#### **B.COM. SEMESTER – II SUBJECT:**Advance Corporate Communication(BM 236)

Teachi	ng Scheme (Hi	r/Week)		Exam Schedule (Marks)	
Lecture	Tutorial	Total	External	Sessional	Total
3	1	4 Hours	<b>60 Marks</b> <b>Theory:</b> 60 Marks (3 Hours)	40 Marks Theory: 36 Marks (1.25 Hours) Assignment: 02 Marks Attendance: 02 Marks	100 Marks

#### A. COURSE CONTENT

NO	TOPIC	COs
[1]	Essentials of Effective BusinessMessages:	CO1
	SevenC's; Various Formats (British and American) forBusinessWriting; Barriers to Communication — Physical Semantic Physosociological Cultural etc.	
[2]	Drafting EffectiveEmails:	CO2
	Placing an Order; Cancelling of Order; Emails for Complaint and Adjustment	CO4
[3]	Life and Fire Insurance: (Communication Related to Life and	CO2
	FireInsurance)	CO6
	<b>Fire:</b> Inquiry about terms and conditions about fire policy — reply; notify about a fireat	
	premises and ask them to arrange an early inspection — reply; letter informing the	
	settlement ofclaim.	
[4]	One Word Substitute:	CO2
	Abbreviation	CO5
	E-Commerce	
	E-Meetings	
	E-Banking	

#### **D. REFERENCE BOOKS**

Refere	nce Books:		
No.	Title	Author	Publication
1	Essentials of Business Communications	RajendraPal &	S. Chand & Sons, New Delhi
1.		J.S. Kothari	
2.	Modern Business Correspondence	L. Gartcide	ELBS
3.	Business Comirei'cia1 Communication	P.M. Mehta	B.S. Shah Pi akashan, A'bad
4.	Modern Commercial Communication	P.M. Mehta	B.S. Shah Prakashan, A'bad
5	Advance Communicative English	Krishna Mohan	Tata McGraw Hill's
з.	Advance Communicative English	&MeenakshiRana	Tata Weblew IIII S
6	Communication Skills	UrmillaRai& S.M	Himalaya Publication
0.	Communication Skins	Rai	Timalaya Tubication
7	The Definitive book of body language	Allan & Barbara	
/•	The Definitive book of body language	Pease	
8	Developing Communication Skills	Krishna Mohan	
0.	Developing Communication Skins	&MeeraBenarji	

### **E. COURSE OUTCOMES**

CO	Skill		Statement
Number			
<b>CO1</b>	Understand an	ıd	Students define the concept of 'Communication'.
	Remember		
<b>CO2</b>	Remember an	ıd	Students construct the steps of cycle of communication.
	Understand		
<b>CO3</b>	Understand		Students evaluate the factors affecting communication.
<b>CO4</b>	Understand an	d	Students execute the steps of effective communication.
	Remember		
<b>CO5</b>	Understand an	d	Students Design the layout for commercial correspondence
	Remember		
<b>CO6</b>	Understand an	d	Students define the concept of 'Communication'.
	Remember		

### F. COURSE MATRIX

	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	3	3	3	2	1	2	2	3	3	2
<b>CO2</b>	3	2	3	3	1	2	2	3	3	1
<b>CO3</b>	3	3	3	3	1	2	2	3	3	2
<b>CO4</b>	3	2	3	3	1	2	2	3	3	1
Avg	3	2.6	3	2.8	1	2	2	3	3	1.6

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[2]	Drafting EffectiveEmails:	CO2
	Placing an Order; Cancelling of Order; Emails for Complaint and Adjustment	CO4
[3]	Life and Fire Insurance: (Communication Related to Life and	CO2
	FireInsurance)	CO6
	<b>Fire:</b> Inquiry about terms and conditions about fire policy — reply; notify about a fireat	
	premises and ask them to arrange an early inspection — reply; letter informing the	
	settlement ofclaim.	
[4]	One Word Substitute:	CO2
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0.	Developing Communication Skins	&MeeraBenarji	

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CO	Skill		Statement
Number			
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	Remember		
<b>CO2</b>	Remember an	ıd	Students construct the steps of cycle of communication.
	Understand		
<b>CO3</b>	Understand		Students evaluate the factors affecting communication.
<b>CO4</b>	Understand an	d	Students execute the steps of effective communication.
	Remember		
<b>CO5</b>	Understand an	d	Students Design the layout for commercial correspondence
	Remember		
<b>CO6</b>	Understand an	d	Students define the concept of 'Communication'.
	Remember		

### F. COURSE MATRIX

	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	3	3	3	2	1	2	2	3	3	2
<b>CO2</b>	3	2	3	3	1	2	2	3	3	1
<b>CO3</b>	3	3	3	3	1	2	2	3	3	2
<b>CO4</b>	3	2	3	3	1	2	2	3	3	1
Avg	3	2.6	3	2.8	1	2	2	3	3	1.6

# **REGULATIONS AND CURRICULUM**

FOR

# **BACHELOR OF DENTAL SURGERY COURSE**

## Our Vision:

Faculty of Dental Science, Dharmsinh Desai University is a centre of excellence for learning and innovation driven by social sensitivity and state-of-the-art technology. The University is amongst the top-rated Educational Institute offering contemporary education, high quality research, and training and consultancy services in Health sciences to suit the ever-changing needs of society.

## **Our Philosophy:**

- To train the students in a way that help them to understand its rationale.
- To Identify, discuss and defend medico-legal, socio-cultural economic and ethical issues as it pertains to rights, equity and justice in access to health care.
- Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non-judgemental and empathetic manner.
- To encourage Research in all the disciplines of health sciences.
- To set the Benchmark in Educational Standards, Policies and Practice.
- To function with spirit of humanity, liberty, integrity, responsibility and togetherness.
- To Demonstrate ability to maintain confidentiality in patient care
- To create and maintain National as well as Global identity.
- To create a rewarding sense of belonging for mutual growth.
- To develop a sense of partnership amongst all.
- To strive hard towards creating human cantered development and building knowledgecantered society and nation.

## Our Strength:

- First Largest and Recognized Deemed Health University of Gujarat State.
- First University in Gujarat to introduce Oral Cancer Centre
- Largest Dental Hospital of Gujarat state having highest patient OPD.

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## SECTION-I

# GOALS OF EDUCATION AND TRAINING IN DENTAL SCIENCE

- The Dental curriculum is oriented towards educating students of B.D.S. course to:
  - 1. Take up the responsibilities as dental surgeon and be capable of functioning independently in both urban and rural environment with special attention to diagnosis, prevention and treatment planning of the society by being abreast to scientifically proven empirical evidence.
  - 2. Provide educational experience that allows hands-on-experience both in hospital as well as in community setting with systematic evidence-based approach.
  - 3. Make maximum efforts to encourage substantial evidence based integrated teaching and de-emphasize compartmentalization of disciplines so as to achieve horizontal and vertical integration in different phases.
  - 4. Offer educational experience that emphasizes health rather than only disease.
  - 5.Use learner-oriented methods, which would encourage clarity of expression, independence of judgment, scientific habits, problem solving abilities, self-initiated and self-directed learning thus making a paradigm shift from passive traditional learning to an active, learner-cantered and result-oriented approach to learning.
  - 6. The changes in Teaching Methodology shall be as following:
  - Addition of active learning methods such as flipped classroom, group discussions, seminars etc,
  - Use of role play, field visits, student exchange and field projects, demonstrations, peer interactions etc.

These will enable students to develop personality, communication skills and other qualities.

 Inculcate in the student the technique to reason out the basic need to understand the evidence, the nature and hierarchy of the evidence, choose the best evidence and how to apply it.

- Towards achieving these goals, the Dental College shall:
  - 1. Evolve institutional objectives, which would be in consonance with the national goals and health policy. The institutional objectives should describe the attributes of their product.
  - 2. Shift the role of Dental teachers from merely imparting knowledge to that of a facilitator and motivator of student learning.
  - 3. Establish a Dental Education Unit for faculty development, preparation of learning resource materials and for improving evaluation methods.
  - 4. Continuous upgradation of the faculty to appraise self and the students in implementation of evidence-based education system.
- Regular periodic assessment shall be done throughout the course. The examinations are designed with a view to assess the knowledge along with practical and clinical skills, habits and values which are necessary for a Graduate to carry out professional day to day work competently.

## **SECTION-II**

## AIM AND OBJECTIVES OF BDS COURSE

#### AIM:

The dental graduates during training in the institutions shall acquire adequate knowledge, necessary skills and such attitudes which are required for carrying out all the activities appropriate to general dental practice involving the prevention, diagnosis and treatment of anomalies and diseases of the teeth, mouth, jaws and associated tissues in line with Evidence based basic and Advanced dental sciences. The graduate shall also understand the concept of community oral health education and be able to participate in the rural health care delivery programs existing in the country. The course aims to cater to an overall multi-dimensional academic upbringing of the student with quality improvement initiatives, evidence-based practice, professional accountability and public expectations.

### **OBJECTIVES:**

The objectives shall deal with (a) Knowledge and Understanding (b) Skills and (c) Attitudes.

- A. Knowledge and understanding-
  - Adequate knowledge of the scientific foundations on which dentistry is based and good understanding of various relevant scientific methods, principles of biological functions and shall be able to evaluate and analyse scientifically various established facts and data.
  - Adequate knowledge of the development, structure and function of the teeth, mouth and jaws and associated tissues both in health and disease and their relationship and effect on general-state of health and also the bearing on physical and social well-being of the patient.
  - Adequate knowledge of clinical disciplines and methods, which provide a coherent picture of anomalies, lesions and diseases of the teeth, mouth and jaws and preventive, diagnostic and therapeutic aspects of dentistry.

- Adequate clinical experience and decision making based on an approach that is beyond the arena of learning to reasoning what is present worldwide.
- Adequate knowledge of biological function and behavior of persons in health and sickness as well as the influence of the natural and social environment on the state of health so far as it affects dentistry.
- Acquire knowledge of basic research methodology and perform research as a part of their dental curriculum.

## B. Skills-

A graduate shall be able to demonstrate the following skills necessary to practice dentistry.

a. Able to diagnose and manage various common dental problems encountered in general dental practice, keeping in mind the expectations and the right of the society to receive the best possible treatment available wherever possible.

b. Skills needed for Evidence Based Practice for e.g., Formulating a question, conducting a literature search, computer skills etc. This will enable the learner to analyse the information at a fairly deep level. Thus, the learner shall be fine-tuned in the skill to delete some information (trivial and redundant), substitute some information and keep some information.

c. Acquire skills to prevent and manage complications if encountered while carrying out various dental surgical and other procedures with scientifically driven inductive techniques to compare published literature as studies, ideas or problems that share a similar concept. This shall foster the synthesis and analysis of information to identify the concept being learned.

d. Possess evidence-based decision skill to carry out required investigative procedures and ability to interpret laboratory findings

e. Inculcate in the student a deliberate practice to concentrate on critical aspects and gradually refining performance through instructor explanatory feedback and repetition.

f. Supporting deliberate practice with feedback information will enlighten learners not only of the correctness of their response but the reason behind a correct or incorrect response. This shall be done through a continuous assessment of both didactic and psychomotor skills and EBES integrated assignments.

- g. Promote oral health and help to prevent oral diseases wherever possible with critical appraisal of observational cross sectional, case control or cohort studies especially pertaining to the Indian sub-continent.
- h. Competent in controlling pain and anxiety during dental treatment.

#### **C.** Attitudes-

A graduate shall develop during the training period the following attitudes-

- i. Willing to apply current knowledge of dentistry in the best interest of the patients and the community.
- j. Maintain a high standard of professional ethics and conduct and apply these in all aspects of professional life.
- k. Seek to improve awareness and provide possible solutions for oral health problems and needs throughout the community.
- I. Willingness to participate in the continuing education programs to update knowledge and professional skills from time to time.
- m. To help &participate in implementation of National Health programs.
- n. To become a creative, flexible and critical in thinking to make treatment effective

#### Program Outcome

- Adequate knowledge of the scientific foundations on which dentistry is based and good understanding of various relevant scientific methods, principles of biological functions and shall be able to evaluate and analyse scientifically various established facts and data.
- Adequate knowledge of the development, structure and function of the teeth, mouth and jaws and associated tissues both in health and disease and their relationship and effect on general-state of health and also the bearing on physical and social well-being of the patient.

- Adequate knowledge of clinical disciplines and methods, which provide a coherent picture of anomalies, lesions and diseases of the teeth, mouth and jaws and preventive, diagnostic and therapeutic aspects of dentistry.
- Adequate clinical experience and decision making based on an approach that is beyond the arena of learning to reasoning what is present worldwide.
- Adequate knowledge of biological function and behaviour of persons in health and sickness as well as the influence of the natural and social environment on the state of health so far as it affects dentistry.
- Adequate training in identifying research questions analyse and interpret existing evidences and use this background for designing pertinent researches
- Acquire a quality of lifelong learning to update with basic and recent advances within the program
- Adopt ethical principles in all aspects of practice.
- Possess Professional honesty and integrity and deliver patient care irrespective of social status, caste, creed or religion of the patient.

The educational literature recognizes four approaches to learning: Receptive, Directive, Guided discovery and Exploratory. Each has its merits, depending on the intended instructional outcome. The oldest and most traditional approach to learning is receptive. In this means of delivering content, the learner is passive. An analogy is that the instructor

opens up the head of the learner, pours in the content, and hopes the brain absorbs it like a sponge. Examples include traditional lecture, a video, or a textbook.

- Although receptive learning environments do not provide active engagement with the content, they can still promote learning.
- In the directive approach, learners gradually build skills and knowledge by progressing from basic to advanced skills. The leaner responds to questions, and the instructors provide corrective feedback. This approach can be use to teach procedural skills for e.g. routine traditional methods of diagnosis and treatment planning.
- Guided discovery learning allows for the development of knowledge and skills through real work-related experiences. Instructors provide relevant problems, resources, and guidance. For e.g., problem or case-based studies and researches conducted by the student in person.
- Exploratory approaches incorporate a collaborative structure whereby learners can exchange ideas and resources with other clinicians with respect to a common outcome goal. Examples of this include use of the Internet to explore current research and evidence-based practice. Many educational activities are a combination of one or more of these approaches. The best approach needs to match the instructional goals and the learner's level of knowledge and skill.

#### \*

Our university, as an instructional planner, has selected the best mix of modes, methods, and learning approaches to achieve the intended educational outcome of course with the greatest credence given to an Evidence Based Education System.

### \*

Thus, in nutshell the Dental curriculum is designed and custom made to:

- **1.** Transfer, translate and integrate basic and research findings into curriculum.
- 2. Involve and integrate health research in teaching and learning.
- **3.** Provide students with focused tasks for research and integration of the same.
- 4. Develop seminars and workshops for faculty and students to provide updates.
- **5.** Practice based on Evidence Based Education System.

## SECTION-III REGULATIONS

1. Eligibility Criteria for admission:

### **1.1. QUALIFYING EXAMINATION-**

A candidate seeking admission to First BDS course:

1.1.1. Shall have passed the Two years Pre-University Examination with English, Physics, Chemistry and Biology,

#### OR

1.1.2. Shall have passed Intermediate examination in Science of an Indian University/Board/Council or other recognized examining bodies with Physics, Chemistry and Biology, which shall include a practical test in these subjects and also English as compulsory subject. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually.

OR

1.1.3. Shall have passed pre- professional/ pre- medical examination with Physics, Chemistry and Biology, after passing either the higher secondary school examination. The pre-professional/ pre- medical examination shall include a practical test in Physics, Chemistry and Biology and also English as compulsory subject.

#### OR

1.1.4. Shall have passed first year of the three-year degree course of a recognized University with Physics, Chemistry and Biology including a practical test in these subjects provided the examination is an 'University Examination' provided that the candidate shall have passed subjects of English, Physics, Chemistry and Biology individually in the pre university or other examinations mentioned in the clauses above. 1.1.5. Shall have passed B.Sc. Examination of an Indian University, provided that he/she has passed the B.Sc. examination with not less than two of the following subjects:

Physics, Chemistry, Biology (Botany, Zoology) provided the candidate has passed subjects of English, Physics, Chemistry and Biology individually in the qualifying examinations mentioned in clause 1.1.1,1.1.2, 1.1.3.

#### AND

1.2. National Eligibility-cum- Entrance Test for admission to BDS course

- There shall be a single eligibility-cum-entrance examination namely "National Eligibilitycum-Entrance Test for admission to BDS course" in each academic year."
- In order to be eligible for admission to BDS Course for a particular academic year, it shall

be necessary for a candidate to obtain minimum of marks of 50<sup>th</sup>percentile in 'National Eligibility cum-Entrance Test to BDS course' held for the said academic year. However, in respect of candidates belonging to Scheduled Castes, Scheduled Tribes, Other Backward Classes, the minimum marks shall be at 40<sup>th</sup>percentile.

In respect of candidates with locomotory disability of lower amendments, the minimum marks shall be at 45<sup>th</sup>percentile. The percentile shall be determined on the basis of highest marks secured in the All-India common merit list in "National Eligibility-cum-Entrance Test for admission to BDS course."

 Provided when sufficient number of candidates in the respective categories fail to secure minimum marks as prescribed in National Eligibility-cum-Entrance Test held for any academic year for admission to BDS Course, the Central Government in consultation with Dental Council of India may at its discretion lower the minimum marks required for admission to BDS Course for candidates belonging to respective categories and marks so lowered by the Central Government shall be applicable for the said academic year only.

- The reservation of seats in dental colleges for respective categories shall be as per applicable laws prevailing in States/Union Territories. An all-India merit list as well as Statewise merit list of the eligible candidates shall be prepared on the basis of the marks obtained in National Eligibility-cum-
- Entrance Test and candidates shall be admitted to BDS course from the said lists only.
- No Candidate who has failed to obtain the minimum eligibility marks as prescribed in Clause (ii.) above shall be admitted to BDS course in the said academic year.
- All admissions to BDS course within the respective categories shall be based solely on marks obtained in the National Eligibility-cum-Entrance Test.
- To be eligible for admission to BDS Course, a candidate must have passed in the subjects of Physics, Chemistry, Biology/Biotechnology and English individually and must have obtained a minimum of 50% marks taken together in Physics, Chemistry and Biology/Biotechnology at the qualifying examination as mentioned in Sub-regulation 2 of Regulation I and in addition must have come in the merit list of "National Eligibility-cum-Entrance Test" for admission to BDS course. In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or other Backward Classes the minimum marks obtained in Physics, Chemistry and Biology/Bio-technology taken together in qualifying examination shall be 40% instead of 50%. In respect of candidates with locomotory disability of lower limbs in terms of sub-regulation 4, after the commencement of these amendments, of Regulation 1 above, the minimum marks in qualifying examination in Physics, Chemistry and Biology/Bio-technology taken together in qualifying examination in Physics, Chemistry and Biology/Bio-technology taken together in a qualifying examination in Physics, Chemistry and Biology/Bio-technology taken together in qualifying examination in Physics, Chemistry and Biology/Bio-technology taken together in qualifying examination in Physics, Chemistry and Biology/Bio-technology taken together in qualifying examination in Physics, Chemistry and Biology/Bio-technology taken together in qualifying examination in Physics, Chemistry and Biology/Bio-technology taken together in qualifying examination shall be 45% instead of 50%.
- Provided that a candidate who has appeared in the qualifying examination the result of which has not been declared, he/she may be provisionally permitted to take up the National Eligibility-cum-Entrance Test and in case of selection for admission to the BDS course, he/she shall not be admitted to that course until he fulfils the eligibility criteria under Regulation 1.

### 1.3. Common Counselling:

- 1.3.1. There shall be a common counselling for admission to BDS course in all dental educational institutions on the basis of merit list of the National Eligibility-cum-Entrance Test.
- 1.3.2. The designated authority for counselling for the 15% All India Quota seats of the contributing States and all BDS seats of Dental Education Institutions of the Central Government universities established by an Act of Parliament and the Deemed Universities shall be the Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India.
- 1.3.3. The counselling for admission to BDS course in a State/Union Territory, including Dental Education Institutions established by the State Government, University established by an Act of State/Union Territory Legislature, Trust, Society, and Minority Institutions shall be conducted by the State/Union Territory Government.
- 1.3.4. In case any dispute arises on such common counselling, the respective State Government shall refer the matter to the Central Government and its decision shall be final, in this regard.
- 2. Age Limit:

The candidate shall have completed the age of 17 years at the time of admission or shall complete this age on 31<sup>st</sup> December of the year in which he/she seeks admission.

3. Duration of the course:

Is a total of FOUR Academic years and ONE year of rotating Internship program. There shall be at least 240 teaching days in each Academic year.

Any student who does not clear the BDS course in all subjects within a period of 9 years, including one-year compulsory rotary paid internship from the date of admission shall be discharged from the course.

4. Titles and Year Wise Distribution of the Subjects for Study:

## FIRST YEAR BDS-

- 1. General Human Anatomy including Embryology and Histology
- 2. General Human Physiology and Biochemistry, Nutrition and Dietetics
- 3. Dental Anatomy, Embryology and Oral Histology
- 4. Dental Materials
- 5. Preclinical Prosthodontics and Crown & Bridge
- 6. Management science
- 7. Behavioural science

## SECOND YEAR BDS-

- 1. General Pathology and Microbiology
- 2. General and Dental Pharmacology and Therapeutics
- 3. Dental Materials
- 4. Oral Pathology & Oral Microbiology
- 5. Preclinical Prosthodontics and Crown & Bridge
- 6. Preclinical Conservative Dentistry & Endodontics

### THIRD YEAR BDS-

- 1. General Medicine
- 2. General Surgery
- 3. Oral Pathology and Microbiology
- 4. Oral Medicine and Radiology
- 5. Public Health Dentistry
- 6. Prosthodontics and Crown & Bridge
- 7. Periodontology
- 8. Oral & Maxillofacial Surgery
- 9. Conservative Dentistry & Endodontics
- 10. Orthodontics & Dentofacial Orthopaedics
- 11. Paediatric& Preventive Dentistry

## FOURTH YEAR BDS-

- 1. Oral Medicine and Radiology
- 2. Public Health Dentistry
- 3. Prosthodontics and Crown & Bridge
- 4. Periodontology
- 5. Oral & Maxillofacial Surgery
- 6. Conservative Dentistry & Endodontics
- 7. Orthodontics & Dentofacial Orthopaedics
- 8. Paediatric& Preventive Dentistry
- 5. Teaching Hours:

The Teaching hours for each subject from First to Fourth year – Theory and Practical/Clinical are shown in the Tables I to VI-

# TABLEI: TOTAL TEACHING/LEARNING HOURS FOR BDS PROGRAM-

Sr.	Subject	Lecture	Practical	Clinical	Total
No.	,	Hours	Hours	Hours	Hours
1	General Human Anatomy including Embryology, Osteology & Histology	100	175	-	275
2	General Human Physiology	120	60	-	180
	Biochemistry, Nutrition& Dietetics	70	60	-	130
3	Dental Materials	80	240	-	320
4	Dental Anatomy, Embryology and Oral Histology	105	250	-	355
5	Dental Pharmacology and Therapeutics	70	20	-	90
6	General Pathology	55	55	-	110
	Microbiology	65	50	-	115
7	General Medicine	60	-	90	150
8	General Surgery	60	-	90	150

9	Oral Pathology and Microbiology	145	130	-	275
10	Oral Medicine and Radiology	65	-	170	235
11	Paediatric& Preventive Dentistry	65	-	170	235
12	Orthodontics & Dental Orthopaedics	50	80	140	220
13	Periodontology	80	-	170	250
14	Oral & Maxillofacial Surgery	70	-	270	340
15	Conservative Dentistry & Endodontics	135	200	370	705
16	Prosthodontics and Crown & Bridge	135	300	370	805
17	Public Health Dentistry including Lectures on Tobacco Control & Habit Cessation	60	-	200	260
	Total	1596	1540	2070	5200

# TABLE –II: TEACHING HOURS FOR FIRST YEAR BDS

Sr.	Subject	Lecture	Practical	Total
No.		Hours	Hours	Hours
01	General Human Anatomy including Embryology,	100	175	275
	Osteology and Histology			
02	General Human Physiology,	120	60	180
03	Biochemistry, Nutrition and Dietetics	70	60	130
04	Dental Anatomy, Embryology, and Oral Histology	105	250	355
05	Dental Materials	20	40	60
06	Preclinical Prosthodontics and Crown & Bridge	-	100	100
07	Management Science	40	-	40
08	Behavioral Science	20	-	20
	Total	475	685	1160

# TABLE –III: TEACHING HOURS FOR SECOND YEAR BDS

Sr. No.	Subject	Lecture Hours	Practical Hours	Total Hours
01	General and Dental Pharmacology and Therapeutics	70	20	90
02	General Pathology	55	55	110
03	Microbiology	65	50	115
04	Dental Materials	60	200	260
05	Oral Pathology and Microbiology	25	50	75
06	Pre-clinical Prosthodontics and Crown & Bridge	25	200	225
07	Pre-clinical Conservative Dentistry	25	200	225
	Total	325	725	1050

# TABLE-IV: TEACHING HOURS FOR THIRD YEAR BDS

Sr. No.	Subject	Lecture Hours	Practical Hours	Clinical Hours	Total Hours
01	General Medicine.	60	-	90	150
02	General Surgery.	60	-	90	150
03	Oral Pathology and Microbiology.	120	80	-	200
04	Oral Medicine and Radiology	20	-	70	90
05	Conservative Dentistry & Endodontics.	30	-	70	100
06	Oral & Maxillofacial Surgery.	20	-	70	90
07	Orthodontics & Dentofacial Orthopaedics.	20	-	80	100
08	Paediatric& Preventive Dentistry.	20	-	70	90
09	Periodontology.	30	-	70	100
10	Prosthodontics and Crown & Bridge.	30	-	70	100
11	Public Health Dentistry	40	-	56	96
	Total	450	80	736	1270

# TABLE –V: TEACHING HOURS FOR FOURTH YEAR BDS

Sr. No.	Subject	Lecture Hours	Practical Hours	Clinical Hours	Total Hours
01	Oral Medicine and Radiology.	45	-	100	145
02	Orthodontics & Dentofacial Orthopedics.	30	30	70	130
03	Paediatric& Preventive Dentistry.	45	-	100	145
04	Periodontology.	50	-	100	150
05	Oral & Maxillofacial Surgery.	50	-	200	250
06	Prosthodontics and Crown and Bridge.	80	-	300	380
07	Conservative Dentistry & Endodontics.	80	-	300	380
08	Public Health Dentistry.	60	-	200	260
	Total	440	-	1420	1860

### 6. EXAMINATION

**6.1** INTERNAL ASSESSMENT EXAMINATIONS:

- 6.1.1 The Internal assessment examination for each year of BDS course shall be conducted by the authorities of the dental college.
- 6.1.2 There shall be THREE Internal examinations (including Preliminary examination) during each year of BDS course. All these three internal examinations are compulsory and shall include Theory as well as Practical/Clinical examination. The average marks of these examinations shall be considered for calculation of internal assessment marks.
- 6.1.3 The First Internal examination (TERMINAL): shall be conducted at the end of First term of the academic year in the following manner-
  - Theory examination- It shall consist of 100 marks with two sections-I & II. Section I and II shall have Two long questions of 15 marks each two short notes to attempted out of three for 5 marks each and five multiple choice questions of 2 marks each.
  - Practical/ Clinical examination- It shall consist of 100 marks according to the scheme of respective departments.
- 6.1.4 The Second Internal examination: shall be conducted in the mid of the second term of the academic year in the following manner-
  - Theory examination- It shall consist of 100 marks having 50 MCQ for 2 Marks each.
  - Practical/ Clinical examination- It shall consist of 100 marks. For subjects of I, II and III BDS the marks obtained by the candidate in the practical examination conducted in the II term at the level of the respective Department shall be considered for the second internal examination. For IV BDS the marks obtained by the candidate in the practical examination at the end of four clinical postings by the respective department shall be considered for the second internal examination at the second internal examination.

- 6.1.5 The Third Internal examination: called as the Preliminary examination shall be completed at least 21 days prior to the University examination and shall be conducted in the following manner-
  - Theory examination- It shall consist of 100 marks with two sections-I & II. Section I and II shall have Two long questions of 15 marks each two short notes to attempted out of three for 5 marks each and five multiple choice questions of 2 marks each.
  - Practical/ Clinical examination- It shall consist of 100 marks according to the scheme of respective departments.
- 6.1.6 The changes in Internal Assessment marks pattern shall be as following:
  - The Internal examination marks and Continuous cumulative evaluation system (CCES) should be considered out of ten marks each then added and averaged in both theory and practical.
  - The internal assessment marks in the subject of Pre-clinical Prosthodontics and Pre-clinical Conservative Dentistry shall be calculated out of 20 marks.

#### The changes in Internal Assessment marks pattern shall be as following:

- 6.1.7 The marks obtained by the candidate in all the three internal examinations shall be considered for calculating 60% of the total internal assessment marks.
- 6.1.8 The remaining 40 % of the internal assessment marks shall be calculated from the Continuous cumulative evaluation system (CCES) earned by the student in Theory and Practical's/clinical individually.
- 6.1.9 The internal assessment marks for the subject of Evidence Based Dentistry shall comprise of twenty (20) marks which will be the total of the two assignments of ten (10) marks each.

- 6.1.10 The Internal Marks shall be known to students before they appear for university theory examination.
- 6.1.11 The Internal Assessment marks shall be submitted to the Dean, by the HOD of each department in the time period prescribed by the office. The Dean, shall submit these marks to the Controller of Examinations.

### **6.2** UNIVERSITY EXAMINATION:

6.2.1 Eligibility Criteria

6.2.1.1 Attendance:

- Every candidate shall fulfil at least 75 %of the attendance during each academic year of the BDS course; separately for both- Theory and Practical/ Clinical in the exam going subjects.
- In case of a subject in which there is no examination at the end of the academic year/semester, the percentage of attendance shall not be less than 70%.
- The candidate shall be detained only in that subject/s in which the attendance is below 75% and/or work quota is not complete.
- On extreme compassionate grounds, the Dean refers the matter to the Student Reform's Committee for authorization to grace Five percent of the attendance, for both- Theory and Practical/ Clinical.
- Student should obtain NOC for successfully attending EBD module. Student fails to do so shall not be allowed to appear for the university examination for all subjects of that year.

## 6.2.1.2 Progress and Conduct:

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- Every candidate shall maintain a Work done record book/journal containing the details of work done during the training program.
- Every candidate shall complete the Work quota as designed by the department. The satisfactory work completion certificate shall be certified by the subject in-charge and the Head of the department.
- Every candidate shall satisfactorily complete the assignments allotted by the respective departments.
- The candidate appearing for the university examination shall fulfil the prescribed requirements of all subject appearing departments and submit the following certificates/ copies of certificates along with the Examination Form to the Controller of Examination:
  - A copy of mark sheet of Last university examination.
  - An NOC from the Student section, Account Section, Hostel, Mess, Learning Resource Centre, which then will be countersigned by Dean.

## 6.2.2. SCHEME OF UNIVERSITY EXAMINATION:

- 6.2.2.1. The Undergraduate Course shall have TWO University Examinations in each Academic year:
  - The Regular Annual examination shall be conducted at the end of One full academic year as follow:
    - I B.D.S. Examination at the end of first academic year.
    - II B.D.S. Examination at the end of second academic year.
    - III B.D.S. Examination at the end of third academic year.
    - IV B.D.S. Examination at the end of fourth academic year.
  - Supplementary Examination:

The supplementary examination for Unsuccessful candidate of First, Second, Third, and Fourth BDS shall be conducted not before FOUR months and not after SIX months from the date of declaration of results.

- 6.2.2.2. The University Examination shall consist of:
  - Written/Theory examination
  - Clinical and /or Practical examination
  - Viva-Voce examination

6.2.2.2.1. Written/Theory Examination:

- A. Following shall be the Subjects & Titles of papers for University examinations:
  - First B.D.S. Examination:
    - General Anatomy including Embryology and Histology
    - Seneral Human Physiology and Biochemistry, Nutrition and Dietetics
    - > Dental Anatomy, Embryology and Oral Histology.

- Second B.D.S. Examination:
  - General and Dental Pharmacology and Therapeutics
  - ➤ General Pathology and Microbiology
  - ➤ Dental Materials
  - Evidence Based Dentistry
- Third B.D.S. Examination:
  - ➤ General Medicine
  - ➤ General Surgery
  - > Oral Pathology and Microbiology
  - ➤ Evidence Based Dentistry
- Fourth B.D.S. Examination:
  - Oral Medicine and Radiology
  - Paediatric and Preventive Dentistry
  - > Orthodontics and Dentofacial Orthopaedics
  - > Periodontology
  - > Oral & Maxillofacial Surgery
  - Prosthodontics including Crown & Bridge
  - Conservative Dentistry and Endodontics
  - Public Health Dentistry
  - ➤ Evidence Based Dentistry
- B. Format of University Theory Question Paper:
  - The Theory paper for all the subjects shall be of total 70 Marks and of Three hours duration.

- The Theory paper shall consist of Two sections viz. Section I& Section II. Each Section shall consist of total 35 marks.
- Each Section shall comprise of Compulsory Two Long questions of 10 marks each (with one option in the second long question), 02 out of 03 Short Notes of 05 marks each and 05 MCQs of 01 mark each.
- The FIRST long answer question shall be from the "MUST to KNOW" syllabus, the SECOND long answer questions shall be from "GOOD to KNOW" and/or "DESIRABLE to KNOW "syllabus. The short notes and the MCQs shall be a mix of "MUST to KNOW", "GOOD to KNOW" and/or "DESIRABLE to KNOW"
- There shall be NO theory examination for Pre-clinical Prosthodontics and Preclinical Conservative & Endodontics.

6.2.2.2.2. Clinical and /or Practical Examination:

- There shall be practical/clinical examinations in all the subjects except for evidence Based Dentistry (EBD). The Clinical or Practical examination shall aim at examining clinical skills and competence of candidates.
- The Practical examinations for all the subjects shall consist of total 90 marks.
- The Practical examinations for Preclinical Prosthodontic and Preclinical Conservative & Endodontics shall be of 80 marks (including 20 marks for Viva Voce).

6.2.2.3 Viva-voce examination:

- The Viva-voce examination shall aim at assessing depth of knowledge, logical reasoning, confidence and verbal communication skills.
- There shall be Viva-voce examination of 20 marks for all the subjects except for Evidence Based Dentistry. Marks obtained in the viva-voce examination shall be added to the marks obtained in the theory examination.

# 7. ELIGIBILITY CRITERIA FOR DECLARING PASS:

- 7.1. A candidate shall secure an aggregate of 50% of total marks allotted in both- theory and in practical / clinical examination independently, so as to be declared as Pass in the university examination.
  - For passing in Theory examination, a candidate shall secure 50% marks in aggregate i.e. marks obtained in university Written examination, Vivavoce examination and Internal assessment (theory) combined together i.e. fifty out of One hundred marks.
  - For passing in the university Practical/clinical examination, a candidate shall secure 50% marks in aggregate i.e. Practical / Clinical and Internal Assessment combined together i.e. fifty out of One hundred marks.
  - In case of Pre-clinical Prosthodontics and Pre-clinical Conservative Dentistry in II BDS, where there is no written examination, for passing, the candidate shall secure 50% of marks in University Practical examination, Viva voce and Internal Assessment combined together i.e. fifty out of One hundred marks.
  - For Evidence Based Dentistry only grades shall be awarded.
- 7.2. A candidate, securing less than 50% marks shall be declared as Failed in the said examination.
- 7.3. A candidate, who has passed all the subjects, shall be allowed to appear for the next higher BDS Class University Examination.

## 8. ELIGIBILITY CRITERIA TO APPEAR IN SUPPLEMENTARY EXAMINATION:

8.1. The candidate failing in any subject/subjects of the university examination shall appear for the supplementary examinations.

- 8.2. The failed candidate shall compulsorily appear in both- Theory as well as Practical / Clinical examination irrespective of failing in either of them.
- 8.3. The unsuccessful candidate can appear for multiple number of times / attempts to clear the BDS University examination provided he/she should be able to complete the course including 1 year of internship within 9 years from the date of joining the course.
- 8.4. The failed candidate shall pay the required fees for the failed period.

The Internal assessment marks for the unsuccessful candidate shall be counted from the examinations conducted between the last University examination and forthcoming examination. The internal assessment marks shall be considered as best out of the two (between previous and present internal assessment marks).

### 9. ALLOWED TO KEEP THE TERM (ATKT):

- 9.1. ATKT will be granted in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> year of BDS only if the candidate fails in one subject.
- 9.2. The ATKT candidate shall undergo all the examinations as scheduled for them from time to time during the period between the last examination and forthcoming examination.
- 9.3. The ATKT candidate shall pay the required fees for the ATKT period as prescribed by the university.
- 9.4. The Internal assessment marks for the subject in which ATKT is granted shall be counted from the examinations conducted between the last University examination and forthcoming examination. The internal assessment marks shall be considered as best out of the two (between previous and present internal assessment marks).
- 9.5. The candidate shall have to pass the ATKT subject before he/she is permitted to appear for the next higher examination.

### 10. AWARD /DISTINCTION/ UNIVERSITY RANKS:

10.1. A candidate, who has successfully passed in all the academic years of BDS course and successfully completed the compulsory rotating one year Internship program, shall be granted a degree of Bachelor of Dental Surgery.

- 10.2. The successful candidate will be awarded Class/ Distinctions as prescribed by the University guidelines.
- 10.3. The successful candidate/s who have secured highest marks either subject wise or on aggregate in first attempt shall be declared as Topper in aggregate or in the concerned subject/s.

## SECTION-IV

## **BDS COURSE CURRICULUM**

# FIRST YEAR BDS

## **GENERAL HUMAN ANATOMY**

(Including Embryology, Osteology and Histology)

## INTRODUCTION

What is Human Anatomy?

It is a branch of science which deals with the structure of Human Body.

Aim:

The students should know structural, functional, histological and developmental anatomy of head and neck as relevant to first year BDS course

#### Objectives:

At the end of the First year BDS course in Anatomical Sciences the Undergraduate student is expected to:

- 1. Know and demonstrate the normal disposition of structures in head and neck region.
- 2. Know and demonstrate the inter-relationship of various structures.
- 3. Know and demonstrate the clinical correlation of various structures
- 4. Know and demonstrate the microscopic structures of various tissues related to head and neck
- 5. Know and demonstrate the basic components of nervous system with clinical correlates
- 6. Know and demonstrate the basis of abnormal development
- 7. Know and demonstrate the sectional anatomy of head and neck and its correlation to modern imaging techniques.
- 8. Know and identify the microscopic anatomy

#### COURSE OUTCOMES ASSESSED:

Were the students able to: Describe the normal disposition of the structures in the body while clinically examining a patient and while conducting clinical procedures. Describe the anatomical basis of disease and injury. Know the microscopic structure of the various tissues, a pre-requisite for understanding of the disease processes. Know the nervous system to locate the site of lesions according to the sensory and or motor deficits encountered. Explain the basis of abnormal development, critical stages of development, effects of teratogens, genetic mutations and environmental hazards. Know the sectional anatomy of head neck and brain to read the features in radiographs and pictures taken by modern imaging techniques. Know the anatomy of cardio-pulmonary resuscitation. To locate various structures of the body and to mark the topography of the living anatomy. To identify various tissues under microscope. To identify the features in radiographs and modern imaging techniques. To detect various congenital abnormalities.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION				
1. General Anatomy					
1.1 Introduction, subdivisions of Anatomy	Must to Know				
1.2 Anatomical terms and planes	Must to Know				
1.3 Connective tissue- Superficial and deep fascia, modifications of deep fascia	Must to Know				
1.4 Bone- Classification, Ossification and growing ends of bone, Structure and Blood supply	Must to Know				
1.5 Muscles- Classification and mode of action	Must to Know				
1.6 Joints- Classification with examples, Typical synovial joint Axis of movement	Must to Know				
<ol> <li>Circulatory system including Anastomosis and collateral circulation , Portal system of veins</li> </ol>	Must to Know				
<ol> <li>1.8 Nervous system- Central and peripheral nervous system, Autonomic Nervous System, Reflex arc, Spinal nerve</li> </ol>	Must to Know				
2. Neuroanatomy					
2.1 Meninges, Dural Venous sinuses	Must to Know				
2.2 Subdivisions of nervous system and Ventricles of brain	Must to Know				
2.3 Attachment of Cranial Nerves on the base of brain	Good to Know				
2.4 Medulla, Pons and Mid brain – localization of cranial nerve nuclei	Must to Know				
$2.53^{ra}$ , $4^{tn}$ , $5^{tn}$ , $6^{tn}$ , $7^{tn}$ , $9^{tn}$ and $12^{tn}$ Cranial nerves	Desirable to Know				
2.6 1 <sup>st</sup> ,2 <sup>nd</sup> ,10 <sup>th</sup> and 11 <sup>th</sup> Cranial nerves	Must to Know				
2.7 Pituitary gland	Good to Know				
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2.8 Blood supply of brain	Desirable to Know				
2.9 Functional areas of brain	Desirable to Know				
3. Gross Anatomy of Head & Neck					
3.1 Scalp	Must to Know				
3.2 Face including facial nerve and lacrimal apparatus	Must to Know				
3.3 Cervical fascia- General investing layer, Pre tracheal and Pre vertebral fascia, Carotid sheath and contents	Must to Know				
3.4 Anterior and posterior Triangles of neck including and spinal accessory nerve	Must to Know				
3.5 Carotid system of arteries, Internal Jugular Vein, Subclavian artery	Must to Know				
3.6 Cranial cavity including muscles of eye ball, vessels and nerves of orbit	Must to Know				
3.7 Parotid gland and facial nerve	Must to Know				
3.8 Temporal and infra temporal fossa including maxillary artery, mandibular nerve and muscles of mastication, Pterygopalatine fossa and maxillary nerve	Must to Know				
3.9 Temporo-mandibular joint	Must to Know				
3.10 Sub mandibular region including sub mandibular and gland sub lingual salivary glands	Must to Know				
3.11 Thyroid and parathyroid gland	Must to Know				
3.12 Oral cavity, tongue, Hypoglossal nerve, Hard and soft palate	Must to Know				
3.13 Pharynx, Palatine tonsil, pharyngotympanic tube and glossopharyngeal nerve	Must to Know				
3.14 Larynx, Nasal cavity and paranasal air sinuses	Must to Know				
3.15 Cervical plexus and sympathetic ganglia	Good to Know				
3.16 Joints of neck	Must to Know				
3.17 Cervical part trachea, esophagus	Must to Know				
4. Embryology					
4.1 General embryology complete- Oogenesis, Spermatogenesis, Fertilisation, Placenta, Primitive streak, Neural crest, Bilaminar and Trilaminar Disc, Intra-embryonic mesoderm	Must to Know				
4.2 Formation and fate of Notochord	Must to Know				
4.3 Branchial apparatus- formation and fate	Must to Know				
4.4 Congenital abnormalities of branchial apparatus	Good to Know				
4.5 Development of face, hard palate, nasal cavity and paranasal sinuses,	Must to Know				
4.6 Congenital Abnormalities, face, palate	Must to Know				
4.7 Development of Tongue, thyroid gland and pituitary	Must to Know				
4.8Temporo-mandibular joint.	Must to Know				
5. Histology					
5.1 General histology Epithelium, Glands, Cartilage, Bone, Must to Know					

Lymphoid tissue, Skeletal, Cardiac and Smooth muscle, Blood	
Vessels, Nervous Tissue	
5.2Intra membranous and endochondral ossification	Must to Know
5.3Skin, tongue and lip	Must to Know
5.4Salivary glands	Must to Know
5.5Endocrine glands (Thyroid, Para thyroid, Pituitary)	Must to Know
5.6Trachea and esophagus	Must to Know
5.7Fundus of stomach	Desirable to Know
5.8Spinal cord	Desirable to Know
6. Structures important to clinical procedures	Must to Know
6.1 Muscles- Deltoid and Axillary nerve, Gluteus maximus and	Must to Know
Sciatic nerve, Vastus lateralis, Triceps and Radial nerve	
6.2Veins- Cephalic, Basilar, Median cubital and Long Saphenous	Must to Know
6.3 Arterial pulsations- Axillary, Brachial, Radial, Carotid, Facial,	Must to Know
Superficial temporal, Femoral, Popliteal and Dorsalis Pedis	
6.4Anatomy of Lumbar puncture	Must to Know

# **B. PRACTICAL:**

- 1. The student will dissect and demonstrate the following:
- Scalp
- Face including facial nerve and lacrimal apparatus
- Cervical fascia- General investing layer, Pre tracheal and Prevertebral fascia, Carotid sheath and contents
- Anterior and posterior Triangles of neck including and spinal accessory nerve
- Carotid system of arteries, Internal Jugular Vein, Subclavian artery
- Cranial cavity including muscles of eye ball, vessels and nerves of orbit
- Parotid gland and facial nerve
- Temporal and infra temporal fossa including maxillary artery, mandibular nerve and muscles of mastication, Pterygopalatine fossa and maxillary nerve.
- Temporo-mandibular joint
- Sub mandibular region including sub mandibular and gland sub lingual salivary glands
- Thyroid and parathyroid gland
- Oral cavity, tongue, Hypoglossal nerve, Hard and soft palate and Pharynx, Palatine tonsil, pharyngotympanic tube and glossopharyngeal nerve
- Larynx
- Nasal cavity and paranasal air sinuses
- Cervical part of trachea and esophagus
- Cervical plexus and sympathetic ganglia
- Joints of neck

• Thoracic and abdominal viscera

## 2. Osteology Demonstration:

- Skull
  - Norma verticalis
  - o Norma frontalis
  - $\circ$ Norma lateralis  $\circ$
  - Norma Basalis o
  - Interior of skull
  - o Frontal, Parietal, Occipital and Temporal bones.
  - $_{\odot}$  Maxillary and Sphenoid bones
- Mandible

## 3. Histology Practical:

- Epithelium
- Glands
- Cartilage
- Bone
- Lymphoid tissue
- Skeletal, Cardiac and smooth muscle.
- Blood vessels
- Nervous tissue
- Skin, Tongue and Lip
- Salivary glands
- Endocrine glands
- Trachea and Oesophagus.

# C. RECOMMENDED BOOKS

S.No.	Title	Author	Publisher
1	Anatomy of Head, Neck and Brain	Vishram Singh	Elsevier
	Dialit		
2	T.B. General Anatomy	Shobha	Jaypee
		RawlaniShivlalRawlani	
3	T.B. Clinical Embryology	Vishram Singh	Elsevier
4	Practical Manual of Histology	Neelkanth B Kote	Jaypee

5	Grant's Dissector	Patrick W Tank	Wolters Kluwer
6	Exam Oriented Anatomy for Dental Students	Dr. S.N.Qazi	CBS
7	T.B. Human Osteology	I.B.Singh	Jaypee

## **REFERENCE BOOKS**

S.No.	Title	Author	Publisher
1	Clinical Anatomy for Medical Students	Richard S. Snell	Wolters Kluwer
2	Gray's Anatomy	Williams	Churchill Livingstone

## A. EXAMINATION SCHEME

- a. INTERNAL EXAM
  - First internal (Theory/Practical): 20 Marks
  - Second internal (Theory/Practical): 20 Marks
  - Third Internal (Theory/Practical): 60 Marks

## b. University Exam:

As per University rules.

## PHYSIOLOGY

## **DEFINITION:**

Human physiology is the study of living organs of the body.

## INTRODUCTION:

1. Aim:

The broad goal of teaching of undergraduate student in Human physiology aims at providing the student comprehensive knowledge of the normal function of the organ systems of the body to facilitate an understanding of the physiological basis of the health and disease.

2. Objectives:

At the end of the course the student shall be able to

- Explain the normal functioning of all the organ systems and their interactions for well-coordinated total body function:
- Assess the relative contribution of each organ system to the maintenance of milieu interieur.
- Elucidate the physiological aspects of normal growth and development.
- Describe the physiological response and adaptations to environmental stresses.
- List the physiological principles underlying pathogenesis and treatment of disease.
- 3. Scope:

At the end of the course the student shall be able to

- Conduct experiments designed for study of physiological phenomena.
- Interpret experimental / investigative data
- Distinguish between normal and abnormal data derived as a result of tests which he / she has performed and observed in the laboratory.

## COURSE OUTCOMES ASSESSED:

Were the students able to: Explain the normal functioning of all the organ systems and their interactions for well-co-ordinated total body function. Assess the relative contribution of each organ system towards the maintenance of the milieu interior. List the physiological principles underlying the pathogenesis and treatment of disease. Conduct experiments designed for the study of physiological phenomena. Interpret experimental and investigative data. Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

# A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION		
1. Introduction			
1.1 Cell	Must to Know		
1.2 Tissue	Must to Know		
1.3 Organ	Must to Know		
2. Structure of Cell			
2.1 Cell Membrane (C.M.)	Must to Know		
2.2 Composition of C.M.	Good To Know		
2.3Structured Model of C.M.	Desirable To Know		
2.4Cytoplasm	Must to Know		
2.5Organelle & Their functions	Must to Know		
2.6Nucleus	Must to Know		
3. Gene	i		
3.1 Chromosome	Must to Know		
3.2 Chromatin	Must to Know		
3.3 Gene expression	Good To Know		
3.4 Genetic disorder	Desirable To Know		
4. Cell Death	Must to Know		
5. Cell Adaptation	Must to Know		
6. Cell Degeneration	Must to Know		
7. Cell Aging	Must to Know		
8. Cell Junction - Definition & Classification	Must to Know		
9. Tight junction	Must to Know		
10. Gap Junction	Must to Know		
11. Chemical Synapse	Must to Know		
12. Anchoring Junction	Good to know		
13. Cell Adhesion Molecule	Desirable to Know		
14. Transport Through Cell Membrane – Introduction	Must to Know		
15. Basic Mechanism	Must to Know		
16. Passive Transport	Must to Know		
17. Diffusion			
17.1 Simple	Must to Know		
17.2 Facilitated	Must to Know		
18. Osmosis	Must to Know		
19. Bulk Flow	Good To Know		
20. Filtration	Good To Know		
21. Factor affecting diffusion	Must to Know		
22. Active Transport – Primary, Secondary	Must to Know		
23. Endocytosis – Pinocytosis, Phagocytosis	Must to Know		
24. Exocytosis	Must to Know		

25. Receptor mediated endocytosis	Good To Know
26. Transcytosis	Good To Know
27. Molecular motors, Ion channel disease	Desirable To Know
28. Homeostasis	
28.1 Introduction	Must to Know
28.2 Mileu Interior	Must to Know
28.3 Claude Bernard Theory	Good to Know
28.4 Mileu Exterior	Desirable to Know
29. Role of Various system	Must to Know
30. Feedback mechanism	Must to Know
31. Regulation of feedback system	Good to Know
32. Altered feedback system	Desirable to Know
33. Acid – Base Balance – Introduction	Must to Know
34. H $^+$ ion and pH	Must to Know
35. Regulation of Acid –Base balance	Must to Know
36. Determination of Acid	Good to Know
37. Disturbance of Acid – Acidosis, Alkalosis	Good to Know
38. Clinical Evaluation	Must to Know
39. Body Fluids	
39.1 Introduction	Must to Know
39.2 Significance	Must to Know
39.3 Composition	Must to Know
39.4 Measurement	Good to Know
39.5 Concentration	Good to Know
39.6 Maintenance	Good to Know
39.7Applied Physiology (Dehydration & Over hydration)	Desirable to Know
40. Blood	
40.1 Introduction	Must to Know
40.2 Properties of blood	Must to Know
40.3 Composition of blood	Must to Know
40.4 Function	Must to Know
40.5 Serum	Good to Know
41. Plasma Protein	
41.1 Introduction	Must to Know
41.2 Normal Values	Must to Know
41.3 Properties	Must to Know
41.4 Origin	Must to Know
41.5 Function	Must to Know
41.6 Seperation	Good to Know
41.7 Plasmapheresis	Desirable to Know
42. RBC	-
42.1 Introduction	Must to Know
42.2 Normal Values	Must to Know
42.3 Properties	Must to Know
42.4 Life span & Fate	Must to Know

42.5 Function	Must to Know
42.6 Physiological Variation in number	Must to Know
42.7 Pathological Variation in number	Good to Know
42.8 Variation in Size	Good to Know
42.9 Variation in structure	Desirable to Know
43. Erythropoesis	
43.1 Definition	Must to Know
43.2 Site of Erythropoesis	Must to Know
43.3 Process of Erythropoesis	Good to Know
43.4 Factors necessary for Erythropoesis	Desirable to Know
44. Haemoglobin and Iron metabolism	·
44.1 Introduction	Must to Know
44.2 Normal Value	Must to Know
44.3 Function	Must to Know
44.4 Structure	Must to Know
44.5 Normal Haemoglobin	Must to Know
44.6 Iron metabolism	Must to Know
44.7 Abnormal Haemoglobin	Good to Know
44.8 Synthesis and destruction	Good to Know
44.9 Abnormal Haemoglobin Derivatives	Desirable to Know
45. Erythrocyte Sedimentation Rate	
45.1 Introduction	Must to Know
45.2 Normal Values	Must to Know
45.3 Significance	Must to Know
45.4 Determination	Good to Know
45.5 Variation	Good to Know
45.6 Factors affecting	Desirable to Know
46. Packed Cell Volume	
46.1 Definition	Must to Know
46.2 Significance	Must to Know
46.3 Normal Value	Must to Know
46.4 Blood Indices	Must to Know
46.5 Determination	Good to Know
46.6 Variation	Good to Know
46.7 Calculation of blood indices	Good to Know
47. Anaemia	
47.1 Introduction	Must to Know
47.2 Classification	Must to Know
47.3 Sign and Symptoms	Must to Know
47.4 Investigation	Good to Know
47.5 Treatment	Good to Know
48. Haemolysis and Fragility of RBCs	
48.1 Definition	Must to Know
48.2 Process of haemolysis	Must to Know
48.3 Fragility test	Good to Know

48.4 Condition when haemolysis occur	Good to Know
48.5 Haemolysin	Desirable to Know
49. White Blood Cells	
49.1 Introduction	Must to Know
49.2 Classification	Must to Know
49.3 Morphology	Must to Know
49.4 Normal Count	Must to Know
49.5 Physiological Variation	Must to Know
49.6 Function	Must to Know
49.7 Properties	Good to Know
49.8 Lifespan & Fate	Good to Know
49.9 Pathological Variation	Good to Know
49.10 Leucopoiesis	Desirable to Know
50. Immunity	
50.1 Definition and Types	Must to Know
50.2 Development & Processing of lymphocyte	Must to Know
50.3 Antigen & Antibody	Must to Know
50.4 Cell mediated immunity	Must to Know
50.5 Antibody mediated immunity	Must to Know
50.6 Natural Killer cell	Good to Know
50.7 Cytokines	Good to Know
50.8 Immunization	Good to Know
50.9 Allergy	Good to Know
50.10 Hypersensitivity	Desirable to Know
50.11 Immune deficiency disease	Desirable to Know
50.12 Autoimmune Disease	Desirable to Know
51. Platelets	
51.1 Introduction	Must to Know
51.2 Structure & composition	Must to Know
51.3 Normal Count	Must to Know
51.4 Physiological Variation	Must to Know
51.5 Function	Must to Know
51.6 Life span & Fate	Must to Know
51.7 Pathological variation	Good to Know
51.8 Activators & Inhibitors	Good to Know
51.9 Development	Good to Know
51.10 Platelet disorder & management	Desirable to Know
51.11 Purpura	Desirable to Know
52. Hemostasis & Coagulation of Blood	
52.1 Definition	Must to Know
52.2 Stages of hemostasis	Must to Know
52.3 Factors involved in clotting	Must to Know
52.4 Sequence of clotting mechanism	Must to Know
52.5 Blood clot	Must to Know
53. Blood Groups & Blood transfusion	

53.1 Introduction	Must to Know
53.2 ABO blood group system	Must to Know
53.3 Rh Factor	Must to Know
53.4 Importance of knowing blood group	Must to Know
53.5 Inheritance of blood group	Good to Know
53.6 Transfusion reaction	Good to Know
53.7 Autologus transfusion	Good to Know
53.8 Haemolytic disease of newborn	Desirable to Know
53.9 Other blood group system	Desirable to Know
53.10 Blood substitute	Desirable to Know
54. Miscellaneous	
54.1 Blood volume	Must to Know
54.2 Reticuloendothelial system	Must to Know
54.3 Spleen	Must to Know
54.4 Lymphatic system & Lymph	Must to Know
54.5 Tissue fluid & Oedema	Must to Know
55. Nerve & Muscle Physiology	·
55.1 Classification of muscles	Must to Know
55.2 Muscle Mass	Must to Know
55.3 Muscle fiber	Must to Know
55.4 Myofibril	Must to Know
55.5 Sarcomere	Must to Know
55.6 Contractile protein	Must to Know
55.7 Sarcotubular system	Must to Know
55.8 Other proteins of the muscle	Good to Know
55.9 Composition	Desirable to Know
56. Properties of Skeletal Muscle	
56.1 Excitability	Must to Know
56.2 Contractibility	Must to Know
56.3 Refractory period	Must to Know
56.4 Muscle Tone	Good to Know
56.5 Length-Tension relationship	Good to Know
56.6 Hypertonia	Desirable to Know
56.7 Hypotonia	Desirable to Know
57. Changes during muscular contraction	
57.1 Introduction	Must to Know
57.2 Electical Changes	Must to Know
57.3 Physical Changes	Must to Know
57.4 Compound action potential	Good to Know
57.5 Graded potential	Good to Know
57.6 Molecular basis of contraction	Good to Know
57.7 Chemical changes	Good to Know
57.8 Thermal Changes	Good to Know
57.9 Patch clamp technique	Desirable to Know
58. Neuromuscular Junction	

58.1 Definition & Structure	Must to Know
58.2 NM transmission	Must to Know
58.3 Motor unit	Must to Know
58.4 NM Blocker	Good to Know
58.5 NM Stimulator	Good to Know
58.6 NM Disease	Desirable to Know
59. Smooth Muscle	
59.1 Distribution	Must to Know
59.2 Function	Must to Know
59.3 Types	Must to Know
59.4 Contractile process	Must to Know
59.5 Control	Must to Know
59.6 Structure	Good to Know
59.7 Electrical activity in single & multiple unit	Desirable to Know
60. Electromyogram and Disorder of SK Muscle & Endurance of Musc	le
60.1 Definition	Must to Know
60.2 Electromyogram	Must to Know
60.3 Endurance of Muscle	Good to Know
60.4 Electromyographic technique	Good to Know
60.5 Myopathy	Desirable to Know
61. Digestive System	
61.1 Introduction	Must to Know
61.2 General structure	Must to Know
61.3 Innervation	Must to Know
61.3 Salivary gland	Must to Know
61.4 Stomach	Must to Know
61.5 Exocrine function & regulation of pancreas	Must to Know
61.6 Liver	Must to Know
61.7 Function & Regulation Gall Bladder	Must to Know
61.8 Motor Movement of GIT – Peristalsis, Segmentation,	Must to Know
Deglutition, Defaecation, Gastric Emptying	
61.9 Composition of saliva	Good to Know
61.10 Composition of gastric juice	Good to Know
61.11 Composition of Pancreatic juice	Good to Know
61.12 Succus entericus	Good to Know
61.13 Mastication	Good to Know
61.14 Gastric filling	Good to Know
61.15 Haustration	Good to Know
61.16 Structure of salivary gland	Desirable to Know
61.17 Peptic ulcer	Desirable to Know
61.18 Pancreatitis	Desirable to Know
61.19 Cholecystitis	Desirable to Know
61.20 Structure of pancreas & gallbladder	Desirable to Know
61.21 Liver structure	Desirable to Know
61.22 Choleretics	Desirable to Know

61.23 Cholegogue	Desirable to Know
61.24 Paralytic ileus	Desirable to Know
62. Excretory System	
62.1 Structure & function of kidney	Must to Know
62.2 Functional unit : Nephron (Function of different part)	Must to Know
62.3 Juxta Glomerular Apprarus	Must to Know
62.3 Glomerular Filtration Rate – Definition, Normal Value, Factor	Must to Know
affecting	
62.4 Tubular Reabsorption (Na,K, Glu, Water)	Must to Know
62.5 Tubular secretion	Must to Know
62.6 Counter current mechanism	Must to Know
62.7 Counter current multiplier system	Must to Know
62.8 Role of kidney in regulation of pH	Must to Know
62.9 Micturition	Must to Know
62.10 Renal blood flow	Good to Know
62.11 Determination of GFR	Good to Know
62.12 Acidosis	Good to Know
62.13 Alkalosis	Good to Know
62.14 Mechanism of concentration & dilution of urine	Good to Know
62.15 Anatomy & Innervation of bladder	Good to Know
62.16 Renal failure	Desirable to Know
63. Body Temperature & Skin	•
63.1 Blood flow: AV Shunting	Must to Know
63.2 Homeostasis of Temperature	Must to Know
63.3 Anatomy	Good to Know
63.4 Hypothlamic regulation (Set point)	Good to Know
63.5 Themogenesis	Good to Know
63.6 Pyrexia	Desirable to Know
63.7 Pyrogens	Desirable to Know
64. Endocrinology	-
64.1 General endocrinology	Must to Know
64.2 Enumeration	Must to Know
64.3 Hormone	Must to Know
64.4 General function	Must to Know
64.5 Properties	Must to Know
66.6 Mechanism of secretion	Must to Know
66.7 Transport	Must to Know
66.8 Regulation	Must to Know
66.9 Anterior Pituitary Hormone	Must to Know
66.10 Posterior Pituitary Hormone	Must to Know
66.11 Thyroid – Synthesis, Secretion, Transport, Action	Must to Know
66.12 Adrenal Cortex & Medulla Hormone – Synthesis, Secretion,	Must to Know
Action	
66.13 Regulation of Blood calcium level	Must to Know
66.14 Chemistry	Good to Know

66.15 Metabolism	Good to Know
66.16 Disorders of Anterior Pituitary Hormone	Desirable to Know
66.17 Disorders of Posterior Pituitary Hormone	Desirable to Know
66.18 Thyroid disorder	Desirable to Know
66.19 Adrenal Disorder	Desirable to Know
67. Reproductive System	•
67.1 Menstrual cycle	Must to Know
67.2 Function of oestrogen& progesterone	Must to Know
67.3 Pregnancy	Must to Know
67.4 Parturition	Must to Know
67.5 Lactation	Must to Know
67.6 Spermatogenesis	Must to Know
67.7 Family planning in Male & Female	Must to Know
67.8 Function of placenta	Must to Know
67.9 Anatomy of male & female sex organ	Good to Know
67.10 Test of ovulation	Good to Know
67.11 Function of ovary	Good to Know
67.12 Fertilization	Good to Know
67.13 Implantation	Good to Know
67.14 Pregnancy test	Good to Know
67.15 Composition of milk	Good to Know
67.16 Milk ejection	Good to Know
67.17 Semen	Good to Know
67.18 Contraceptive pills	Good to Know
67.19 Sex differentiation	Desirable to Know
67.20 Factor controlling lactation	Desirable to Know
67.21 Development of secondary sexual characters	Desirable to Know
68. Cardiovascular System	
68.1 Functional anatomy & innervations of heart	Must to Know
68.2 Cardiac impulse	Must to Know
68.3 Electrocardiogram (ECG)	Must to Know
68.4 Heart Rate – Normal, Regulation	Must to Know
68.5 Cardiac Output – Definition, Normal Values, Determinants,	Must to Know
Regulation	
68.6 Arterial blood pressure – Definition, Normal Value,	Must to Know
Determination, Regulation, Measurement	
68.7 Cardiac Cycle	Must to Know
68.8 Volume changes in ventricle	Good to Know
68.9 Jugular venous pulse (JVP)	Good to Know
68.10 Arterial Pulse	Good to Know
68.11 Heart block	Good to Know
68.12 Murmurs	Good to Know
68.13 Coronary circulation	Good to Know
68.14 Two changes in ECG in Myocardial infarction	Good to Know
68.15 Variation in HR	Good to Know

68.16 Variation in CO	Good to Know
68.17 Measurement of CO	Good to Know
68.18 Abnormal JVP	Desirable to Know
68.19 Angina Pectoris	Desirable to Know
68.20 Myocardial infarction	Desirable to Know
68.21 Factors changing preload and afterload in heart	Desirable to Know
69. Respiratory System	•
69.1 Physiology of respiration – External, Internal	Must to Know
69.2 Respiratory movement	Must to Know
69.3 Muscle of respiration (Diaphragm)	Must to Know
69.4 Mechanics of Respiration	Must to Know
69.5 Surfactant	Must to Know
69.6 Compliance	Must to Know
69.7 Spirometry – Volume, Capacity, Definition, Normal Value	Must to Know
69.8 Exchanges of gases – Diffusion Capacity, Factor affecting	Must to Know
69.9 Transport of Oxygen & CO2 in blood	Must to Know
69.9.1 O2 – Co2 dissociation curve	Must to Know
69.9.2 Bohr's effect	Must to Know
69.9.3 Haldane Effect	Must to Know
69.9.4 Double bohr's effect	Must to Know
69.10 Regulation of respiration	Must to Know
69.10.1 Neural (Medullary Pontine Centre)	Must to Know
69.10.2 Chemical (Chemoreceptor)	Must to Know
69.11 Functional anatomy & passage	Good to Know
69.12 Accessory Muscle of respiration	Good to Know
69.13 Intrapleural & Pulmonary pressure(changes in respiration)	Good to Know
69.14 Work of breathing	Good to Know
69.15 Factor affecting FEV & its variation	Good to Know
69.16 Obstructive disease	Good to Know
69.17 Restrictive disease	Good to Know
69.18 Dyspnoea	Good to Know
69.19 Pulmonary ventilation	Good to Know
69.20 Alveolar ventilation	Good to Know
69.21 Dead space ventilation	Good to Know
69.22 Ventilation-Perfusion ratio	Good to Know
69.23 Composition of inspired air, alveolar air, Expired air	Good to Know
69.24 Ondine's Curse	Good to Know
69.25 Prebotzinger's complex	Good to Know
69.26 Hypoxia	Good to Know
69.27 Dyspnoea	Good to Know
69.28 Cyanosis	Good to Know
69.29 Artificial Respiration	Good to Know
69.30 Sleep apnoea	Desirable to Know
69.31 Periodic breathing	Desirable to Know
69.32 Pulmonary function test	Desirable to Know

70. Central Nervous System	
70.1 Organization of CNS	Must to Know
70.2 Neuronal organization at spinal cord level	Must to Know
70.3 Ascending Tracts	Must to Know
70.4 Descending Tracts	Must to Know
70.5 Synapse	Must to Know
70.6 Receptors	Must to Know
70.7 Reflexes	Must to Know
70.8 Sensation & Tracts	Must to Know
70.9 Physiology of Pain	Must to Know
70.10 Function of - Cerebral cortex, Cerebellum, CSF	Must to Know
70.11 Autonomic nervous system – Fight & Flight response, Rest	Must to Know
& Digest response	
70.12 Function of Hypothalamus	Good to Know
70.13 Regulation of Autonomic function	Good to Know
70.14 Higher function of brain – Memory, Learning, Motivation	Good to Know
70.15 Function of limbic system	Good to Know
70.16 Sleep (REM-NREM)	Good to Know
70.17 Parkinson sign	Good to Know
70.18 Function of Thalamus	Desirable to Know
70.19 Applied physiology – Cerebellum, Basal Ganglia,	Desirable to Know
Hypothalamus, Brainstem	
70.20 Autonomic function test	Desirable to Know
70.21 Autonomic disturbance	Desirable to Know
70.22 EEG	Desirable to Know
71. Special Sense	
71.1 Vision	Must to Know
71.2 Hearing	Must to Know
71.3 Physiology of hearing	Must to Know
71.4 Function of cochlea, organ of corti	Must to Know
71.5 Function of outer. middle, inner ear	Must to Know
71.6 Taste & its types	Must to Know
71.7 Taste buds	Must to Know
71.8 Primary taste sensation	Must to Know
71.9 Smell	Must to Know
71.10 Receptors	Must to Know
71.11 Anatomy of eyeball	Good to Know
71.12 Function of iris	Good to Know
71.13 Aqueous humor	Good to Know
71.14 Visual pathway	Good to Know
71.15 Anatomic consideration	Good to Know
71.16 Auditory pathway & area	Good to Know
71.17 Lesion of visual pathway	Desirable to Know
71.18 Blindness	Desirable to Know
71.19 Deafness	Desirable to Know

71.20 Auditory function test	Desirable to Know
71.21 Altered taste sensation	Desirable to Know
71.22 Anosmia	Desirable to Know
71.23 Parosmia	Desirable to Know

# **B. Practical work quota**

1. Practical exercise

To be	done by Students	Hours
1.	Study of Microscope and its uses	02
2.	Collection of blood and study of haemocytometer	02
3.	Haemoglobinometry	02
4.	Determination of RBC count	08
5.	Determination of WBC count	04
6.	Determination of blood groups	02
7.	Leishman's staining and differential leucocyte count	10
8.	Calculation of blood indices	02
9.	Determination of bleeding time	01
10.	Determination of clotting time	01
11.	Blood pressure recording	04
12.	Auscultation of Heart sounds	-

# 1. Demonstrations (only)

1.	Determination of ESR	02
2.	Determination of PCV	02
3.	Determination of specific gravity	02
4.	Fragility test for RBC	02
5.	Clinical examination of chest	02
6.	Determination of vital capacity	02
7.	Artificial respiration	02
8.	Demonstration of reflexes	02

9.	Activity of frogs heart and effects of drugs	02
	Total	60

# C. Books Recommended

Sr	Author	Name of Book	Edition	Publisher
no.				
1.	Guyton	Textbook of Physiology	12 <sup>th</sup> Edition	Elsevier
2.	Ganong	Review of Medical Physiology	24 <sup>rd</sup> Edition	Lange Basic Science
3.	A.K.Jain	Human Physiology for BDS students	1 <sup>st</sup> Edition	Arya
4.	Chaudhary	Concise Medical Physiology	2 <sup>nd</sup> Edition	NCBA
5.	Indu Khurana	Textbook of Medical Physiology	1 <sup>st</sup> Edition	Elsevier
6.	K Sembulingam	Essential of Medical Physiology	5 <sup>th</sup> Edition	Jaypee
7.	Chaterjee	Human Physiology	10 <sup>th</sup> Edition	Current distribution
8.	Vander	Human Physiology	12 <sup>th</sup> Edition	McGraw-Hill

# REFERENCE BOOKS

Sr.	Title	Author	Latest Edition	Publisher
no.				
1	Physiolgy	Berne & Levy	6 <sup>th</sup> Edition	Mosby/Elsevier
2	Physiological basis of medical practice	Best & Taylor	10 <sup>th</sup> Edition	Williams & Wilkins Co
3	Medical Physiology	Boron & Boulpaep	2 <sup>nd</sup> Edition	Elsevier

# PRACTICAL BOOKS FOR EXPERIMENTAL PHYSIOLOGY

Author	Title	Edition	Publisher
Ranade	Practical Physiology	4 <sup>th</sup> Edition	
CL Ghai	A Textbook of Practical Physiology	7 <sup>th</sup> edition	јаурее
AK Jain	Manual Practical for BDS	1 <sup>st</sup> edition	Arya
GK Pal	Textbook of Practical Physiology	3 <sup>rd</sup> edition	Orient
Hutchison's	Clinical Method	20 <sup>th</sup> edition	SaunderElesevier

# **B. EXAMINATION SCHEME**

- c. INTERNAL EXAM
  - First internal (Theory/Practical): 20 Marks
  - Second internal (Theory/Practical): 20 Marks
  - Third Internal (Theory/Practical): 60 Marks
- d. University Exam:

As per University rules

## BIOCHEMISTRY

Aim:

The broad goal of the teaching of undergraduate students in Biochemistry is to provide a sound knowledge and make them understand the scientific basis of the life processes at the molecular level so that they can apply this acquired knowledge in solving clinical problems.

Objectives:

- The objective is dealt under three headings,
- (a) Knowledge and understanding,
- (b) Skills and
- (c) Attitudes which will be dealt during the course

Course outcomes assessed:

Were the students able to: Explain the normal functioning of all the organ systems and their interactions for well-co-ordinated total body function. Assess the relative contribution of each organ system towards the maintenance of the milieu interior. List the physiological principles underlying the pathogenesis and treatment of disease. Conduct experiments designed for the study of physiological phenomena. Interpret experimental and investigative data. Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

# A. COURSE CONTENT AND APPROACH TO THE SUBJECT:

- 1. Chemistry of Bioorganic Molecules
- 1.1 Carbohydrates Chemistry
  - 1.1.1. Definition
  - 1.1.2. Biological importance
  - 1.1.3. Classification.
  - 1.1.4. Monosaccharides
  - 1.1.5. Isomerism
  - 1.1.6. Glycosaminoglycans
  - 1.1.7. Anomerism
  - 1.1.8. Sugar derivatives
  - 1.1.9. Disaccharides
  - 1.1.10. Polysaccharides
  - 1.1.11. Structures of starch and glycogen.
- 2. Lipids Chemistry

- 2.1. Definition biological
- 2.2. Importance and Classification
- 2.3. Fatty Acids.
- 2.4. Compound lipids.
- 2.5. Phospholipids
- 2.6. Lipoproteins
  - 2.6.1. Formation
  - 2.6.2. Function
- 2.7. Cholesterol
- 2.8. Micelle
- 2.9. Prostaglandins
- 2.10 Bimolecular leaflet.
- 3. Proteins Chemistry
  - 3.1. Biological importance
  - 3.2. Amino acids
    - 3.2.1. Classification.
    - 3.2.2. Introduction to peptides
  - 3.3. Proteins
    - 3.3.1. Simple and conjugated
    - 3.3.2. Globular and fibrous
    - 3.3.3. Classification of amino acids
  - 3.4. Plasma proteins
    - 3.4.1. Classification and separation.
    - 3.4.2. Functions of Albumin.
    - 3.4.3. A brief account of immunoglobulins.
    - 3.4.4. Denaturation.
- 4. Nucleic acids Chemistry
  - 4.1. Building units
  - 4.2. Nucleotides
  - 4.3. Outline structure of DNA and RNA.
- 5. Nutrition
  - 5.1. Energy needs
    - 5.1.1. Basal metabolic rate
    - 5.1.2. Dietary carbohydrates
    - 5.1.3. Fibers
    - 5.1.4. Dietary lipids
    - 5.1.5. Essential fatty acids
    - 5.1.6. Essential amino acids
    - 5.1.7. Nitrogen balance
  - 5.2. Balanced diet
    - 5.2.1. Fibers
    - 5.2.2. SDA
    - 5.2.3. Protein Energy Malnutrition

#### 5.2.3.1. Kwashiorkor

#### 5.2.3.2. Marasmus.

- 6. Vitamins
  - 6.1. Definition
  - 6.2. Classification of vitamins.
    - 6.3. Daily requirement, source and deficiency symptoms of fat & water soluble vitamins (brief account of water soluble vitamin is required with biochemical function 4. Introduction to antivitamine and hypervitaminesis
  - 6.4. Introduction to antivitamins and hypervitaminosis.
- 7. Energy metabolism
  - 7.1. Carbohydrates Metabolism
    - 7.1.1. Digestion and absorption
    - 7.1.2. Glucose Transporters
    - 7.1.3. Outlines of Glycolysis
    - 7.1.4. Pyruvate Oxidation
    - 7.1.5. Citric acid cycle.
    - 7.1.6. Importance of pentose phosphate pathway
    - 7.1.7. Formation of glucuronic acid.
    - 7.1.8. Gluconeogenesis.
    - 7.1.9. Rapoport Lubering cycle
    - 7.1.10. Glycogenesis
    - 7.1.11. Glycogenolysis
    - 7.1.12. Regulation of Blood Glucose.
    - 7.1.13. Diabetes mellitus and related disorders.
    - 7.1.14. Evaluation of glycaemic status
    - 7.1.15. Glycogen storage disorders
    - 7.1.16. Glucose 6-phosphate dehydrogenase deficiency

#### 8. Lipid Metabolism

- 8.1 Digestion and absorption
- 8.2 Adipose tissue metabolism
- 8.3. Beta oxidation of fatty acids
- 8.4. Ketone body formation and utilization
- 8.5 Lipogenesis
- 8.6. Lipolysis.
- 8.7. Biochemical evaluation.
- 8.8. Hyperlipoproteinemia
- 8.9. Atherosclerosis
- 8.10. Fatty liver.
- 9. Protein Metabolism
  - 9.1. Digestion & absorption
  - 9.2. Nitrogen balance formation
  - 9.3. Fates of ammonia
  - 9.4. Ammonia metabolism

- 9.4.1. Deamination
- 9.4.2. Transmination
- 9.4.3. Transdeamination
- 9.4.4. Decarboxylation
- 9.4.5. Transmethylation
- 9.5. Urea formation
  - 9.5.1. Brief introduction about metabolism of phenyl alanine, tyrosine, methionine, glycine. Phenylketonuria, Albinism, Alkaptonuria.
- 10. Metabolic interrelationship of carbohydrates, lipids and proteins metabolism.
- 11. Special Aspects of Metabolism
  - 11.1 Detoxication mechanisms: Brief outline in the detoxification.
- 12. Biochemical Genetics and Protein Synthesis
  - 12.1. Introduction to nucleotides
    - 12.1.1. Formation and Degradation.
  - 12.2. DNA as genetic material.
    - 12.2.1. Introduction to replication and transcription.
    - 12.2.2. Forms and functions of RNA.
  - 12.3. Genetic code and mutation.
  - 12.4. Outline of translation process.
  - 12.5. Antimetabolites and antibiotics interfering in replication
  - 12.6. Transcription
  - 12.7. Translation.
- 13. Enzyme and Metabolic Regulation
  - 13.1 Enzymes
    - 13.1.1. Definition
    - 13.1.2. Classification
    - 13.1.3. Specificity
    - 13.1.4. Active site
    - 13.1.5. Cofactors.
    - 13.1.6. Effect of pH
    - 13.1.7. Temperature
    - 13.1.8. Substrate concentration
    - 13.1.9. Introduction to enzyme inhibitors
    - 13.1.10. Proenzymes
    - 13.1.11. Isoenzymes
    - 13.1.12. Clinical enzymology
    - 13.1.13. Introduction to allosteric regulation
    - 13.1.14. Covalent modification and regulation by induction/repression.
- 14. Structural Components and Blood Proteins
  - 14. 1. Connective tissue
    - 14.1.1. Brief outline of structure

- 14.1.2. Synthesis
- 14.1.3. Function of collagen and elastin.
- 15. Kidney Function Test, Liver Function Test, Gastric Function Test 15.1. Brief introduction to kidney function tests
  - 15.1.1. Brief outline of Urea clearance test
  - 15.1.2. Creatinine Clearance test
  - 15.2. Liver function test
    - 15.2.1. Brief outline of tests for liver function
    - 15.2.2. Galactose tolerance test
    - 15.2.3. Van den Bergh reaction
    - 15.2.4. Albumin / Globulin Ratio
    - 15.2.5. Bromsulphathalein Excretion test
    - 15.2.6. Serum enzyme markers
    - 15.2.7. Jaundice
  - 15.3. Gastric function tests
    - 15.3.1. Gastric function
    - 15.3.2. Hydrochloric acid secretion
    - 15.3.3. Assessment of free and total acidity
    - 15.3.4. Brief outline of pancreatic function test

#### 16. Acid Base Balance

- 16.1. Acid base regulation (role of the buffer, kidney, lungs)
- 16.2. Acid base imbalance.
- 17. Water and Electrolyte Balance
  - 17.1. A brief introduction to the following topics body water compartments
  - 17.2. Osmolality
  - 17.3. Electrolyte concentration of body fluid compartments
  - 17.4. Regulation of Sodium and water balance
  - 17.5. Renin Angiotensin system
  - 17.6. Clinical application of sodium, potassium, chloride.

#### 18. Haemoglobin Chemistry and Metabolism

- 18.1. Structure and functions.
- 18.2. Types of normal and Haemoglobin derivatives.
- 18.3. Brief introduction to heme synthesis and degradation.
- 18.4. Hemoglobinopathies

#### 19. Mineral

- 19.1. Sources
- 19.2. Absorption
- 19.3. Transport
- 19.4. Requirement
- 19.5. Daily requirement
- 19.6. Metabolism

- 19.7. Hormonal regulation of metabolism
- 19.8. Disorders
- 19.9. Toxicity associated with Calcium, Phosphorus, Iron, Iodine, fluoride.
- 20. Biological Oxidation
  - 20.1. General concept of oxidation and reduction.
  - 20.2. Role of mitochondria
  - 20.3. High energy compounds
  - 20.4. Electron transport chain.
  - 20.5. Substrate level
  - 20.6. Oxidative phosphorylation
  - 20.7. Role of uncouplers and inhibitors.
- 21. Cancer
  - 21.1. Introduction to cancer
  - 21.2. Etiology
  - 21.3. Chemical carcinogens
  - 21.4. Outline mechanism of carcinogenesis.
  - 21.5. Introduction to the following terms and their importance
    - 21.5.1. Tumour markers
    - 21.5.2. Oncogenes
    - 21.5.3. Viruses.

22. Hormone:

22.1 Introduction to secondary messenger (cAMP, calcium ion, inositol triphosphate). 22.2. Brief outline of mechanism of hormone action

# APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION
1. Introduction to biochemistry and its scope in dentistry	Desirable to Know
2. Carbohydrates	
2.1 Definition	Must to Know
2.2 Classification	Must to Know
2.3 Isomerism of Sugars	Must to Know
2.4 Physiologically important mono, di and polysaccharides	Must to Know
2.5 Glycogen, starch, cellulose	Must to Know
2.6 Mucopolysaccharides - hyaluronic acid, chondroitin sulphate,	Must to Know
heparin.	
3. Amino Acids	
3.1 Classification based on structure and nutritional importance	Must to Know
3.2 Optical activity	Must to Know
3.3 Isoelectric pH	Must to Know
3.4 Physiologically active peptides	Must to Know
4. Proteins	
4.1 Definition	Must to Know
4.2 Functions	Must to Know
4.3 Classification	Must to Know
4.4 Structure	Must to Know
4.5 Denaturation	Must to Know
4.6 Plasma Proteins and their separation by electrophoresis	Must to Know
4.7 Immunoglobulins	Must to Know
4.8 Haemoglobin and its abnormal forms	Must to Know
4.9 Special features and organisation of Proteins, collagen,	Desirable to Know
structure and composition, muscle	
5. Lipids	
5.1 Definition	Must to Know
5.2 Functions	Must to Know
5.3 Classification	Must to Know
5.4 Fatty Acids	Must to Know
5.5 Neutral Fats	Must to Know
5.6 Phospholipids	Must to Know
5.7 Cholesterol	Must to Know
5.8 Lipoproteins	Must to Know
6. Nucleic Acids	
6.1 Composition	Must to Know
6.2 Structure & Types of Deoxy ribonucleic acid (DNA) &	Must to Know
Ribonucleic acid (RNA)	
6.3 Nucleosides and Nucleotides and their importance	Must to Know
7. Vitamins	
7.1 Definition	Must to Know

7.2Classification, Chemistry, Sources, Requirement, Function,	Must to Know
Metabolic role and Deficiency signs of vitamins: A, D, E, K,	
C,Thiamin, Riboflavin, Niacin, Pyridoxine, Folic Acid,	
Cyanocobalamin.	
8. Genetic Code	Desirable to know
9. Enzymes	
9.1 Definition	Must to Know
9.2 Classification	Must to Know
9.3 Chemical nature	Must to Know
9.4 Enzyme specificity, mechanism of action	Must to Know
9.5 Properties of enzymes	Must to Know
9.6 Coenzymes and cofactors	Must to Know
9.7 Holoenzyme	Must to Know
9.8 Proenzyme	Must to Know
9.9 Isoenzyme	Must to Know
9.10 Factors influencing enzyme activity	Must to Know
9.11 Enzyme inhibition-types and examples	Must to Know
10. Diagnostic enzymes	Desirable to Know
11. Carbohydrate Metabolism	
11.1 Digestion and absorption of carbohydrates	Must to Know
11.2 Glycolysis	Must to Know
11.3 Cori's cycle	Must to Know
11.4 Citric acid cycle	Must to Know
11.5 Energetics of glucose oxidation	Must to Know
11.6 Glycogenolysis	Must to Know
11.7 Glycogenesis	Must to Know
11.8 Hexose monophosphate shunt	Must to Know
11.9 Regulation of blood glucose	Must to Know
12.Fermentation, biochemical changes during muscular contraction,	Desirable to know
electron transport chain, oxidative phoaphorylation, respiratory	
poisons, oxygen toxicity, gluconeogenesis, glycogen storage	
disorders.	
13. Lipid Metabolism	
13.1 Digestion and absorption of lipid	Must to Know
13.2 Beta oxidation of fatty acids and its energetic	Must to Know
13.3 Ketone body formation	Must to Know
13.4 Utilization	Must to Know
13.5 Ketoacidosis	Must to Know
14. Synthesis of palmitic acid and triglycerides, fatty liver, and Desirable	to know lipotropic
action, metabolism during starvation	
15. Protein Metabolism	
15.1 Digestion and absorption of Amino acids	Must to Know
15.2 Synthesis of Proteins	Must to Know
15.3 Deamination of mino acids	Must to Know
15.4 Transamination	Must to Know

15.5 Decarboxylation	Must to Know
15.6 Production and fate of ammonia	Must to Know
15.7 Urea cycle pathway	Must to Know
15.8 Methionine metabolism	Must to Know
15.9 Phenylalanine metabolism	Must to Know
15.10 Phenylketonuria, albinism, Alkaptouria	Must to Know
16. Glycine metabolism, Synthesis of important products like creatine,	Desirable to know
noradrenaline, adrenaline, thyroxin, serotonine, heme from amino	
acids.	
17. Nutrition and Dietics	
17.1 Dietary factors	Must to Know
17.2 Basal metabolic rate	Must to Know
17.3 Biological value of protein	Must to Know
17.4 Glucose sparing action	Must to Know
17.5 Essential amino acids	Must to Know
17.6 Dietary fibre	Must to Know
17.7 Essential fatty acids	Must to Know
17.8 Balanced diet	Must to Know
18. Principles of calorimetry, Respiratory quotient, Specific Dynamic	Desirable to know
Action of foods, protein- calorie malnutrition (kwashiorkor and	
marasmus), nitrogen balance, milk-composition and functions,	
determination of Basal Metabolic Rate (BMR)	
19. Mineral metabolism	
19. Mineral metabolism Distribution, sources, functions, requirements, aborption, r	metabolism, effect of
<ol> <li>Mineral metabolism</li> <li>Distribution, sources, functions, requirements, aborption, r</li> <li>deficiencies of -</li> </ol>	netabolism, effect of
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<ul> <li>19. Mineral metabolism <ul> <li>Distribution, sources, functions, requirements, aborption,</li> <li>deficiencies of -</li> </ul> </li> <li>19.1 Calcium and phosphorus <ul> <li>19.2 Iron</li> <li>19.3 Iodine</li> <li>19.4 Fluorine</li> </ul> </li> <li>20. Liver Function Tests <ul> <li>20.1 Liver function tests</li> <li>20.2 Importance of alkaline phosphatase</li> <li>20.3 Galacose tolerance test</li> </ul> </li> <li>21.Van den Bergh reaction Albumin /Globulin Ratio, Bromsulphathalein, Excretion test Serum Glutamate, Pyruvate Transaminase (SGPT) and other enzymes</li> <li>22. pH and its biological importance <ul> <li>22.1 Acids and bases</li> </ul> </li> </ul>	Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know Desirable to know
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<ul> <li>19. Mineral metabolism <ul> <li>Distribution, sources, functions, requirements, aborption, redeficiencies of -</li> <li>19.1 Calcium and phosphorus</li> <li>19.2 Iron</li> <li>19.3 Iodine</li> <li>19.4 Fluorine</li> </ul> </li> <li>20. Liver Function Tests <ul> <li>20.1 Liver function tests</li> <li>20.2 Importance of alkaline phosphatase</li> <li>20.3 Galacose tolerance test</li> </ul> </li> <li>21.Van den Bergh reaction Albumin /Globulin Ratio, Bromsulphathalein, Excretion test Serum Glutamate, Pyruvate Transaminase (SGPT) and other enzymes</li> <li>22. pH and its biological importance</li> <li>22.2 Buffers</li> <li>22.3 Acid base balance</li> </ul>	Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know Desirable to know Must to Know Must to Know Must to Know
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<ul> <li>19. Mineral metabolism <ul> <li>Distribution, sources, functions, requirements, aborption,</li> <li>deficiencies of -</li> </ul> </li> <li>19.1 Calcium and phosphorus <ul> <li>19.2 Iron</li> <li>19.3 Iodine</li> <li>19.4 Fluorine</li> </ul> </li> <li>20. Liver Function Tests <ul> <li>20.1 Liver function tests</li> <li>20.2 Importance of alkaline phosphatase</li> <li>20.3 Galacose tolerance test</li> </ul> </li> <li>21.Van den Bergh reaction Albumin /Globulin Ratio, Bromsulphathalein, Excretion test Serum Glutamate, Pyruvate Transaminase (SGPT) and other enzymes</li> <li>22. pH and its biological importance</li> <li>22.3 Acid base balance</li> <li>22.4 Acidosis and alkalosis</li> </ul> <li>23. Henderson-Hasselbatch equation, role of the kidney in acid base</li>	Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know Desirable to know Must to Know Must to Know Must to Know Must to Know Must to Know
<ul> <li>19. Mineral metabolism <ul> <li>Distribution, sources, functions, requirements, aborption,</li> <li>deficiencies of -</li> </ul> </li> <li>19.1 Calcium and phosphorus <ul> <li>19.2 Iron</li> <li>19.3 Iodine</li> <li>19.4 Fluorine</li> </ul> </li> <li>20. Liver Function Tests <ul> <li>20.1 Liver function tests</li> <li>20.2 Importance of alkaline phosphatase</li> <li>20.3 Galacose tolerance test</li> </ul> </li> <li>21.Van den Bergh reaction Albumin /Globulin Ratio, Bromsulphathalein, Excretion test Serum Glutamate, Pyruvate Transaminase (SGPT) and other enzymes</li> <li>22. pH and its biological importance</li> <li>22.1 Acids and bases</li> <li>22.2 Buffers</li> <li>22.3 Acid base balance</li> <li>22.4 Acidosis and alkalosis</li> </ul> <li>23. Henderson-Hasselbatch equation, role of the kidney in acid base balance.</li>	metabolism, effect of Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know Desirable to know Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know
<ul> <li>19. Mineral metabolism Distribution, sources, functions, requirements, aborption, deficiencies of -</li> <li>19.1 Calcium and phosphorus</li> <li>19.2 Iron</li> <li>19.3 Iodine</li> <li>19.4 Fluorine</li> <li>20. Liver Function Tests</li> <li>20.1 Liver function tests</li> <li>20.2 Importance of alkaline phosphatase</li> <li>20.3 Galacose tolerance test</li> <li>21.Van den Bergh reaction Albumin /Globulin Ratio, Bromsulphathalein, Excretion test Serum Glutamate, Pyruvate Transaminase (SGPT) and other enzymes</li> <li>22. pH and its biological importance</li> <li>22.1 Acids and bases</li> <li>22.2 Buffers</li> <li>22.3 Acid base balance</li> <li>22.4 Acidosis and alkalosis</li> <li>23. Henderson-Hasselbatch equation, role of the kidney in acid base balance.</li> <li>24. Renal Function Test</li> </ul>	Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know Must to Know Desirable to know Must to Know Must to Know Must to Know Must to Know

24.2 Creatinine Clearance	Must to Know
25. Blood Constituents	
25.1 Calcium and phosphorous	Must to Know
25.2 Creatinine	Must to Know
25.3 Alkaline and acid phosphatase	Must to Know
26. Normal and abnormal variations of Urea, cholesterol, bilirubin, uric	Desirable to know
acid, transaminases.	

# B. PRACTICALS:

- 1. Reactions of monosaccharides glucose & fructose
- 2. Reactions of disaccharides lactose, maltose and sucrose
- 3. Preparation of osazones from glucose, fructose, lactose & maltose
- 4. Reactions of polysaccharides starch
- 5. Identification of unknown carbohydrate
- 6. Colourreactions of proteins albumin
- 7. Colour reactions of proteins gelatin & peptone
- 8. Colour reactions of proteins casein
- 9. Precipitation reactions of albumin
- 10. Precipitation reactions of gelatin and peptone
- 11. Precipitation reactions of casein
- 12. Identification of unknown protein
- 13. Reactions of urea, uric acid and creatinine
- 14. Identification of physiologically important constituents
- 15. Composition of saliva and starch digestion by salivary amylase
- 16. Qualitative analysis of gastric juice normal and abnormal contents
- 17. Urine analysis normal constituents
- 18. Urine analysis abnormal or pathological constituents
- 19. Determination of titrable acidity and ammonia content in urine
- 20. Determination of creatinine content in urine, calculation of creatinine clearance
- 21. Estimation of Blood glucose

## DEMONSTRATION SESSIONS

- 1. Colorimeter
- 2. Electrophoresis & Chromatography
- 3. Estimation of Serum calcium and phosphorus
- 4. Estimation of Bilirubin
- 5. Estimation of Urea in blood
- 6. Estimation of total protein in blood serum
- 7. Preparation of haemin crystals
- 8. Discussion of clinical charts Glucose Tolerance Test (GTT)
- Spotting of specimens -Haemin, Osazone - Microscopy, Ryle's tube, Folin -wu tube, Urinometer, Tests - Biuret reaction, Millon's reaction, Jaffe's reaction, Barfoed's reaction.

# C. RECOMMENDED BOOKS

Name of book & Title	Author	Publisher
A Text book of	Harbanslal	CBS Pub.
Biochemistry for		
Dental Students		
Concise Clinical	Pattabhiraman	Prithvi Pub
Medical biochemistry		
Fundamentals of Biochemistry	A. C. Deb	New Central Book Agency
Text Book of Biochemistry	AVS Rama Rao	UBSPD with LKS pub.
Textbook of Medical	S. Rama Krishnan	Orient Longman
Biochemistry	K.G.Prasannan	
	R. Rajan	

# **REFERENCE BOOKS**

Name of book & Title	Author	Publisher
Review of Biochemistry	Harpers	USA Appleton and Lange Pub.
Basic and Applied Dental	William R.D	Singapore Langman Pub
Biochemistry		
Elliot J.C. Principles of	Albert Lehninger	CBS pub.
Biochemistry		

## **C. EXAMINATION SCHEME**

- a. INTERNAL EXAM
  - First internal (Theory/Practical): 20 Marks
  - Second internal (Theory/Practical): 20 Marks
  - Third Internal (Theory/Practical): 60 Marks
- b. University Exam:

As per University rules

# DENTAL ANATOMY, EMBRYOLOGY, ORAL HISTOLOGY AND ORAL PHYSIOLOGY

## INTRODUCTION:

The Course Includes Instructions In The Subject Of Dental Morphology, Oral Embryology, Oral Histology And Oral Physiology, a Composite of Basic Dental Sciences & Their Clinical Applications.

AIM: The broad goal of the teaching of undergraduate students in dental morphology, oral embryology, oral histology and oral physiology is to provide a sound knowledge and make them understand the scientific basis of the oral anatomy, oral physiology and oral histology at the molecular level so that they can apply this acquired knowledge in solving clinical problems.

### **OBJECTIVES**:

The Subject of Dental Anatomy, Histology Including Embryology And Physiology Aims At Imparting Knowledge In Understanding The Structure, Function, Genesis, Morphology, Physiology And Histology Of Normal Tissues Associated With Oral Cavity.

#### a) KNOWLEDGE:

After a course on Dental Anatomy, Histology including Embryology and Physiology,

- 1) The Student Is Expected to Know Morphology, Histology, Physiology And Embryology With Clinical Applications So As To Impart This Understanding For Diagnosing Oral Diseases In Future.
- The Student Should Understand the Histological Basis and Physiologic Aging Process In The Dental Tissues So As To Apply This Knowledge In Various Dental Treatment Procedures.
- 3) The Students Must Acquire the Basic Knowledge of Microscope and Various Methods Of Preservation Of Tissues (Hard And Soft Tissues), Different Staining Techniques And Their Visualization Under Microscope.
- b) SKILLS:
  - 1) Identification Of Deciduous & Permanent Teeth.
  - 2) Age Estimation by Patterns of Teeth Eruption from Plaster Cast of Different Age Groups.
  - 3) Microscopic Study of Oral Tissues.
  - 4) Carving Of Crown and Root of Permanent Teeth In Wax.

COURSE OUTCOMES ASSESSED:

Were the students able to: Describe the normal development, morphology, structure & functions of oral tissues & variations in different pathological/non-pathological states. Understand the histological basis of various dental treatment procedures and physiologic ageing process in the dental tissues. Describe various research methodologies. Carve crowns of permanent teeth in wax. Identify & Draw Microscopic appearances of Oral tissues. Identify Deciduous & Permanent teeth. Estimate age by patterns of teeth eruption from plaster casts of different age groups.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT:

TOPIC	DISTRIBUTION
1. Introduction To Dental Anatomy	
1.1. Definitions, Meaning of Different Terms	Must to know
1.2. Aims & Scope of Dental Anatomy	Must know
1.3. Classification & Types	Good to know
2. Maxillary incisors	
2.1. Nomenclature Morphological Features	Good to know
2.2. Set Traits Arch Traits Class Traits Type Traits	Must know
2.3. Morphological Variation Clinical Considerations	Desirable to know
3. Mandibular central incisor	
3.1. Nomenclature Morphological Features	Good to know
4. Set traits arch traits class traits type traits	Must know
4.1. Morphological Variation Clinical Considerations	Desirable to know
5. Maxillary canine	
5.1. Nomenclature Morphological Features	Good to know
5.2. Set Traits Arch Traits Class Traits Type Traits	Must to know
5.3. Morphological Variation Clinical Considerations	Desirable to know
6. Mandibular canine	
6.1. Nomenclature Morphological Features	Good to know
6.2. Set Traits Arch Traits Class Traits Type Traits	Must know
6.3. Morphological Variation Clinical Considerations	Desirable to know

7. Development of Head and Neck	
7.1. Pharyngeal Arch Development,	Must to know
7.2. Pituary Gland Development,	Must to know
7.3. Thyroid gland, Ear Development	Must to know
8. Development of Facial Structures	
8.1. Palate Development	Must to know
8.2. Development Of Maxilla	Must to know
8.2. Dovelopment Of Mandible	Must to know
6.5. Development Of Nandble	
8.3.1. Development Of Structural Component of The Head And	Good to know
Neck (Vasculature, Skeletal Elements, Facial Muscles,	
Innervation)	
8.4. Developmental Anomalies (Cervical Cysts And Fistulas,	Must to know
Thyroglossal Cysts And Fistulas, Mandibulofacial Dysostosis,	
Cleft Lip & Palate)	
9. Development of Tooth	
9.1. Development Of Dental Lamina	Must to know
9.2. Stages Of Teeth Development (Bud, Cap, Bell, Advanced Bell	Must to know
Stages)	
9.3. Hertwig's epithelial root sheath and root formation.	Good to know
9.4. Clinical Considerations For Tooth Development With	Must to know
Histophysiologic Stages of Teeth Development	
10. Enamel	
10.1. Physical Properties of Enamel.	Must to know
10.2. Histologic Structure of Enamel	Must to know
10.3. Development of Enamel	Must to know
10.4. Crystalline (Inorganic) Component	Good to know
10.5. Organic Matrix	Good to know
10.6. Enamel Rods	Good to know
10.7. Transverse Striations	Good to know

10.8.	Direction Of Rods	Good to know
10.9.	Hunter-Schreger Bands	Must to know
10.10.	Incremental Lines of Retzius	Must to know
10.11.	Perikymata	Good to know
10.12.	Rod Ends	Good to know
10.13.	Imbrication Lines	Good to know
10.14.	Enamel Cracks	Must to know
10.15.	Enamel Cuticle	Must to know
10.16.	Enamel Lamellae	Must to know
10.17.	Enamel tufts	Must to know
10.18.	Dentin enamel junction	Must to know
10.19.	Enamel Spindles	Good to know
10.20.	Age Changes in Enamel	Good to know
10.21.	Clinical Considerations	Desirable to know
10.22.	Life Cycle of Ameloblasts	Must to know
10.23.	Amelogenesis (Matrix Formation and Mineralization)	Must to know
10.24.	Clinical Considerations	Desirable to know
10.25.	Ultra-Structural Features of Structure Of Enamel	Good to know
11. Dentin		
11.1. F	ormation	Must know
11.2. S	tructure	Must know
11.3. C	lassification	Desirable to know
11.4. C	linical Consideration	Good to know
11.5. D	entinogenesis	Good to know
11.6. D	entinal Tubules & Odontoblasts	Good to know
11.7. Ty	/pes Of Dentin	Good to know
11.8. Aç	ge Changes Associated	Good to know
11.9. E	bithelial- Mesenchymal Interactions in Odontogenesis	Must to know
11.10. T	ypes & Need for Such Classifications	Must to know

11.11. Structural Changes	Must to know
11.12 Anomalies Associated with Dentinogenesis	Desirable to know
11.13. Location & Clinical Importance	Desirable to know
11.14. Implications In Clinical Practice	Desirable to know
12. Cementum.	
12.1. Physical Characteristics Chemical Composition Structure	Good to know
Diffrence Between Cementocyte& Osteocyte Cemento	
enamel junction	
12.2. Difference Between Acellular Extrinsic Fiber Cementum	Must to know
&Cellular Intrinsic Fiber Cementum, Cement dentinal junction,	
Function Hypercementosis	
12.3. Clinical Consideration	Desirable to know
13. Periodontal Ligament	
13.1. Development	Must to know
13.2. Cell Biology of Normal Periodontium	Must to know
13.3. Periodontal Ligament Homeostasis	Must to know
13.4. Relationship Between Cells	Must to know
13.5. Clinical Consideration	Desirable to know
14. Oral Mucosa	
14.1. Introduction	Must to know
14.2. Oral Epithelium	Must to know
14.3. Lamina Propria	Must to know
14.4. Classification	Must to know
14.5. Junctions Of the Oral Epithelium	Must to know
	March to Luc
14.6. Age Unanges and Development	IVIUST TO KNOW
14.7. Definition Of Oral mucous membrane and General Considerations boundries	Must to know
of oral cavity subdivisions of oral mucosa layers of oral	

mucosa	
function: protection, sensory, secretory, thermal	
14.8. Types Of Epithelium Components Of Epithelium	Good to know
Keratinization Pattern Proliferation And Maturation	
14.9. Keratinocytes And Non Keratinocytes And Associated	Good to know
14.10 Structure and Two Zones Attatchment Of Lamina Propria	Good to know
14.11. Masticatory Mucosa	Must to know
14.12. Lining Mucousa	Must to know
14.13. Specialized Mucosa	Good to know
14.14. Muco Gingival Junction, Muco-Cutaneous Junction,	Good to know
Dento Gingival Junction	
14.15. Clinical Changes ChangesOccuring In Epithelium And	Good to know
Connective Tissue	
14.16. Clinical Features- Colour, Texture, Consistency, Other	Must to know
Features Like Contour (Scalloped, Straight, Interputtrd), Size,	
Shape And Position	
14.17. Ultrastructural Features And Cellular Events of Cell	Must to know
Maturation Cell Layers Shape Of the Cell in Each Layer	
Intermediate Filaments Attachment Between Cell To Cell	
And Cell to Basement Membrane	
14.18. Difference Between Keratinized and Non-Keratinized Mucosa	Must to know
14.19. Interlocking Arrangement Basement Membrane and Basal	Must to know
Lamina	
14.20. How they differ/functions limitations and boundaries types of	Must to know
keratinization with structure blood supply and nerve supply	
examples for the types of oral mucosa,	
14.21. Histological Features (Epithelium, Lamina Propria,	Must to know
Submucosa	
14.22. Development Of the Junctions Shifting Of The Junction	Must to know
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14.23. Symptoms Associated With Changes	Must to know
14.24. Clinical Correlation	Desirable to know
15. Maxillary sinus	Must to know
15.1 Definition Development Anatomy Structure & Variation	Good to know
Microscopic Features Function Importance	
15.2. Histology	Must to know
15.3. Clinical Consideration	Desirable to know
16. Eruption And Shedding	
16.1. Eruption	Must to know
17. Pattern	Good to know
17.1. Mechanism	Must to know
17.2. Clinical Consideration	Desirable to know
17.3. Histology	Good to know
17.4. Shedding	Good to know
17.5. Chronology	Good to know
18. Occlusion	
18.1. Basics Of Occlusion	Must to know
18.2. Compensatory Curves, Centric Jaw Relations And	Must to know
Occlusion	
18.3. Overjet, Overbite	Must to know
18.4. Malocclusion	Must to know
19. Histochemistry	
19.1. Tissue Fixation	Good to know
19.2. Tissue Processing, Microtomy& Staining and Mounting	Good to know
19.3. Materials Used in Fixation and Their Specific Use	Good to know
19.4. Materials Used Their Specific Use	Good to know
19.5. Mechanism Of Fixation	Must to know
19.6. Mechanism Of Processing and Staining, Microtome Types	Must to know
And Mechanism	

19.7. Different Fixative Used in Various Histochemical Technique	Desirable to know
19.8. Technical Details of All Procedures	Desirable to know

# B. SYLLABUS FOR PRACTICALS:

Demonstration:

1

- Crown morphology: Students are demonstrated on teeth carving of permanent natural teeth, following which the students carve the teeth and get it approved by respective mentors.
- Students are supposed to bring natural tooth with normal anatomy for the carving practicals.
- Students are shown variation in normal teeth pattern with the help of models, charts and extracted teeth.
- Normal oral histology slides are shown to the students which they are able to apply later in the preclinical and clinical settings.
  - Assignments are given students in relation to variations in normal anatomy of individual teeth as well as their implications in forensic odontology and asked to search databases and find current and relevant literature evidences and make a report on the same.
- Students are given assignment in groups or in single to search for at least two relevant evidences related to variation in crown morphology of individual tooth
- Practical aspects of Histochemistry, tissue Fixation, tissue processing, microtomy, staining and mounting will be discussed in small groups and students will get hands on for histopathology processing so that they can understand it well.

## C. RECOMMENDED TEXT BOOKS:

SR.NO.	AUTHOR	TITLE					EDITION
	Antonio Nanci	Ten C	Cate`s	0	ral	Histology	7th
1		Developmer	nt,Struct	ture,and F	Functio	n	
	Prabhu S.R	Textbook	of	Oral	&	Maxillofacial	
2		Anatomy, His	stology	& Embryo	ology		
3	Avery James K	Oral Develo	pment a	and Histol	ogy		6th
4	Chandra Satish	Textbook of	<sup>:</sup> Dental	and Ora	al Histo	ology with	

		Embryology	
5	Nanci Antonio	Oral histology	7th
6	Kumar, G S	Orban's Oral Histology and Embryology	Twelfth
7	Ash Major M	Wheeler-s atlas of tooth form	5th
8	Berkovitz B.K.B	Oral anatomy, histology and embryology	4th
9	Woelfel Julian B	Dental anatomy its relevance to dentistry	N.A.
		Textbook of Dental Anatomy and Oral	
10	Manjunatha BS	Physiology	
11	P.R. Garant	Oral cell & tissues	

# D. SCHEME OF EXAMINATION

### a. INTERNAL EXAM

- First internal (Theory/Practical): 20 Marks
- Second internal (Theory/Practical): 20 Marks
- Third Internal (Theory/Practical): 60 Marks

## b. UNIVERSITY EXAMINATION:

As per the university rules

Viva Voce (distribution of marks)

SL NO	TOPIC	MARKS
1	Dental Anatomy and Oral Physiology	10
2	Dental Histology and Embryology	10
TOTAL		20

#### PRACTICAL EXAMINATION: (distribution of marks)

#### Practicals: 90 Marks

- 1. Carving 30 marks 1 hour 15 min
- 2. Spotters 48 marks (12 spotter) 1 hour 15 min
  - 06--histology and ground section slides---4 marks each
  - -03-tooth identification 4 marks each
  - -03-casts for identifications of teeth, numbering system and age assessment-4 marks each
- 3. Journal: 12 MARKS

## DENTAL MATERIALS

Dental material science refers to the art and science that deals with the physical nature, chemical basis, manipulation and biological behaviour of dental materials used as or in the fabrication of a restoration or prosthesis.

#### AIMS:

- 1. To present basic chemical and physical properties of dental materials as they are related to its manipulation.
- 2. To teach the student the criteria of selection of dental material thus enabling him/her to discriminate between facts and propaganda with regards to claims of manufacturer.

### **OBJECTIVES**:

- 1. To understand the evolution and development of science of dental materials.
- 2. To explain purpose of course in dental materials to personnel concerned with the profession of dentistry, knowledge of the physical and chemical properties and biomechanical behaviour.
- 3. To make the student aware of laying down of standards or specifications of various materials.
- 4. To keep abreast with recent advances in materials.
- 5. To understand and evaluate claims made by manufacturers of dental materials.

## SCOPE OF THE SUBJECT:

The science of dental materials is imperative for the clinical and laboratory procedures involved in restorative dentistry such as Prosthodontics, Conservative dentistry, Periodontics, Orthodontics and Pedodontics.

## COURSE OUTCOMES ASSESSED:

Were the students able to: Understand the evolution and development of science of dental material. Explain purpose of course in dental materials to personnel concerned with the profession of the dentistry. Acquire knowledge of physical and chemical properties. Acquire knowledge of biomechanical requirements of particular restorative procedure. Search for newer and better materials which may answer our requirements with greater satisfaction. Evaluate the claims made by manufactures of dental materials

# A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION
1. Structure of Matter and Principles of Adhesion	
1.1 Change of state	Must to Know

1.2 Interatomic primary bond, secondary bond	Must to Know
1.3 Inter atomic bond distance and bond energy, thermal energy	Desirable to Know
1.4 Crystalline structure & Non crystalline structure	Good to Know
1.5 Diffusion	Good to Know
1.6 Adhesion & Bonding – General	Must to Know
1.7 Adhesion and bonding to tooth structure	Must to Know
2. Important Physical Properties - Applicable to Dental Materials	
2.1 Physical properties are based on laws of mechanics, acoustics, optics, thermodynamics, electricity, magnetism, radiation, atomic structure or nuclear phenomenon, hue, value, chroma and translucency	Must to Know
2.2 Thermal conductivity and coefficient of thermal expansion	Must to Know
<ol> <li>Stress, strain, proportional limit, elastic limit, yield strength, modulus of elasticity,</li> </ol>	Must to Know
2.4 Flexibility, Resilience,	Must to Know
2.5 Strength: Impact strength, permanent deformation, flexure strength, static fatigue,	Must to Know
2.6 Toughness, brittleness, hardness,	Must to Know
2.7 Ductility and malleability,	Must to Know
2.8 Abrasion resistance,	Must to Know
2.9 Rheology, thixotrophy, static creep, dynamic creep, flow,	Must to Know
2.10 Color: three dimensional color- hue, chroma, value, munsell system, metamerism, fluorescence,	Must to Know
2.11 Physical property of tooth,	Must to Know
2.12 Stress during mastication	Must to Know
3. Biological Considerations in Use of Dental Materials	
3.1 Materials used are with the knowledge of certain biological considerations for use in oral cavity.	Must to Know
3.2 Requirement of materials from prospective of biological compatibility. Classification of material from prospective of biological compatibility E.g. contact with soft tissue, affecting vitality of pulp, used for root canal filling, affecting hard tissue of teeth, laboratory material that could be ingested or inhaled during handling	Must to Know
<ul> <li>3.3 Hazards associated with materials: PH effecting pulp, polymer causing chemical irritation, mercury toxicity etc. micro leakage, thermal changes, galvanism and toxic effect of materials. Biological evaluation for systemic toxicity, skin irritation, mutagenicity and cariogenicity. Disinfection of impression materials for infection control.</li> <li>4. Gypsum and Gypsum Products</li> </ul>	Must to Know

4.1 Gypsum- its origin, chemical formula, and products manufactured from gypsum	Must to Know
4.2 Dental plaster, dental stone, die stone, high strength, high expansion stone	Must to Know
4.3 Application and manufacturing procedure for each	Good to Know
4.4 Macroscopic and microscopic structure of each	Must to Know
4.5 Supplied as and commercial name	Must to Know
4.6 Chemical setting, setting reaction, theories of setting, gauging water, microscopic structure of set material	Must to Know
4.7 Setting time, working time, measurement of setting time and factors controlling setting time	Must to Know
4.8 Setting expansion, hygroscopic setting expansion- factors affecting each	Must to Know
4.9 Strength : wet strength, dry strength, factors affecting strength, tensile strength	Must to Know
4.10 Slurry- need and use	Good to Know
4.11 Care of cast	Must to Know
4.12 ADA classification	Must to Know
4.13 Description of impression plaster and dental investment	Must to Know
4.14 Manipulation including recent methods and advanced methods	Must to Know
4.15 Disinfection: infection control, liquids, sprays, radiation	Must to Know
4.16 Methods of use of disinfectants	Good to Know
4.17 Storage of material- shelf life	Must to Know
5. Impression Materials used in Dentistry	
5.1 Impression plaster	Must to Know
5.2 Impression compound	Must to Know
5.3 Zinc oxide eugenol impression paste	Must to Know
5.4 Bite registration paste	Good to Know
5.5 Non eugenol paste	Must know
5.6 Hydrocolloids- Reversible and irreversible	Must to Know
5.7 Elastomeric impression materials	·
5.7.1 Polysulfide	Must to Know
5.7.2Condensation silicones	Must to Know
5.7.3 Addition silicones	Must to Know
5.7.4 Polyether	Must to Know
5.7.5 Visible light cure polyethyl urethane dimethacrylate	Good to Know
5.8Historical background and development of each impression material	Must to Know

5.9 Definition of impressions, purpose of making impressions, application and uses, market and commercial names, composition, chemistry of setting, impression trays, adhesion to trays, manipulation and equipments required for manipulation, techniques of impressions, storage of impressions, compatibility with cast and die materials, recent advancement in materials and mixing devices,	Must to Know
5.10 Study of individual and comparative properties	Must to Know
6. Synthetic Resin used in Dentistry	
6.1 Historical background and development of material, denture base materials and their classification and requirement	Must to Know
6.2 Classification of resins	Must to Know
6.3 Dental resins- requirements of dental resin, application, polymerization, polymerization mechanism, stages in addition polymerization, inhibition of polymerization, copolymerization, molecular weight, cross linking, plasticizers, physical properties of polymers, polymer structures type of resins	Must to Know
6.4 Acrylic resin: mode of polymerization: heat activated, chemically activated, light activated, mode of supply, application, composition, polymerization reaction of each.	Must to Know
6.5 Technical considerations	Must to Know
6.6 Methods of manipulation of each type of resin	Must to Know
6.7 Physical properties of each type of resin	Must to Know
6.8 Miscellaneous resins and techniques: repair resins, relining and rebasing, short term and long term soft liners temporary crown and bridge resins, resin impression trays, tray materials, resin teeth, materials in maxillofacial prosthesis, denture cleansers, infection control in detail, biological properties and allergic reactions.	Good to Know
7. Dental waxes	
7.1 Introduction and importance of waxes	Must to Know
7.2 Sources of natural waxes and their chemical nature	Must to Know
7.3 Classification of waxes	Must to Know
<ul> <li>7.4 Properties: melting range, thermal expansion, mechanical Must to Kn flow, residual stresses, ductility</li> <li>7.5 Dental waxes: mode of supply classification, composition, properties</li> </ul>	ow properties,
7.5.1 Bite registration wax	Must to Know
7.5.2 Impression waxes for corrective impression	Must to Know
7.5.3 Base plate wax	Must to Know
7.5.4 Processing wax	Must to Know

7.5.5 Boxing wax7.5.6.Utility wax7.5.7 Sticky wax7.5.8 Casting wax

Must to Know Must to Know Must to Know Must to Know

# **B. SYLLABUS FOR PRACTICALS:**

- 1. Gypsum Products:
  - a. Dental plaster: Manipulation, Properties and Preparation of one cube 2" x 2"
  - b. Dental Stone: Manipulation, Properties and Preparation of one cuboid 3" x 2"
    - c. Die Stone: Vacuum mixing and properties
- Impression Compound: Manipulation, Properties and making primary impression of finger
- 3. Shellac Baseplate: Manipulation, Properties and Preparation of one special tray
- 4. Zinc Oxide Eugenol Impression Paste: Manipulation, Properties and making final impression of finger
- 5. Alginate-Irreversible Hydrocolloid: Manipulation, Properties and making impression of jaw typodont.
- 6. Agar Agar-Reversible Hydrocolloid: Demonstration of manipulation of agar for duplication
- 7. Polysulfide Elastomer, Polyether Elastomer, Condensation Silicone Elastomer, Addition Silicone Elastomer: composition, properties and Demonstration of manipulation
- 8. Auto Polymerizing Resin: Manipulation, Properties and stages of polymerisation
- 9. Heat Cure Acrylic Resin: Manipulation, Properties and stages of polymerisation
- 10. Dental Waxes: Modelling Wax, Beading & Boxing, Wax Blue Inlay Wax, Yellow Sticky Wax: Composition, Manipulation, Properties and uses.
- 11.EBES in Dental materials is practiced as generation of PICO on properties of Dental materials and superiority of manipulation techniques, literature search and reflective group discussions facilitated by teaching staff.

### C. RECOMMENDED BOOKS:

Title	Author	Publisher
Science of Dental Material	Kenneth J Annusavice	W.B. Saunder's
Restorative Dental Materials	Robert G Craig	Mosby, USA
Dental Materials	Craig, Power and Wataha	
Notes on Dental Material	E C Combe	ChurchillLivingstone, UK
Basic Dental Material	Mannapalli	

## D. EXAMINATIONS:

### a. INTERNAL ASSESSMENT

- No internal assessment for both theory and practical shall not be conducted for I BDS Dental Materials subject.
  - b. UNIVERSITY EXAM
- University Exam (theory & practical) shall be conducted at the end of II BDS

# **PROSTHODONTICS AND CROWN & BRIDGE**

Prosthodontics is the dental specialty pertaining to the diagnosis, treatment planning, rehabilitation and maintenance of the oral function, comfort, appearance and health of patients with clinical conditions associated with missing or deficient teeth and/or maxillofacial tissues using biocompatible substitutes.

### AIM:

To train the dental student with adequate knowledge, necessary skills and reasonable attitudes which are required for carrying out procedures related to prosthodontic practice involving prevention, diagnosis and treatment of missing and associated structures in the oral and extraoral region.

### **OBJECTIVES**:

- 1. To have an adequate knowledge of the science of prosthodontics
- 2. To understand the principles of biologic functioning and prosthodontic methods
- 3. To diagnose and treat the prosthodontic patient as a whole.
- 4. To evaluate and analyse scientifically and evidence based established facts and data.

### COURSE OUTCOMES ASSESSED:

Were the students able to: Mark anatomical landmarks in edentulous casts, classify partially edentulous arches and correlate to clinical picture. Identify instruments and equipment used for clinical and laboratory prosthodontic procedures. Perform all lab procedures to make a conventional complete denture, removable interim partial denture. Perform tooth preparation and wax patterns for crowns on typhodont teeth

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT:

TOPIC	DISTRIBUTION
1. Terminology	Must to Know
2. Anatomical Landmarks	Must to Know
3. Pouring The Cast	Must to Know
4. Special Tray	Must to Know
5. Beading Boxing	Must to Know
6. Record Base	Must to Know
7. Occlusal Rim	Must to Know
8. Articulators	Must to Know
9. Impression Procedure In CD	Must to Know

10. Teeth Selection	Must to Know
11. Teeth Arrangement	Must to Know
12. Lab Procedures In CD	Must to Know
13. Characterization	Must to Know

### B. SYLLABUS FOR PRACTICALS:

#### EXERCISES TO BE CONDUCTED

Part-I Complete Denture

- 1. Overview to prosthodontics
- 2. Introduction to complete dentures
- 3. Anatomical landmarks: maxillary arch
- 4. Anatomical landmarks: mandibular arch
- 5. Clinical and laboratory steps in fabrication of complete dentures.
- 6. Making of primary impression with medium fusing impression compound: maxilla
- 7. Making of primary impression with medium fusing impression compound: mandible
- Demonstration for making primary impression with alginate making of primary impression with alginate for both maxillary and mandibular completely edentulous arches dies
- 9. Demonstration for making primary impression with addition silicone
- 10. Demonstration for making primary impression with agar agar
- 11. Pouring of primary cast: maxilla (inversion method)
- 12. Pouring of primary cast: mandible (inversion method)
- 13. Fabrication special trays with different spacer designs. (FLIPPED CLASSROOM)
- 14. Pouring of master cast
- 15. Fabrication denture bases with occlusion wax rims.
- 16. Transfer of jaw relations to mean value articulator (mounting of casts)
- 17. Selection of artificial teeth.
- 18. Arrangement of teeth in class I relation:
  - 18.1 Arrangement of upper anterior teeth
  - 18.2 Arrangement of lower anterior teeth
  - 18.3 Arrangement of upper posterior teeth
  - 18.4 Arrangement of lower posterior teeth
- 19. Wax up, carving and polishing
- 20. EBES in Pre-clinical Prosthodontics is practiced as generation of PICO on methods and techniques, literature search and group discussions facilitated by teaching staff.

## C. RECOMMENDED BOOKS

TITLE	AUTHOR	PUBLISHER
Dental lab Procedures Part I: Complete dentures	Rudd & Murrow	-
Dental lab Procedures Part II: Removable Partial	Rudd & Murrow	-
dentures		
Dental lab Procedures Part I: Fixed Partial	Rudd & Murrow	-
dentures		
Manual for Pre-clinical Prosthodontics	S Lakshmi	Elsevier
Essential Manual of PreClinical Prosthodontics	Dr. Paranjay Prajapati	Jaypee
	Dr. Sneha Kulkarni	

- D. EXAM SCHEME:
  - a. INTERNAL ASSESSMENT
- No internal assessment for both theory and practical shall not be conducted in I BDS.
   b. UNIVERSITY EXAM
- University Exam (theory & practical) shall be conducted at the end of II BDS

# **BEHAVIOURAL SCIENCES (20 HOURS OF INSTRUCTION)**

### GOAL:

The aim of teaching behavioural sciences to undergraduate students is to impart such knowledge and skills that may enable him to apply principles of behaviour –

- a) For all round development of his personality
- b) In various therapeutic situations in dentistry

The students should be able to develop skills of assessing psychological factors in each patient, explaining stress, learning simple counselling techniques, and improving patients compliance behaviour.

#### **OBJECTIVES**:

#### A) KNOWLEDGE AND UNDERSTANDING

At the end of the course, the student shall be able to:

- 1) Comprehend different aspects of normal behaviour like learning, memory, motivation, personality and intelligence.
- 2) Recognise difference between normal and abnormal behaviour.
- 3) Classify psychiatric disorders in dentistry.
- 4) Recognise clinical manifestations of dental phobia, dental anxiety, facial pain, oro-facial manifestation of psychiatric disorder, and behavioural problems in children. Addictive disorders, psychological disorders in various dental departments.
- 5) Have understanding of stress in dentistry and knowledge of simple counselling techniques.
- 6) Have some background knowledge of interpersonal, managerial and problem-solving skills which are an integral part of modern dental practice.
- 7) Have knowledge social context of dental care.
- B) SKILLS

The student shall be able to :

- 1) Interview the patient and understand different methods of communication skills in dentist-patient relationship.
- 2) Improve patient compliance behaviour.
- 3) Develop better interpersonal, managerial and problem-solving skills.

4) Diagnose and manage minor psychological problems while treating dental patients.

## INTEGRATION:

The training in behavioural sciences shall prepare the students to deliver preventive, promotive, curative and rehabilitative services to the care of the patients both in family and community and refer advanced cases to specialised psychiatric hospitals.

Training should be integrated with all the departments of dentistry, medicines, pharmacology, psychology and biochemistry.

## PSYCHOLOGY:

- 1) Definition and need of behavioural science. Determinants of behaviour: Scope of behavioural science
- 2) Sensory process and perception perceptual process- clinical application.
- 3) Attention- Definition- Factors that determine attention. Clinical application.
- Memory- Memory process- types of memory, forgetting. Methods to improve memory, clinical assessment of memory and clinical application.
- Definition- Laws of Learning Type of Learning : Classical Conditioning, Operant Conditioning, Cognitive Learning, Insight Learning, Social Learning, Observational Learning, Principles of Learning- Clinical application.
- 6) Intelligence- Definition: Nature of Intelligence Stability of Intelligence Determinants of Intelligence, clinical application.
- 7) Thinking- Definition: Types of Thinking, delusions, problem solving
- 8) Motivation- Definition: Motive, Drive, needs classification of motives
- 9) Emotions-Definition differentiation from feelings- Role of Hypothalamus, cerebral cortex, adrenal glands, ANS. Theories of emotion, types of emotion.

Personality assessment of personality: Questionnaires, personality inventory, rating scales, Interview projective techniques- Rorshach ink blot test, RAT, CAT. SOCIOLOGY:

Social class, social groups- family, types of family, types of marriages, communities and Nations and Institutions.

### **REFERENCE BOOKS:**

- 1) General psychology S.K.Mangal
- 2) General psychology Hans Raj Bhatia
- 3) General psychology Munn
- 4) Behavioural sciences in Medical Practice Manju Mehta
- 5) Sciences basic to Psychiatry Basanth Puri and Peter J Tyrer

# MANAGEMENT SCIENCE

- 1. To describe and discuss the elements of effective management.
- 2. To comprehend details about the basic Organizational Behavioural Science, Human resource Management, Accounting& Finance Management, Marketing Management and Hospital Administration processes in understanding entire concept of management science.
- 3. To identify environmental issues as they impact management and develop strategies to adapt to these environments.
- 4. To Identify and explain issues involved in managing a diverse workforce and conduct necessary research to address these issues.
- 5. Todiscuss and apply the planning, organizing and control processes.
- 6. To educate students of management with different concept of accounting.
- 7. To develop ability among management student to evaluate and use accounting information which assist in decision making for manager
- 8. To Understand Concepts of Marketing and Customer Value
- 9. To equip students with basic understanding finance and its utility
- 10. To enable students to take decisions related with financial feasibility and working capital management
- 11. To Identify, discuss and/or describe various theories related to the development of Work Teams in organizations.
- 12. Duration of each session is one hour.

## COURSE CONTENTS

#### MODULE I: Managerial Functions & Organizational Behavior (10 sessions)

Concept and foundations of Management science, Evolution of Management thoughts; Managerial Functions – Planning, Organizing, Directing, Controlling, and Decision Making: Role of Managers, Managerial Skills; Social Responsibility and Managerial Ethics.

Concept of Organizational Behavior; Individual and organizational Behavior; Personality; Value and Attitude; Perception; Motivation; Learning and Reinforcement; Work stress and stress Management; Leadership process and styles; Conflict and Negotiation; Managing Cultural Diversity.

#### MODULE II Accounting and Finance- Part I (6 Sessions)

Meaning & Role of Accounting & Finance in Hospital Management: Basic Concepts and Terminology of Accounting & Finance: Accounting Statements: Understanding & Importance. **MODULE III: Marketing Management (9 sessions)**  Defining Marketing; Importance, Scope, Core Marketing, New Marketing; Developing & Implementing Marketing Strategies & Plans; Marketing and Customer Value, Corporate and Division Strategic Planning, Business Unit Strategic Planning, the Marketing Plan & Marketing Performance: Creating Customer Value, Satisfaction and Loyalty; Building Customer Value & Satisfaction, Cultivating Customer Relationships; Crafting Brand Positioning & Dealing with Competition; Developing & Communicating Positioning Strategy, differentiation Strategies, Competitive Forces, Analyzing Competitors, and Competitive Strategies; Designing and Managing Services; The nature of Services, marketing strategies, managing service brands, managing product services.

#### MODULE IV; Accounting and Finance Part –II (5 sessions)

Cost Accounting for Hospitals: Understanding of Corporate Finance for Hospital Managers: Source of Financing, Cost of Capital & Capital Budgeting: Purchase & Inventory Management: Budgeting & Budgetary Control; Investment, Financial Markets & Services;

#### MODULE V Human Resource Management (5sessions)

Human Resource Management: Introduction; HRM functions; HR planning; Job Analysis; Job Evaluation; Recruitment & Selection; Training and Development; Performance Management and Compensation: Industrial Relation and Labour laws; HRIS

#### MODULE VI: Hospital Services Management/Administration (15 sessions)

Introduction to Hospitals, Hospital Administration: A contemporary Overview, building a hospital and challenges faced in setting up of hospital, Energy Conservation. Clinical Services: Out Patient Department, Emergency Service Department, Operation Theater and ICU, In Patients Department. Diagnostic Services: Radiology and Laboratory Services. Support and other utility services: Pharmacy services, Medical Record Department, Dietary and Housekeeping services. Material and Equipment Management, Quality and Safety management: Occupational Safety and Hospital Acquired Infections, Hospital Waste Management and Quality Management. Recent Advances in Hospital Administration

## SECOND BDS GENERAL PATHOLOGY AND MICROBIOLOGY

## GENERAL PATHOLOGY:

### **DEFINITION:**

"Pathology is the study (logos) of disease (pathos). More specifically, it is devoted to the study of the structural, biochemical and functional changes in cells, tissue and organ that underlie disease."

### AIM:

At the end of the course in General Pathology the student should be able to understand how the cells and the tissues of the body respond to various types of injury and how these structural and functional abnormalities bring about the various clinical manifestations with which the patient present to the healthcare professional.

### **OBJECTIVES**:

Enabling the student

- I. To demonstrate and apply basic fact, concepts and theories in the field of pathology.
- II. To recognize and analyse pathological changes at macroscopically and microscopical levels and explain their observations in term of disease processes.
- III. To integrate knowledge from the basic science, clinical medicine and dentistry in the study of Pathology.
- IV. To demonstrate understanding of the capabilities and limitations of morphological Pathology in its contribution to medicine, dentistry and biological research.
- V. To demonstrate ability to consult resource materials outside lectures, laboratory and tutorial classes.

## SCOPE:

By the use of molecular, microbiological, immunological and morphologic techniques, pathology attempts to explain the ways and wherefores of the sign and symptoms manifested by patients while providing a rational basis for clinical care and therapy. It thus serves as the bridge between the basic sciences and clinical medicine and is the scientific foundation for all of medicine.

## COURSE OUTCOMES ASSESSED:

Were the students able to Apply the scientific study of disease processes, which result in morphological and functional alterations in cells, tissues and organs to the study of pathology and the practice of dentistry. Demonstrate and apply basic facts, concepts and theories in the field of Pathology. Recognize and analyze pathological changes at macroscopically and microscopical levels and explain their observations in terms of disease processes. Integrate knowledge from the basic sciences, clinical medicine and dentistry in the study of Pathology. Demonstrate

understanding of the capabilities and limitations of morphological Pathology in its contribution to medicine, dentistry and biological research. Demonstrate ability to consult resource materials outside lectures, laboratory and tutorial classes. Understand the basics of various branches of microbiology and able to apply the knowledge relevantly. Apply the knowledge gained in related medical subjects like General Medicine and General Surgery and Dental subjects like Oral Pathology, Community Dentistry, Periodontics, Oral Surgery, Pedodontics, Conservative Dentistry and Oral medicine in higher classes. Understand and practice various methods of Sterilisation and disinfection in dental clinics. Able to diagnose infectious diseases and lesions in the oral cavity. Should be able to select, collect and transport clinical specimens to the laboratory. Should be able to carry out proper aseptic procedures in the dental clinic.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION
1. Introduction to Pathology	
1.1 lerminologies	Must to Know
1.2 The cell in health	Must to Know
1.3 The normal cell structure	Must to Know
1.4 The cellular functions	Must to Know
2. Etiology and Pathogenesis of Disease	
2.1 Cell Injury	Must to Know
2.2 Types – congenital	Must to Know
2.3 Acquired	Must to Know
2.4 Mainly Acquired causes of disease	Must to Know
2.5 Hypoxic injury, chemical injury, physical injury, immunological	
injury	Must to Know
3. Degenerations	
3.1 Amyloidosis	Must to Know
3.2 Fatty change	Must to Know
3.3 Cloudy swelling	Must to Know
3.4 Hyaline change, mucoid degeneration	Must to Know
4. Cell death: Necrosis & Apoptosis	
4.1 Def, causes, features and types of necrosis	Must to Know
4.2 Gangrene - Dry, wet, gas	Must to Know
4.3 Pathological Calcifications	Must to Know
4.4 Dystrophic and metastatic	Must to Know
5. Inflammation	
5.1 Definition, causes types, and features	Must to Know
5.2 Acute inflammation	Must to Know

5.2.1 The vascular response	Must to Know
5.2.2 The cellular response	Must to Know
5.2.3 Chemical mediators	Must to Know
5.2.4 The inflammatory cells	Must to Know
5.2.5 Fate	Must to Know
5.3 Chronic inflammation	Must to Know
5.4 Granulomatous inflammation	Must to Know
6. Healing	-
6.1 Regeneration	Must to Know
6.2 Repair	Must to Know
6.2.1 Mechanisms	Must to Know
6.2.2 Healing by primary intention	Must to Know
6.2.3 Healing by secondary intention	Must to Know
6.2.4 Fracture healing	Must to Know
6.2.5 Factors influencing healing process	Must to Know
6.2.6 Complications	Must to Know
7. Tuberculosis	
7.1 Epidemiology	Must to Know
7.2 Pathogenesis (Formation of tubercle)	Must to Know
7.3 Pathological features of Primary and Secondary TB	Must to Know
7.4 Complications and Fate	Must to Know
8. Syphilis	
8.1 Epidemiology	Desirable to know
8.2 Types and stages of syphilis	Desirable to know
8.3 Pathological features	Desirable to know
8.4 Diagnostic criterias	Desirable to know
8.5 Oral lesions	Good to know
9. Typhoid	
9.1 Epidemiology	Desirable to know
9.2 Pathogenesis	Desirable to know
9.3 Pathological features	Desirable to know
9.4 Diagnostic criterias	Desirable to know
10. Thrombosis	
10.1 Definition, Pathophysiology	Must to Know
10.2 Formation, complications & Fate of a thrombus	Must to Know
11. Embolism	•
11.1 Definition	Must to Know

11.2 Types	Must to Know
11.3 Effects	Must to Know
12. Ischaemia and Infraction	
12.1 Definition, etiology, types	Must to Know
12.2 Infraction of various organs	Must to Know
13. Derangements of body fluids	
13.1 Oedema – pathogenesis	Good to know
13.2 Different types	Good to know
14. Disorders of circulation	
14.1 Hyperaemia	Good to know
14.2 Shock	Good to know
15. Nutritional Disorders	
15.1 Common Vitamin Deficiencies	Good to know
16. Immunological mechanisms in disease	
16.1 Humoral& Cellular immunity	Good to know
16.2 Hypersensitivity &autommunity	Good to know
17. AIDS and Hepatitis.	Must to Know
18. Hypertension	
18.1 Definition, classification	Must to Know
18.2 Pathophysiology	Must to Know
18.3 Effects in various organs	Must to Know
19. Diabetes Mellitus	
19.1 Def, Classification, Pathogenesis, Pathology in different	
organs	Must to Know
20. Adaptive disorders of growth	
20.1 Atrophy & Hypertrophy, Hyperplasia, Metaplasia and	
Dysplasia	Must to Know
21. General Aspects of Neoplasia	
21.1 Definition, terminology, classification	Must to Know
21.2 Differences between benign and malignant neoplasms	
	Must to Know
21.3 The neoplastic cell	Good to Know
21.4 Metastasis	Must to Know
21.5 Etiology and pathogenesis of neoplasia, Carcinogenesis	Good to Know
21.6 Tumour biology	Good to Know

21.7 Oncogenes and anti-oncogenes	Good to Know
21.8 Diagnosis	Must to Know
21.9 Precancerous lesions	Must to Know
21.10 Common specific tumours, Sq papilloma &Ca, Basal cell Ca, Adenoma &Adenoca,Fibroma&Fibrosarcoma, Lipoma and liposarcoma	Must to Know
22 Anaemias	
22.1 Iron Deficiency anaemia, Megaloblastic anaemia	Must to Know
23. Leukaemias	
23.1 Acute and chronic leukaemias, Diagnosis and clinical features	Good to Know
24. Diseases of Lymph nodes	
24.1 Hodgkin's disease, Non Hodgkins lymphoma, Metastatic carcinoma	Good to know
25. Diseases of oral cavity	
25.1 Lichen planus, Stomatitis, Leukoplakia, Sq cell Ca, Ameloblastoma	Must to Know
26. Diseases of salivary glands	
26.1 Normal structure, Sialadenitis, Tumours	Must to Know
27. Common diseases of Bones	
27.1 Osteomyelitis, Metabolic bone diseases, Bone Tumours.	Desirable to know
28. Diseases of Cardiovascular system	
28.1 Atherosclerosis	Good to know
28.2 Ischaemic heart Disease	Good to know
29. Haemorrhagic Disorders	
29.1 Coagulation cascade	Must to Know
29.2 Coagulation disorders	Must to Know
29.3 Platelet function	Must to Know
29.4 Platelet disorders	Must to Know
30. Blood Transfusion	
30.1 Donor selection criteria	Good to know
30.2 Blood grouping and cross matching	Good to know
30.3 Blood transfusion reaction	Good to know

# **B. PRACTICALS**

1. Urine Abnormal constituents

- 1.1. Physical
- 1.2. Chemical
  - 1.2.1. Sugar
  - 1.2.2. Albumin
  - 1.2.3. bile salts
  - 1.2.4. Bile pigments
  - 1.2.5. Ketone bodies
- 1.3. Microscopy
- 2. Haemoglobin (Hb) estimation
- 3. Total WBC count
- 4. Differential WBC Count
- 5. Packed cell volume (PCV)
- 6. Erythrocyte sedimentation Rate (ESR)
- 7. Bleeding Time & clotting Time
- 8. Histopathology Tissue Processing Staining
- 9. Histopathology slides
  - 9.1. Acute appendicitis
  - 9.2. Granulation tissue
  - 9.3. Fatty liver
  - 9.4. CVC lung,
  - 9.5. CVC liver
  - 9.6. Kidney amyloidosis
  - 9.7. Tuberculosis
  - 9.8. Actionomycosis
  - 9.9. Rhinosporidiosis
  - 9.10. Papilloma,
  - 9.11. Basal cell Carcinoma
  - 9.12. Squamous cell Carcinoma
  - 9.13. Osteosarcoma
  - 9.14. Osteoclastoma
  - 9.15. Fibrosarcoma
  - 9.16. Malignant melanoma
  - 9.17. Ameloblastoma
  - 9.18. Adenoma
  - 9.19. Mixed parotid tumour
  - 9.20. Metastatic carcinoma in lymph node
- Specimens:
- 1. Acute Appendicitis.
- 2. Tuberculosis Lymph node.
- 3. Fatty liver.
- 4. Infarction spleen.
- 5. Chronic Venous Congestion (C.V.C.) Liver
- 6. Squamous papilloma
- 7. Basal cell carcinoma
- 8. Lipoma
- 9. Squamous cell carcinoma

- 10. Malignant Melanoma
- 11. Adenocarcinoma
- 12. Osteosarcoma
- 13. Osteoclastoma.
- 14. Gangrene

# C. RECOMMENDED BOOKS

Sr. No.	Title	Author	Publisher	Edition	Year
1	Robbins Basic Pathology	Vinay Kumar	-	<b>8</b> th	2011
2	Textbook Of Pathology	Harsh Mohan	-	<b>6</b> th	2010
3	Wheater's Basic Histopathology- A Color Atlas And Text	Alan Stevens	Churchill Livingstone	<b>4</b> th	2002
4	Pathology Practical Book	Harsh Mohan	Jaypee Brother	2nd	2007
5	Clinical Pathology	SabitriSanyal	Elsevier	3 <sup>rd</sup>	2012
6	Wintrobe's Clinical Hematology	-	Lippincott Williams & Wilkins	11th	2004
7	Currans Atlas Of Histopathology	R. C. Curran	Oxford University Press	4th	2005
8	Clinical Diagnosis And Management By Laboratory Methods	John Bernard Henry	Saunders	12 <sup>th</sup>	2001
10	Textbook Of Medical Laboratory Technology	P.B.Godkar	Bhalani Publishing House	2nd	2003
11	Pathology Quick Review And Mcqs Based On Harsh Mohans Textbook Of Pathology	Harsh Mohan	Jaypee Brother	5th	2005
12	Viva Voce In Pathology,Bacteriology And Haematology	K.N Sachdev	-	3rd	
13	Pathology	Ivan Damjanov	-	<b>1</b> st	

14	Anderson's Pathology	Ivan Damjanov	-	<b>10</b> th	1995
15	Practical Hematology For BDS	KomalMarwala	-	<b>1</b> st	2002
16	Medical Laboratory Technology Methods And Interpretations	RamnikSood	-	6 <sup>th</sup>	
17	De Gruchys Clinical Haematology In Medical	Frank Firkin	Wiley India	5 <sup>⊤н</sup>	2008

# D. SCHEME OF EXAMINATION:

### a. INTERNAL EXAM

- First internal (Theory/Practical): 20 Marks
- Second internal (Theory/Practical): 20 Marks
- Third Internal (Theory/Practical): 60 Marks
- b. University Exam:

As per University rules

## MICROBIOLOGY

#### 1. DEFINITION:

"Microbiology is the science of living organisms that are only visible under the microscope. Medical Microbiology deals with the causative agents of infectious diseases of man, his reaction to such infections, the ways in which they produce disease and the methods for their diagnosis."

### 2. AIM & OBJECTIVES:

The aim is to introduce the students to the exciting world of microbes and make them aware of various branches of Microbiology, importance, significance and contribution of each to mankind and other fields of medicine.

A. Knowledge and understanding:

At the end of Microbiology course, the student is expected to:

- 1. Understand the basics of various branches of microbiology and be able to apply the knowledge relevantly.
- 2. Apply the knowledge gained in related medical subjects like General Medicine and General Surgery and Dental subjects like oral pathology, community dentistry, periodontics, oral surgery, pedodontics, conservative dentistry and oral medicine in higher classes.
- 3. Understand and practice various methods of sterilization and disinfection in dental clinics.
- 4. Have a sound understanding of various infectious diseases and lesions in the oral cavity.

#### B. SKILLS:

- 1. Students should have acquired the skill to diagnose and differentiate various oral lesions
- 2. Should be able to select, collect and transport clinical specimens to the laboratory
- 3. Should be able to carry out proper aseptic procedures in the dental clinic.

The objectives of teaching microbiology can be achieved by various techniques such as:

- a. Lectures
- b. Lecture Demonstrations
- c. Practical Exercises
- d. Audio Visual Aids
- e. Small group discussion with regular feedback from the students

COURSE OUTCOMES ASSESSED:

Were the students able to: Apply the scientific study of disease processes, which result in morphological and functional alterations in cells, tissues and organs to the study of pathology and the practice of dentistry. Demonstrate and apply basic facts, concepts and theories in the field of Pathology. Recognize and analyse pathological changes at macroscopically and microscopical levels and explain their observations in terms of disease processes. Integrate knowledge from the basic sciences, clinical medicine and dentistry in the study of Pathology. Demonstrate understanding of the capabilities and limitations of morphological Pathology in its contribution to medicine, dentistry and biological research. Demonstrate ability to consult resource materials outside lectures, laboratory and tutorial classes. Understand the basics of various branches of microbiology and able to apply the knowledge relevantly. Apply the knowledge gained in related medical subjects like General Medicine and General Surgery and Dental subjects like Oral Pathology, Community Dentistry, Periodontics, Oral Surgery, Pedodontics, Conservative Dentistry and Oral medicine in higher classes. Understand and practice various methods of Sterilisation and disinfection in dental clinics. Able to diagnose infectious diseases and lesions in the oral cavity. Should be able to select, collect and transport clinical specimens to the laboratory. Should be able to carry out proper aseptic procedures in the dental clinic.

### A. COURSE CONTENT AND APPROACH TO SUBJECT

TOPICDISTRIBUTION1. Introduction1.11.1Definition of Microbiology1.2Terminologies used in Microbiology1.3Importance of subject2.1 Scientists & their contributionsGood to know3. Morphology and Physiology of bacteria3.1 DefinitionMust to Know3.2 Difference between prokaryotes & eukaryotesMust to Know3.3 Structure of Bacterial CellGood to Know3.4 Classification based on morphologyGood to Know3.5 Growth requirements of bacteriaMust to Know3.6 Bacterial Growth CurveMust to Know4.1 DefinitionsMust to Know4.2 MethodsGood to Know4.3 Applications/UsesMust to Know		
1. Introduction         1.1       Definition of Microbiology       Must to Know         1.2       Terminologies used in Microbiology       Must to Know         1.3       Importance of subject       Must to Know         2. History       2.1       Scientists & their contributions       Good to know         3. Morphology and Physiology of bacteria       3.1       Definition       Must to Know         3.2       Difference between prokaryotes & eukaryotes       Must to Know         3.3       Structure of Bacterial Cell       Good to Know         3.4       Classification based on morphology       Good to Know         3.5       Growth requirements of bacteria       Must to Know         3.6       Bacterial Growth Curve       Must to Know         4.1       Definitions       Must to Know         4.2       Methods       Good to Know         4.3       Applications/Uses       Must to Know         5       Culture Media and Culture Techniques	TOPIC	DISTRIBUTION
1.1Definition of MicrobiologyMust to Know1.2Terminologies used in MicrobiologyMust to Know1.3Importance of subjectMust to Know2. History2.1 Scientists & their contributionsGood to know3. Morphology and Physiology of bacteria3.1 DefinitionMust to Know3.1 DefinitionMust to Know3.2 Difference between prokaryotes & eukaryotesMust to Know3.3 Structure of Bacterial CellGood to Know3.4 Classification based on morphologyGood to Know3.5 Growth requirements of bacteriaMust to Know3.6 Bacterial Growth CurveMust to Know4. Sterilization and DisinfectionMust to Know4.1 DefinitionsMust to Know4.2 MethodsGood to Know5 Culture Media and Culture TochniquesMust to Know	1. Introduction	
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3. Morphology and Physiology of bacteria         3.1 Definition       Must to Know         3.2 Difference between prokaryotes & eukaryotes       Must to Know         3.3 Structure of Bacterial Cell       Good to Know         3.4 Classification based on morphology       Good to Know         3.5 Growth requirements of bacteria       Must to Know         3.6 Bacterial Growth Curve       Must to Know         4. Sterilization and Disinfection       4.1 Definitions         4.2 Methods       Good to Know         4.3 Applications/Uses       Must to Know	2.1 Scientists & their contributions	Good to know
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3.6 Bacterial Growth Curve       Must to Know         4. Sterilization and Disinfection       Must to Know         4.1 Definitions       Must to Know         4.2 Methods       Good to Know         4.3 Applications/Uses       Must to Know         5 Culture Media and Culture Techniques       Must to Know	3.5 Growth requirements of bacteria	Must to Know
4. Sterilization and Disinfection         4.1 Definitions       Must to Know         4.2 Methods       Good to Know         4.3 Applications/Uses       Must to Know         5 Culture Media and Culture Techniques	3.6 Bacterial Growth Curve	Must to Know
4.1 Definitions       Must to Know         4.2 Methods       Good to Know         4.3 Applications/Uses       Must to Know         5 Culture Media and Culture Techniques	4. Sterilization and Disinfection	-
4.2 Methods     Good to Know       4.3 Applications/Uses     Must to Know       5 Culture Media and Culture Techniques	4.1 Definitions	Must to Know
4.3 Applications/Uses Must to Know	4.2 Methods	Good to Know
5. Culture Modia and Culture Techniques	4.3 Applications/Uses	Must to Know
J. Culture Media and Culture rechniques	5. Culture Media and Culture Techniques	
5.1 Types Must to Know	5.1 Types	Must to Know
5.2 Methods Good to Know	5.2 Methods	Good to Know
5.3 Anaerobic Culture Methods Must to Know	5.3 Anaerobic Culture Methods	Must to Know

## 6. Collection & Transport

6.1. Basic knowledge of selection, collection & transport of Must to Know specimens

6.2Basic knowledge of processing of clinical specimens	Must to Know
6.3Basic knowledge of identification of bacteria	Good to Know
7. Bacterial Genetics	
7.1 Structure of DNA	Good to know
7.2Plasmid	Desirable to know
7.3Drug Resistance in bacteria	Desirable to know
8. Infection	
8.1 Definition	Must to Know
8.2Classification	Must to Know
8.3 Sources & Modes of Transmission	Must to Know
8.4Types of Infectious Diseases	Must to Know
9. Immunity	
9.1 Definition	Good to Know
9.2Types of Immunity	Must to Know
9.3Vaccines	Must to Know
10.1 Structure of Immune System	Good to Know
10.2 Functions of Immune System	Good to Know
10.3 Briefly Immune Response	Good to Know
11. Antigen	•
11.1 Definition	Good to Know
11.2 Types	Good to Know
11.3 Factors/Determinants of antigenicity	Good to Know
12. Immunoglobulins/Antibodies	
12.1 General structure	Must to Know
12.2 Types	Must to Know
12.3 Role played by each one in the defence mechanism of the	Good to Know
body	
13. Complement System	
13.1 Definition	Must to Know
13.2 Biological functions	Must to Know
13.3 Pathways	Good to Know
14. Antigen-Antibody Reactions	_
14.1 Principles of various Ag-Ab. Reactions	Must to Know
14.2 Clinical applications of each one	Must to Know
15. Immunodeficiency Disorders	
15.1 Brief knowledge of immunodeficiency disorders	Good to Know
15.2 Sound knowledge of immunodeficiency disorders relevant to	Must to Know
dentistry	
16. Hypersentivity	
16.1 Definition	to Know
16.2 Types of reactions	Must to Know

17. Autoimmune Disorders	
17.1 Basic knowledge of various types	Good to Know
17.2 Sound knowledge of autoimmune disorders of oral cavity and	Must to Know
related structures	
18. Immunology of Transplantation & Malignancy	Good to Know
19. Immunehaematology	Good to Know
20. Pyogenic Cocci	
20.1 Staphylococcus	Must to Know
20.2 Streptococcus: Cariogenic Streptococci	Must to Know
20.3 Pneumococcus	Good to Know
20.4 Gonococcus	Good to Know
20.5 Meningococcus	Must to Know
20.6 Mode of spread	Must to Know
20.7 Laboratory diagnosis	Godd to Know
20.8 Chemotherapy	Must to Know
20.9 Prevention	Must to Know
21. Corynebacterium diphtheria	
21.1 Mode of spread	Must to Know
21.2 Important clinical features	Must to Know
21.3 Laboratory diagnosis	Must to Know
21.4 Chemothearpy	Must to Know
21.5 Immunisation/Immunoprophylaxis	Must to Know
22. Mycobacteria	
22.1 Tuberculosis	Must to Know
22.2 Leprosy	Good to Know
22.3 Mode of spread	Must to Know
22.4 Important clinical features	Must to Know
22.5 Laboratory diagnosis	Must to Know
22.6 Prevention	Must to Know
23. Clostridium	
23.1 Gas gangrene	Must to Know
23.2 Tetanus	Must to Know
23.4 Morphology	Must to Know
23.5 Laboratory diagnosis	Must to Know
23.6 Immunoprophylaxis	Must to Know
24. Non-sporing Anaerobes	
24.1 Classification	Must to Know
24.2 Morphology	Must to Know
24.3 Dental Pathogens	Must to Know
24.4 Mechanism of disease production	Must to Know
24.5 Prevention	Must to Know
25. Gram Negative Bacilli	1
25.1 E.coli	Must to Know
25.2 Kelbsiella	Good to Know
25.3 Salmonella	Must to Know

25.4 Shigella	Good to Know
25.5 Vibrio	Good to Know
25.6 Infections caused by them	Good to Know
25.7 Mode of spread	Good to Know
25.8 Laboratory diagnosis	Good to Know
25.9 Prevention	Must to Know
26. Spirochetes	
26.1 Treponema pallidum	Must to Know
26.2 Oral lesions of Syphilis	Must to Know
26.3 Laboratory diagnosis	Must to Know
26.4 Borrelia vincentii	Must to Know
27. Actinomycetes	
27.1 Morphology	Must to Know
27.2 Clinical features	Good to Know
27.3 Laboratory diagnosis	Good to Know
28. Virology	
28.1 General properties	Good to Know
28.2 Cultivation	Good to Know
28.3 Host-virus interaction	Must to Know
28.4 Interferon	Good to Know
28.5 Laboratory diagnosis	Must to Know
28.6 Chemotherapy	Good to Know
28.7 Immunoprophylaxis	Must to Know
29. Bacteriophage	
29.1 Structure	Good to Know
29.2 Significance	Good to Know
30. Hepatitis viruses	
30.1 Hepatitis B	Must to Know
30.2 Morphology	Good to Know
30.3 Clinical features	Must to Know
30.4 Laboratory diagnosis	Good to Know
30.5 Immunoprophylaxis	Must to Know
30.6 Brief account of other Hepatitis viruses	Must to Know
31. Human Immunodeficiency virus (HIV)	
31.1 Morphology	Must to Know
31.2 Modes of transmission	Must to Know
31.3 Clinical features	Must to Know
31.4 Opportunistic infections (briefly)	Must to Know
31.5 Laboratory diagnosis	Must to Know
31.6 Prevention	Must to Know
32. Herpes virus	Must to Know
33. Mumps virus	Good to Know
34. Measles & Rubella viruses (briefly)	Good to Know
35. Rabies	
35.1 Morphology	Must to Know

35.2 Pathogenesis	Must to Know
35.3 Prophylaxis	Must to Know
35.4 Prevention	Must to Know
36. Mycology	•
36.1 Classification	Must to Know
36.2 Morphology	Must to Know
36.3 Infection	Must to Know
37. Candida	•
37.1 Morphology	Must to Know
37.2 Clinical manifestations	Must to Know
37.3 Laboratory diagnosis	Must to Know
38. Fungi causing oral lesions of systemic mycoses	Must to Know
39. Parasitology	•
39.1 Classification	Good to Know
39.2 Modes of transmission	Good to Know
39.3 Prevention	Good to Know
39.4 Protozoans and Helminths commonly seen in the region	Good to Know
40. Entamoeba histolytica	•
40.1 Mode of transmission	Must to Know
40.2 Morphological forms	Must to Know
40.3 Life cycle	Must to Know
40.4 Amoebiasis	Must to Know
40.5 Laboratory diagnosis	Must to Know
41. Malaria	•
41.1 species	Must to Know
41.2 Morphological forms	Must to Know
41.3 Life cycle	Must to Know
41.4 Clinical features	Must to Know
41.4 Laboratory diagnosis	Must to Know
41.5 Prevention	Must to Know
42. Round worm (Ascaris lumbricoides)	
42.1 Morphological forms	Good to Know
42.2 Life cycle	Good to Know
42.3 Clinical features	Good to Know
42.4 Laboratory diagnosis	Good to Know
42.5 Prevention	Good to Know
43. Hook worm (Ancylostoma duodenale)	
43.1 Morphological forms	Good to Know
43.2 Life cycle	Good to Know
43.3 Clinical features	Good to Know
43.4 Laboratory diagnosis	Good to Know
43.5 Prevention	Good to Know
44. Hospital Acquired Infections (HAI)	
44.1 Definition	Must to Know
44.2 Various HA Infections	Must to Know

44.3 Methods of prevention & control of HAI	Must to Know
45. Universal Work Precautions	
45.1 Definition	Must to Know
45.2 Various precautions	Must to Know
46. Biomedical Waste Management	
46.1 Definition	Must to Know
46.2 Categories	Must to Know
46.3 Methods of disposal	Must to Know
46.4 Use of correct color-coded bags	Must to Know

### **B.** Practical:

#### 1. Microscope

- 1.1 Parts & Functions of Compound Microscope
- 1.2 Other Microscopes & their uses
- 1.3 Demonstration of Microscope, its parts & slides
- 2. Morphology of Bacteria
  - 2.1 Classification
  - 2.2 Bacterial Cell
  - 2.3 Demonstration of slide of various micro-organisms
- 3. Staining:
  - 3.1 Types of staining
  - 3.2 Gram & Acid Fast (ZN) Staining
  - 3.3 Principles
  - 3.4 Methods & Reagents
  - 3.5 Observations
  - 3.6 Interpretations
  - 3.7 Demonstration of staining methods
  - 3.8 Demonstration of slides for both the types of staining methods
- 4. Sterilization & Disinfection
  - 4.1 Definitions
  - 4.2 Methods
  - 4.3 Demonstration of eqipments & their working used for sterilization
- 5. Culture Media
  - 5.1 Types
  - 5.2 Uses
  - 5.3 Demonstration of media
- 6. Culture Methods/Isolation of bacteria
  - 6.1 Anaerobic culture methods in details
  - 6.2 Demonstration of methods of inoculation & culture plates

 Identification of bacteria/Biochemical Tests 7.1 Different biochemical tests
 7.2 Utility of these tests
 7.3 Demonstration of various biochemical tests

Immunology

- 8. Serological Reactions
  - 8.1 Different serological tests
  - 8.2 Application of these tests for diagnosis
  - 8.3 Demonstration of various

tests Systemic Bacteriology

- 9. Staphylococci & Streptococci
  - 9.1 Morphology
  - 9.2 Infections they produce
  - 9.3 Briefly Lab. Diagnosis
  - 9.4 Demonstration of slides, culture plates & tests
- 10. Neisseriae
  - 10.1 Morphology
  - 10.2 Infections they produce
  - 10.3 Briefly Lab. Diagnosis
  - 10.4 Demonstration of slides, culture plates & tests
- 11. Gram Negative

Bacilli 11.1 E.coli

- 11.2 Klebsiella
- 11.3 Salmonella
- 11.4 Shigella
- 11.5 Vibrio cholerae
- 11.6 Briefly account of:
- 11.7 Infectious syndromes
- 11.8 Laboratory diagnosis
- 11.9 Demonstration of slides, culture plates & tests

#### 12. Corynebacterium diphtheriae:

- 12.1 Morphology
- 12.2 Infections
- 12.3 Laboratory diagnosis
- 12.4Immunopropylaxis
- 12.5 Demonstration of slides, culture plates & tests
- 13. Clostridium welchii& Clostridium tetani

- 13.1 Morphology
- 13.2 Infections
- 13.3 Laboratory diagnosis
- 13.4 Immunopropylaxis
- 13.5 Demonstration of slides
- 14. Spirochetes
  - 14.1 Syphilis
  - 14.2 Laboratory diagnosis
  - 14.3 Demonstration of tests used in diagnosis
  - 15. Mycology
    - 15.1 Classification
    - 15.2 Candida: Morphology & laboratory diagnosis
    - 15.3 Demonstration of slides, culture plates &

tests Parasitology

- 16. Protozoa
  - 16.1 Entamoeba histolytica
  - 16.2 Malaria
  - 16.3 Morphology
  - 16.4 Life cycle
  - 16.5 Laboratory diagnosis
  - 16.6 Demonstration of slides of various morphological forms
  - 16.7 Charts diplaying life cycle

#### 17. Helminths

- 17.1 Ascaris lumbricoides
- 17.2 Ancylostoma duodenale
- 17.3 Morphology
- 17.4 Life cycle
- 17.5 Laboratory diagnosis
- 17.6 Demonstration of slides of various morphological forms
- 17.7 Charts displaying life cycle

## C. RECOMMENDED BOOKS:

Title	Author	Publisher
Textbook of Microbiology	R. Ananthanaryan& C.K.	Orient Longman Private Ltd.
	Jayram Paniker	Chennai
Textbook of Microbiology for		C. P
Dental Students		

Medical Microbiology Volume I	Cruickshank	Medical Division Orient Longman group Edinburg
Text Book of Bacteriology	Fair Brothers	

Bacteriology for Dental Students	T.H. Merville and G.L. Slack	Medical Book Ltd. London
Bacteriology for students of Dental Surgery	R.B. Lucas and Ivor R.H.Kramer	
Oral Microbiology and Infectious Diseases	Burnett and Scherp	Oxford Book Company
Immunology	Donald M Weir	Longman Singapore
Medical Parasitology	N. C. Dey and T.K.Dey	New Central Book Agency Pvt.Ltd. Calcutta
Notes on Medical Virology	Morag C.Timbury	
Manual of Clinical Mycology	Conant and Smith	

## **EXAMINATION SCHEME**

- a. INTERNAL EXAM
  - First internal (Theory/Practical): 20 Marks
  - Second internal (Theory/Practical): 20 Marks
  - Third Internal (Theory/Practical): 60 Marks
- b. University Exam:

As per University rules

# **GENERAL & DENTAL PHARMACOLOGY AND THERAPEUTICS**

### Definition:

It is the science of drugs which deals with interaction of exogenously administered drugs with living systems.

### Aim:

The broad goal of teaching undergraduate students in pharmacology is to inculcate rational and scientific basis of therapeutics keeping in view of dental curriculum and profession.

## Objectives:

a. Knowledge

At the end of the course the student shall be able to,

- I. Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular.
- II. List the indications, contraindications, interactions and adverse reactions of commonly used drugs with reason.
- III. Tailor the use of appropriate drugs in disease with consideration to its cost, efficacy and safety for individual and mass therapy needs.
- IV. Indicate special care in prescribing common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal hepatic damage and immune compromised patients.
- V. Integrate the rational drug therapy in clinical pharmacology.
- VI. Indicate the principles underlying the concepts of "essential drugs".

#### b. Skills:

At the end of the course the student shall be able to,

- I. Prescribe drugs for common dental and related medical ailments.
- II. To appreciate adverse reactions and drug interactions of commonly used drugs.
- III. Observe experiments designed for study of effects of drugs.
- IV. Critically evaluate drug formulations and be able to interpret the clinical pharmacology of marketed preparations commonly used in dentistry.
- c. Integration:

Acquire knowledge and skills on use of drugs in clinical practice through integrated teaching with clinical departments.

Note: All the above includes the scope for dental pharmacology.
#### Course outcomes assessed:

Were the students able to: Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular. List the indications, contraindications; interactions, and adverse reactions of commonly used drugs with reason. Tailor the use of appropriate drugs in disease with consideration to its cost, efficacy, safety for individual and mass therapy needs. Indicate special care in prescribing common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal, hepatic damage and immuno compromised patients. Integrate the rational drug therapy in clinical pharmacology. Indicate the principles underlying the concepts of "Essential drugs". Prescribe drugs for common dental and medical ailments. Appreciate adverse reactions and drug interactions of commonly used drugs. Infer from experiments designed for study of effects of drugs. Critically evaluate drug formulations and interpret the clinical pharmacology of marketed preparations commonly used in dentistry.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION
1. General Pharmacology	
1.1 Definitions: Pharmacology, drug, Pharmacy, sources of drug with examples.	Must to Know
1.2 Pharmacokinetics with clinical implications.	Must to Know
1.3 Routes of administration: oral, inhalation, intra-dermal, subcutaneous, intramuscular, intravenous, intra-thecal, peri-neural & newer drug regimes. (Advantages and disadvantages with the examples of drug administered).	Must to Know
1.4 Pharmacodynamics:mechanism of action, factors, modifying drug actions with emphasis on factors like- age, sex, dose, frequency & route of administration, presence of other drugs, pharmacogenetics and pathological conditions.	Must to Know
1.5 Therapeutics: principles of drug therapy, adverse drug reactions and drug interactions.	Must to Know
2. ANS Drugs	
2.1 Sympathomimetics	Must to Know
2.2 Sympatholytics- alpha blockers, Beta- blockers.	Must to Know
2.3 Cholinomimetics.	Must to Know

2.4 Anti cholinergics.	Must to Know
1. Detailed Pharmacology of	
3.1 Clinically used opioid and non-opioid analgesics.	Must to Know
3.2 Local anaesthetics and preanaesthetic medication.	Must to Know
<ol> <li>Detailed pharmacology &amp; enumeration of clinically used pharmacology, clinical uses along with dental uses if any , effects of:</li> </ol>	l agents, their brief and specific adverse
4.1 Ethyl alcohol- actions, uses and drug interactions.	Good to Know
4.2 General anaesthetics	Good to Know
4.3Antipsychotics	Desirable to Know
4.4Antidepressants	Desirable to Know
4.5Anxiolytics	Must to Know
4.6Sedative hypnotics	Desirable to Know
4.7Anti epileptics	Desirable to Know
5. CVS Drugs	
5.1 Cardiac glycosides	Desirable To Know
5.2Anti anginal drugs	Good To Know
5.3Anti hypertensives.	Must Know
5.4Diuretics	Good To Know
5.5 Pharmacotherapy of shock-anaphylactic, cardiogenic, hypovolemic & septic.	Must to Know
6. Blood	
<ol> <li>6.1 Coagulants, anticoagulants, fibrinolytics, antiplatlet drugs and styptics</li> </ol>	Must to Know
6.2Hematinics: Iron preparation Vit B12, Folic acid Vit.C	Must to Know
6.3Vit.D& Calcium Preparations	Must to Know
4. Endocrine	
7.1 Drugs used in diabetes mellitus	Must to Know
7.2Corticosteroids	Must to Know
8. Chemotherapy	
8.1 Sulfonamides	Must to Know
8.2Beta-lactam antibiotics	Must to Know
8.3Macrolides	Must to Know
8.4Aminoglycosides	Desirable to Know
8.5Broad spectrum antibiotics	Must to Know
8.6Antifungal and antiviral (acyclovir) agents	Desirable to Know
8.7 Metronidazole and fluroquinolones	Must to Know
8.8Anti neoplastic drugs: Alkylating agents, Anti metabolites, Radioactive Isotopes, Vinka Alkaloids, Anticancer antibiotics.	Desirable to Know
8.9Drug therapy of Tuberculosis, Leprosy & Malaria	Good to Know

5.	Other	Drugs
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0	
9.1 Antihistamines and antiemetics	Good To Know
9.2 Drugs used in bronchial asthma and cough	Good To Know
9.3 Drugs used in peptic ulcer	Good To Know
9.4 Chelating agents- BAL, EDTA & Penicillamine	Desirable To Know
9.5 Anti helminthics	Desirable To Know
10. Dental Pharmacology	
10.1 Fluoride pharmacology	Must to Know
10.2 Antiseptics, astringents &sialogogues	Must to Know
10.3 Obtundents, Mummifying and disclosing agents	Must to Know
10.4 Prevention and drug therapy of emergencies in dental	Must to Know
practice	
10.5 Seizures	Must to Know
10.6 Anaphylaxis	Must to Know
10.7 Severe bleeding	Good to Know
10.8 Shock	Must to Know
10.9 Tetany	Must to Know
10.10 Status asthmaticus	Must to Know
10.11 Acute addisonian crisis	Must to Know
10.12 Diabetic Ketoacidosis	Must to Know

#### **B.** Practical

- 1. Introduction
  - 1.1 Equipment used in dispensing pharmacy
  - 1.2 Prescription parts and model prescription
- 2. Demonstration of common dosage forms used in clinical practice
- 3. Mixtures
  - 3.1 Simple mixtures (salicylate mixture)
  - 3.2 Diffusible (Bismuth Kaolin/ Chalk) mixtures
- 6. Emulsion-Types and example (Liniment turpentine/ shark liver oil) of emulsion
- 7. Powders- toothpowder
- 8. Paints
  - 6.1 Mandle's paint/ Gum paint
  - 6.2 Percentage dilution- concept and calculations with suitable examples

- 7. Mouthwashes
  - 7.1 Alkaline mouthwash
  - 7.2 Antiseptic mouthwash
  - 7.3 Astringent mouthwash
  - 8. Toothpastes
  - 9. Prescription writing for 15 general conditions commonly encountered in clinical practice. e.g. Bronchial asthma, hypertension congestive heart failure, angina pectoris, peptic ulcer, bacillary dysentery, pseudomembranous colitis, diabetes mellitus, diabetic coma, osteoarthritis, anaphylaxis, status asthmaticus, status epilepticus, iron deficiency & pernicious anaemia
  - 10. Dental prescriptions for about fifteen dental conditions commonly encountered in practice e.g. Acute necrotising ulcerative gingivitis, acute herpetic gingivitis/stomatitis, acute gingival abscess, peri coronal abscess (impacted teeth), dental caries, aphthous ulcers, hypersensitive dentine, dentoalveolar abscess, xerostomia, acute toothache, postoperative pain, post extraction pain with swelling, oral candidacies, scurvy etc.

## C. RECOMMENDED BOOKS

1. R.S.Satoskar, Kale Bhandarkar's Pharmacology and Pharmacolherapentics, 10th Edition, Bombay Popular Prakashan 1991.

2. Bertam G Katzung, Basic and Clinical pharmacology 6th ed. Appleton & Lange 1997

3. Lauerence D.R. Clinical Pharmacology 8th ed. Churchill Livingstone 1997

4. Satoskar R.S. & Bhandarkar S.D., Pharmacology and Pharmaco Therapeutics part I & part ii, 13th Popular Prakashan Bombay 1993

5. Tripathi K.D., Essentials of Medical Pharmacology 4th ed Jaypee Brothers 1999.

## D.SCHEME OF EXAMINATION

#### a. INTERNAL EXAM

- First internal (Theory/Practical): 20 Marks
- Second internal (Theory/Practical): 20 Marks
- Third Interna (Theory/Practical)I: 60 Marks
- b. University Exam:

As per University rules

### **DENTAL MATERIALS**

Course outcomes assessed:

Were the students able to: Understand the evolution and development of science of dental material. Explain purpose of course in dental materials to personnel concerned with the profession of the dentistry. Acquire knowledge of physical and chemical properties. Acquire knowledge of biomechanical requirements of particular restorative procedure. Search for newer and better materials which may answer our requirements with greater satisfaction. Evaluate the claims made by manufactures of dental materials

### A. COURSE CONTENT AND APPROACH TO THE SUBJECT

The change in II BDS Dental Material theory syllabus shall be as following:

1. To introduce Reverse Engineering/CAD-CAM as desirable to

know These will enable students to stay up-to-date with advances

in dentistry.

The change in II BDS Dental Materials theory syllabus shall be as following:

1. Biomedical waste management of dental materials used in prosthodontics under desirable to know section

These will enable students to handle the material waste with caution.

The change in II BDS Dental Materials theory syllabus shall be as following:

1. To incorporate optical physics, recent advances in tooth coloured restoration and endodontic related materials like EDTA, gutta percha, irrigants as desirable to know.

These will enable students to stay up-to-date with advances in endodontics.

TOPIC	DISTRIBUTION
. 1. Metals and Alloys	
1.1 Structure and behavior of metals	Must to Know
1.2 Solidification of metals	Must to Know
1.3 Mechanism of crystallization- amorphous & crystalline	Must to Know
1.4 Classification of alloys	Must to Know
1.5 Solid solution	Good to Know
1.6 Constitutes and equilibrium phase diagrams: electric alloys, physical properties, peritectic alloys, solid state reaction other binary system	Good to Know
1.7 Metallography and heat treatment	Good to Know
1.8 Tarnish and corrosion	Must to Know
1.9 Corrosion of dental restorations	Must to Know
1.10 Clinical significance of galvanic current	Must to Know
. 2.Dental Casting Alloys	
2.1 Historical background	Must to Know
2.2 Desirable properties of casting alloys	Must to Know
2.3 CAD-CAM technology	Good to Know
2.4 Classification of casting alloys: by function and description	Must to Know
2.5 Recent classification: high noble, noble and predominantly base metal	Must to Know
2.6 Alloys for crown and bridge, metal ceramic and removable partial denture	Must to Know
2.7 Composition, function, constituents and application, each alloy both noble and base metal	Must to Know
2.8 Properties of alloys: melting range, mechanical properties, hardness, elongation, modulus of elasticity	Must to Know
2.9 Casting shrinkage and compensation of casting shrinkage	Must to Know
2.10 Biocompatibility- handling hazards & precautions of base metal alloys	Must to Know
2.11 Casting investments used	Must to Know
2.12 Heat treatment- softening and hardening heat treatment	Must to Know
2.13 Recycling of metal	Good to Know
2.14 Titanium alloys and their application, properties and advantages	Good to Know
2.15 Technical considerations in casting- heat source and furnaces	Desirable to Know
3. Dental Casting Investments	
3.1 Definition, requirement, classification	Must to Know

3.2 Gypsum bonded, phosphate bonded, silica bonded - Classification	
3.3 Mode of supply- composition, application, setting mechanism, setting time, and factors controlling it.	Must to Know
3.4 Expansions: setting expansion, hygroscopic setting expansion and thermal expansion	Must to Know
3.5 Factors affecting properties: strength, porosity and fineness and storage	Must to Know
3.6 Technical considerations for casting procedures,	Must to Know
3.7 Preparation of die, wax pattern, spruing, investing, (FLIPPED CLASSROOM) control of shrinkage compensation, wax burnout and heating the investing ring	Must to Know
3.8 Casting, casting machines, source of heat for melting the alloy	Must to Know
3.9 Casting defects	Must to Know
4.Dental Ceramic	
4.1 Historical background & general applications	Good to Know
4.2 Definition, classification, application, mode of supply, manufacturing procedures, methods of strengthening.	Must to Know
4.3 Properties of fused ceramic: Strength and factor affecting, Modulus of Elasticity, Surface Hardness, Wear Resistance, Thermal Properties, Specific Gravity, Chemical Stability, Esthetic Properties, Biocompatibility, Technical Considerations	Must to Know
4.4 Metal ceramics (PFM) alloys: Types and Composition.	Must to Know
<ul> <li>4.5 Metal ceramic bond</li> <li>4.5.1 Nature of bond</li> <li>4.5.2 Bonding using electro deposition, foil coping, bonded platinum foil, swaged gold alloy foil coping.</li> <li>4.5.3 Technical considerations for porcelain and porcelain used metal restorations. Recent advances- all porcelain restorations, manganese core, injection molded, castable ceramics, glass infiltrated alumina core, in Ceram, ceramic veneer, inlays and onlays and CAD-CAM ceramic. Chemical attack of ceramic by fluoride. Porcelain furnaces.</li> </ul>	Must to Know
<ul> <li>4.6 Recent Advances</li> <li>4.6.1 All porcelain restorations</li> <li>4.6.2Manganese core</li> <li>4.6.3 Injection moulded</li> <li>4.6.4 Castable ceramics</li> <li>4.6.5Glass infiltrated alumina core</li> <li>4.6.6 In Ceram</li> <li>4.6.7 Ceramic veneer</li> <li>4.6.8 Inlays and onlays and CAD-CAM ceramic</li> <li>4.6.9 Chemical attack of ceramic by fluoride</li> </ul>	Desirable to Know

4.6.10 Porcelain furnaces

4.6.11 Zirconia as an all ceramic restoration

5.Die and Die Materials

5.1 Types: Gypsum, Epoxy Resin, Cement and Amalgam	Must to Know
5.2 Electroforming and electro polishing	Must to Know

6.Abrasive and Polishing Agents

6.1 Definition	Must to Know
6.2 Need	Must to Know
6.3 Finishing, polishing and cleaning	Must to Know
6.4 Types of abrasives:	
6.4.1 Diamond	Must to Know
6.4.2 Emery	Must to Know
6.4.3 Aluminum oxide	Must to Know
6.4.4 Garnet	Good to Know
6.4.5 Pumice	Must to Know
6.4.6 Kieselgurh	Good to Know
6.4.7 Tripoli	Good to Know
6.4.8 Rouge	Must to Know
6.4.9 Tin oxide	Good to Know
6.4.10 Chalk	Good to Know
6.4.11 Chromium oxide	Good to Know
6.4.12 Sand	Must to Know
6.4.13 Carbides	Good to Know
6.4.14 Zirconium silicates	Good to Know
6.4.15 Zinc oxide	Good to Know

7.Dental Implant

Y	
7.1 Evolution, Types and Materials	Must to Know
<ul> <li>8. Biomedical Waste Management of Dental materials used in Prosthodontics</li> <li>8.1.Gypsum Products</li> <li>8.2. Dental Silicone</li> <li>8.3. Acrylic Resin</li> </ul>	Desirable to know
8.4. Miscellaneous	
9. Dental Cements: Definitions, classifications, setting-mechanism, p	roperties, factors

9. Dental Cements: Definitions, classifications, setting-mechanism, properties, factors affecting setting, manipulations, mode of supply, mode of adhesion, modifications & recent advances, clinical implications of :

9.1 Silicate Cement	Must to Know
9.2 Glass lonomer,	Must to Know

9.3 Zinc Phosphate,	Must to Know
9.4 Zinc Oxide Eugenol,	Must to Know
9.5 Calcium Hydroxide,	Must to Know
9.6 Zinc Polycarboxylate,	Must to Know
9.7 Gutta-Percha & Varnish	Must to Know
10. Dental Amalgam	
10.1 History,	Good to Know
10.1 Definitions, classifications	Must to Know
10.1 Manufacturing	Good to Know
10.1 Compositions, setting reaction	Must to Know
10.1 Properties, microlekage, manipulations,	Must to Know
10.1 Effect of dimensional changes, finishing & polishing	Must to Know
10.1 Mercury toxicity & hygiene	Must to Know
10.1 Clinical implications	Must to Know
10.1 Biocompatibility	Must to Know
11. Direct Filling Gold	
11.1 Properties	Good to Know
11.2 Mode of adhesions	Good to Know
11.3 Classifications,	Good to Know
11.4 Manipulations	Good to Know
11.5 Removal of surface impurities	Good to Know
11.6 Mode of supply	Good to Know
11.7 Clinical performance	Good to Know
12.Abrasion and Polishing Agents	•
12.1 Definition, Needs and Types	Must to Know
12.2 Desirable characteristics of an abrasive	Must to Know
12.3 Rate of abrasion,	Must to Know
12.4 Size of particle	Must to Know
12.5 Pressurized speed	Must to Know
12.6 Polishing materials,	Must to Know
12.7 electrolytic polishing and burnishing	Must to Know
13.Tarnish and Corrosion	
13.1 Definition,	Must to Know
13.2 Corrosion types	Must to Know
13.3 Methods to overcome	Must to Know
13.4 Corrosion	Must to Know

14.Adhesion

14.1 Need for bonding,	Must to Know
14.2 Types of bonding, clinical factors affecting bonding,	Must to Know
14.3 Advantage & disadvantages of bonding	Must to Know
14.4 Acid etch techniques	Must to Know
14.5 Enamel bonding	Must to Know
14.6 Dentin bonding agents	Must to Know
15. Optical physics	Desirable to Know
16. Recent advances in tooth colored restorations	Desirable to Know
17. Endodontic related materials like EDTA, Gutta percha, Irrigants	Desirable to Know

## B. SYLLABUS FOR PRACTICALS:

- 1. Investment Materials: Composition, Manipulation, Properties and demonstration of investing procedure.
- 2. Dental Casting Alloys, Wrought Metal Alloys: identification and composition and properties
- 3. Dental Porcelain: Manipulation, Properties and demonstration.
- 4. Dental Implants: types and properties
- 5. Materials For Maxillo-Facial Prosthesis:
- 6. Tissue Conditioner: Composition, and manipulation and use
- 7. Soft Liner: Composition, and manipulation and use
- 8. Separating Media: Composition, and manipulation and use
- 9. Finishing And Polishing Agents :identification, Types and use
- 10. Manipulation of Silver Amalgam.
  - 10.1. Demonstration of proportioning.
  - 10.2. Demonstration of trituration, mulling, condensation, carving, finishing and polishing of dental amalgam.
  - 10.3. Students are demonstrated to do restoration in Class I amalgam cavity.
- 11. Manipulation of Zinc Phosphate Cement.
  - 11.1. Demonstration of powder: liquid ratio, method of mixing, consistency, application as a base into the cavity.
- 12. Manipulation of Glass Ionomer Cement.
  - 12.1. Demonstration of powder: liquid ratio, method of mixing, consistency, application as a base into the Class IV cavity in restorative and luting consistency.
- 13. Manipulation of Zinc Polycarboxylate Cement.

- 13.1. Demonstration of powder: liquid ratio, method of mixing, consistency, application as a base into the cavity.
- 14. Manipulation of Zinc Oxide Eugenol Cement.
  - 14.1. Demonstration of powder: liquid ratio, method of mixing, consistency, application as a base into the cavity in restorative and luting consistency.
- 15. Discussion and Demonstration of application of calcium hydroxide powder and/or Dycal as sub base and pulp capping agent.
- 16. Discussion and Demonstration and application of dental varnish.
- 17. Demonstration of composite resin- acid etching, bonding procedure, incremental buildup of Class IV/V composite resin. Light curing procedures and finishing and polishing.

Title	Author	Publisher
Science of Dental Material	Kenneth J Annusavice	W.B. Saunder's
Restorative Dental Materials	Robert G Craig	Mosby, USA
Dental Materials	Craig, Power and Wataha	
Notes on Dental Material	E C Combe	ChurchillLivingstone, UK
Basic Dental Material	Mannapalli	

### C. RECOMMENDED BOOKS:

# D. SCHEME OF EXAMINATION

a. INTERNAL EXAM:

- First internal (Theory/Practical): 20 Marks
- Second internal (Theory/Practical): 20 Marks
- Third Internal (Theory/Practical): 60 Marks

#### b. UNIVERSITY EXAM

The change in II BDS Dental Material university exam shall be as following:

These will enable students to develop analytical thinking.

# Practical Examination: (distribution of marks)

SR.	PARTICULARS	MARK
NO		
1	Spotters- 10 X 2	20
2	Exercise No-1 (Based on OSPE) Prosthodontic: Any one exercise	30
	from the following:	
	Manipulation of:	
	s. Impression Compound	
	t. Alginate Impression Material	
	u. Zinc Oxide Eugenol Impression Paste	
	v. Dental Stone	
	w. Dental Plaster	
	x. Acrylic resin	

3	Exercise No:2 (Based on OSPE)	30
	Conservative: Any one from following	
	Manipulation of:	
	p. Silver Amalgam	
	q. Zinc Oxide Eugenol(Luting and Base consistency)	
	r. Zinc Phosphate Cement (Luting and Base consistency)	
	s. Glass Ionomer Cement Type I/II (Luting/Filling consistency)	
	t. Polycarboxylate Cement (Luting consistency)	
4	Journal	10
	Total (Practical)	90
5	VIVA VOCE	20

## **ORAL PATHOLOGY & MICROBIOLOGY**

### **DEFINITION:**

Oral Pathology deals with the nature of oral diseases, their causes, processes and effects. It relates the clinical manifestation of oral diseases to physiologic and anatomic changes associated with these diseases. It deals with commonly occurring pre malignancies and malignancies and serves commonly with the scientifically based information. It also deals with application of dental science to the administration of law and the furtherance of justice.

#### AIM:

To make undergraduate student training program effective so as to develop independent capabilities in a student, to learn and apply the knowledge of Oral Pathology in identifying the problems and diagnosis with sound scientific knowledge and skills.

### **OBJECTIVES**

At end of Oral Pathology & Microbiology course, the student should be able to:

- i. Identify the different types of pathological processes that involve the Orofacial tissues.
- ii. Comprehend the manifestations of common diseases, their diagnosis & correlation with clinical pathological processes.
- iii. Understand the oral manifestations of systemic diseases and correlate with the system physical signs & laboratory findings.
- iv. Understand the underlying biological principles governingtreatment oforaldiseases.
- v. Understand the principles of certain basic aspects of Forensic Odontology.

### SKILLS

The Following skills are to be developed:

- i. Microscopic study of common lesions affecting oral tissues through microscopic slides &projection slides
- ii. Study of the disease process by surgical specimens
- iii. Study of teeth anomalies/polymorphisms through tooth specimens & plaster casts.
- iv. Microscopic study of plaque pathogens
- v. Study of haematological preparations (blood films) of anaemias& leukemias
- vi. Basic exercises in Forensic Odontology such as histological methods of age estimation and appearance of teeth in injuries

### SYLLABUS

IInd Year: students appriciate basic oral patholgoy in slides casts and specimen.

Students are assigned with formulating research, questions to the oral pathology and search

for related evidences.

- Identify pathology of oral region- hard &soft tissue.
- Assignment incorporating available literature evidences& searching relevant database for evidence.
- Application of evidence in diagnosing the pathology.

EBEs incorporation in other UG activities:

In addition to the above students are encouraged to discuss evidences of oral pathological

conditions while examining histopathological slides.

Assignments are given related to oral pathological lesions and students are asked to search databases and find current and relevant literature evidences and make a report on the same

Course outcomes assessed:

Were the students able to: Describe the different types of pathological processes, that involve the oral cavity. Describe the manifestations of common diseases, their diagnosis & correlation with clinical pathological processes. Explain the oral manifestations of systemic diseases should help in correlating with the systemic physical signs & laboratory findings. Explain the underlying biological principles governing treatment of oral diseases. Explain the principles of basic aspects of Forensic Odontology. Describe the laboratory procedures in histo-pathology. Identify the pathologies on basis of histopathological observations and correlate them with clinical picture.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION	
1. Developmental disturbances of oral and paraoral structures		
1.1. Developmental disturbances of Jaws	Must to Know	
1.1.1. Agnathia	Good to Know	
1.1.2. Micrognathia	Must to Know	
1.1.3. Macrognathia	Must to Know	
1.1.4. Facial Hemihypertrophy	Good to Know	
1.1.5. Facial Hemiatropy	Good to Know	
1.2 Developmental Disturbances of lips and palate		
1.2.1 Congenital Lip pits and Commissural pits and fistulas	Desirable to Know	
1.2.2 Cheilitis Granulomatosa	Good to Know	
1.2.3 Hereditary Intestinal Polyposis	Good to Know	

1.2.4 Hereditary Melanotic Macule	Good to Know
1.2.5Double lip,Cleft lip,cleft Palate,Chelitis Glandularis	Desirable to Know
1.3 Developmental disturbances of Oral Mucosa	
1.3.1 Fordyce's Granules	Must to Know
1.3.2 Focal epithelial Hyperplasia	Good to Know
1.4 Developmental disturbances of gingiva	
1.4.1 Fibromatosis Gingiva	Must to Know
1.4.2 Retrocuspid Papilla	Good to Know
1.5 Developmental Disturbances Of Tongue	
1.5.1 Macroglossia	Must to Know
1.5.2 Microglossia	Must to Know
1.5.3 Ankyloglossia	Must to Know
1.5.4 Cleft Tongue	Must to Know
1.5.5 Fissured Tongue	Must to Know
1.5.6 Median Rhomboid Glossitis	Must to Know
1.5.7 Benign Migratory Glossitis	Must to Know
1.5.8 Hairy Tongue	Must to Know
1.6 Development disturbances of lymphoid tissue	
1.6.1 Reactive lymphoid aggregates	Good to Know
1.6.2 Lymphoid hamartoma	Good to Know
1.6.3 Angiolymphoid Hyperplasia	Good to Know
1.6.4 Lympho-epithelial cyst	Good to Know
1.7 Developmental disturbances of salivary glands	
1.7.1 Aplasia	Desirable to Know
1.7.2 Xerostomia	Must to Know
1.7.3 Hyperplasia of the palatal glands	Desirable to Know
1.7.4 Atresia	Desirable to Know
1.7.5 Abberrancy, Stafine'scyst	Must to Know
1.8 Developmental disturbances in size of teeth	
1.8.1 Microdontia	Must to Know
1.8.2 Macrodontia	Must to Know
1.9 Developmental disturbances in the shape of the teeth	
1.9.1 Fusion	Must to Know
1.9.2 Germination	Must to Know
1.9.3 Concrescence	Must to Know
1.9.4 Dilacerations	Must to Know
1.9.5 Talon'sCusp	Must to Know
1.9.6 Dens in Dente	Must to Know
1.9.7 Dens Evaginatus	Must to Know
1.9.8 Taurodontism	Must to Know
1.9.9 Supernumerary roots	Must to Know
1.9.10Enameloma	Must to Know
1.10 Developmental Disturbances in number of teeth	÷
1.10.1 Anodontia	Must to Know
1.10.2 Supernumerary teeth	Must to Know

1.10.3 Predecidious Dentition	Must to Know
1.10.4 Post Permanent Dentition	Must to Know
1.11 Developmental Disturbances in Structure of Teeth	
1.11.1 Amelogenesis Imperfecta	Must to Know
1.11.2 Enamel Hypoplasia	Must to Know
1.11.3 Dentinogenesis Imperfecta	Must to Know
1.11.4 Dentinal dysplasia	Must to Know
1.11.5 Regional Odontodysplasia	Must to Know
1.11.6 Shell Teeth	Good to Know
1.12 Developmental Disturbances in eruption of teeth	
1.12.1 Premature Eruptions	Must to Know
1.12.2 Eruption Sequestrum	Must to Know
1.12.3 Delayed eruption	Must to Know
1.12.4 Impaction	Must to Know
2. Dental caries	
2.1 Theories	Must to Know
2.2 Clinical features	Must to Know
2.3 Classification	Must to Know
2.4 Histopathology	Must to Know
2.5 Microbiology of Dental caries	Desirable to Know
2.6 Immunology	Desirable to Know
2.7 Caries activity tests	Desirable to Know
2.8 Factors influencing caries	Must to Know
3. Diseases of Pulp & Periapical tissues	
3.1 Diseases of the Dental Pulp	Must to Know
3.1.1 Pulpitis	Must to Know
3.1.2 Focal Reversible Pulpitis	Must to Know
3.1.3 Chronic Pulpitis	Must to Know
3.1.3 Pulp Polyp	Must to Know
3.2 Diseases of the Periapical Tissues	
3.2.1 Periapical Granuloma	Must to Know
3.2.2 Periapical Abscess	Must to Know
3.2.3 Periapical Cyst	Must to Know
3.3 Osteomyelitis	
3.3.1 Acute Suppurative Osteomyelitis	Must to Know
3.3.2 Chronic Focal and Diffuse	Must to Know
3.3.3 Sclerosing Osteomyelitis	Must to Know
3.3.4 Garre's Ostemyelitis	Must to Know
3.4 Sequalae of periapical abscess	
3.4.1 Summary of space infections	Must to Know
3.4.2 Systemic complications & significance	Desirable to Know
3.5 Cellulitis	Must to Know
3.6 Ludwig's angina	Must to Know
3.7 Intracranial complication of dental infection	Desirable to Know
3.8 Maxillary sinusitis	Must to Know

3.9 Focal infection and foci of infection	Must to Know
4. Spread of Oral Infection	Must to Know

### B. PRACTICALS:

#### II BDS ORAL PATHOLOGY

#### LIST OF SLIDES FOR ORAL PATHOLOGY

		2001
NO.		NAME OF SLIDE
1		HEMATOXYLIN AND EOSIN STAIN
		PERIODIC ACID SCHIFF STAIN
	SPECIAL STAINS	MALLORY'S STAIN
		VAN GIESON'S STAIN
		PAPANICOLAOU STAIN
2		
		SMOOTH SURFACE CARIES
	DENTAL CARIES	PIT AND FISSURE CARIES
		DENTINAL TUBULES (BEADED
		APPEARANCE)
		LIQUEFACTION FOCI OF MILLER'S
3	PULP AND PERIAPI	ICAL PULP POLYP
	LESIONS	PULP STONES
		NECROSIS OF PULP
		PERIAPICAL GRANULOMA
		HYALINE DEGENERATION PULP
		RADICULAR CYST

LIST OF MODELS

- 1 GEMINATION
- 2 FUSION
- 3 TAURODONTISM
- 4 DILACERATION
- 5 CONCRESCENCE
- 6 TALON CUSPS
- 7 BIFID ROOTS, SUPERNUMERARY ROOTS
- 8 MESIODENS
- 9 ENAMEL PEARLS
- 10 SUPERNUMARARY TEETH CAST

- 11 PARA PREMOLARES OR PARAMOLARS CAST
- 12 CLEFT LIP AND CLEFT PALATE CAST
- 13 COMPLETE OR PARTIAL ANODONTIA CAST
- 14 PIT & FISSURE CARIES
- 15 PROXIMAL CARIES
- 16 CERVICAL CARIES
- 17 ATTRITION TOOTH SPECIMEN
- 18 ABRASION TOOTH SPECIMEN
- 19 EROSION TOOTH SPECIMEN
- 20 LOCALISED OR GENERALISED GINGIVAL ENLARGEMENT CAST

### C. RECOMMENDED BOOKS: Refer to page no.

D. SCHEME OF EXAMS:

The examination shall be conducted at the end of III BDS.

## PRECLINICAL CONSERVATIVE

#### Course outcomes assessed:

Were the students able to: Identify hand and rotary cutting instruments. Prepare cavity designs to receive various restorative materials on typhodont teeth in skill laboratory

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION
1. Introduction to operative dentistry	
1.1Definition, factors	Must to Know
1.2Radiologic indications	Must to Know
1.3Dynamics of operative dentistry	Must to Know
1.4Future demand	Must to Know
2. Scope of subject and nomenclature	
2.1Terminologies	Must to Know
2.2Nomenclature of cavities	Must to Know
2.3Classification of cavities	Must to Know
2.4Nomenclature, various surfaces of tooth	Good to Know
2.5Systems with similar and different notations in each segment	Good to Know
3. Tooth Structures	
3.1Enamel and Dentin.	Must to Know
3.2Histological features	Must to Know
3.3Clinical considerations	Must to Know
3.4Applied anatomy.	Good to Know
4. Dental Caries	
4.1Introduction	Must to Know
4.2Classification	Must to Know
4.3Histopathology	Good to Know
4.4Etiology	Must to Know
4.5Contributory factors in dental caries	Must to Know
4.6Caries of enamel, dentin and Cementum	Must to Know
4.7Morphological and chemical events in caries process	Must to Know
4.8Epidemiology	Must to Know
4.9Microbiology and histopathology	Must to Know
5. Caries Diagnosis	
5.1Assessment tools	Must to Know
5.2Procedures	Must to Know
5.3Diagnosis of pits and fissures, smooth surface, root surface caries	Must to Know
5.4Caries activity test	Must to Know
5.5FOTI	Good to Know

5.7 Laser auto fluorescence       Desirable to Know         5.8 Endoscopy       Good to Know         5.9 Electrical resistance       Good to Know         6. Caries prevention and radiology       Electrical resistance         6.1 Fluoride exposure       Must to Know         6.2 Immunization       Desirable to Know         6.3 Diet       Must to Know         6.4 Salivary flow       Must to Know         6.5 Oral hygiene       Must to Know         6.6 Anti microbial agent       Must to Know         6.7 Pit and fissure sealants       Must to Know         6.8 Restoration       Must to Know         6.9 Enameloplasty       Must to Know         7.1 Classification of hand instruments, rotary instruments-detail Features       Must to Know         7.2 Application, techniques       Must to Know         7.3 Sterilization of instruments       Must to Know         7.4 Speeds in operative dentistry       Must to Know         7.5 Powered cutting instruments       Must to Know         7.6 Hazards with cutting instruments       Must to Know         7.10 Bladed and abrasive cutting       Must to Know         7.10 Elastification of hand instruments       Must to Know         7.4 Speeds in operative dentistry       Must to Know         7.12 Applica	5.6 UV illumination	Good to Know
5.8 Endoscopy       Good to Know         5.9 Electrical resistance       Good to Know         5.10 Ultrasonic imaging and die penetration       Good to Know         6. Caries prevention and radiology       Must to Know         6.1 Fluoride exposure       Must to Know         6.2 Immunization       Desirable to Know         6.3 Diet       Must to Know         6.4 Salivary flow       Must to Know         6.5 Oral hygiene       Must to Know         6.6 Anti microbial agent       Must to Know         6.7 Pit and fissure seatants       Must to Know         6.8 Restoration       Must to Know         6.9 Enameloplasty       Must to Know         7.1 Classification of hand instruments, rotary instruments-detail       Features         7.2 Application, techniques       Must to Know         7.3 Sterifization of instruments       Must to Know         7.4 Speeds in operative dentistry       Must to Know         7.5 Powered cutting instruments       Must to Know         7.6 Hazards with cutting instruments       Must to Know         7.9 Dental burs       Must to Know         7.10 Eladed and abrasive cutting       Must to Know         7.11 Classification of instruments       Must to Know         7.12 Pulp and soft tissue protection	5.7 Laser auto fluorescence	Desirable to Know
5.9 Electrical resistance       Good to Know         5.10 Ultrasonic imaging and die penetration       Good to Know         6. Caries prevention and radiology       Must to Know         6.1 Fluoride exposure       Must to Know         6.2 Immunization       Desirable to Know         6.3 Diet       Must to Know         6.4 Salivary flow       Must to Know         6.5 Oral hygiene       Must to Know         6.6 Anti microbial agent       Must to Know         6.7 Pit and fissure sealants       Must to Know         6.8 Restoration       Must to Know         6.9 Enameloplasty       Must to Know         7.1 Classification of hand instruments, rotary instruments-detail Features       Must to Know         7.2 Application, techniques       Must to Know         7.3 Sterilization of instruments       Must to Know         7.4 Speeds in operative dentistry       Must to Know         7.5 Powered cutting instruments       Must to Know         7.6 Hazards with cutting instruments       Must to Know         7.1 Balded and abrasive cutting       Must to Know         7.10 Elastide and abrasive cutting       Must to Know         7.10 Elastide and abrasive cutting       Must to Know         7.10 Elasted and abrasive cutting       Must to Know	5.8 Endoscopy	Good to Know
5.10 Ultrasonic imaging and die penetration       Good to Know         6. Caries prevention and radiology	5.9 Electrical resistance	Good to Know
6. Caries prevention and radiology         6.1 Fluoride exposure       Must to Know         6.2 Immunization       Desirable to Know         6.3 Diet       Must to Know         6.4 Salivary flow       Must to Know         6.5 Oral hygiene       Must to Know         6.6 Anti microbial agent       Must to Know         6.7 Pit and fissure sealants       Must to Know         6.8 Restoration       Must to Know         6.9 Enameloplasty       Must to Know         7.1 Classification of hand instruments, rotary instruments-detail       Features         7.2 Application, techniques       Must to Know         7.3 Sterilization of instruments       Must to Know         7.4 Speeds in operative dentistry       Must to Know         7.5 Powered cutting instruments       Must to Know         7.6 Hazards with cutting instruments       Must to Know         7.7 Cutting mechanism       Must to Know         7.10 Bladed and abrasive cutting       Must to Know         7.11 Eye and ear inhalation       Must to Know         7.12 Pulp and soft tissue protection       Must to Know         7.13 Aerosols       Must to Know         7.14 Specing characteristics       Must to Know         7.15 Recent advances-lasers       Desirable to Know	5.10 Ultrasonic imaging and die penetration	Good to Know
6.1 Fluoride exposure       Must to Know         6.2 Immunization       Desirable to Know         6.3 Diet       Must to Know         6.4 Salivary flow       Must to Know         6.5 Oral hygiene       Must to Know         6.6 Anti microbial agent       Must to Know         6.7 Pit and fissure sealants       Must to Know         6.8 Restoration       Must to Know         6.9 Enameloplasty       Must to Know         7.1 Classification of hand instruments, rotary instruments-detail Features       Must to Know         7.2 Application, techniques       Must to Know         7.3 Sterilization of instruments       Must to Know         7.4 Speeds in operative dentistry       Must to Know         7.5 Powered cutting instruments       Must to Know         7.6 Hazards with cutting instruments       Must to Know         7.7 Outing mechanism       Must to Know         7.8 Sharpening of hand instruments       Must to Know         7.10 Bladed and abrasive cutting       Must to Know         7.11 Eye and ear inhalation       Must to Know         7.12 Pulp and soft tissue protection       Must to Know         7.13 Aerosols       Must to Know         7.14 Design characteristics       Must to Know         7.15 Recent advances-lasers       <	6. Caries prevention and radiology	•
6.2 Immunization       Desirable to Know         6.3 Diet       Must to Know         6.4 Salivary flow       Must to Know         6.5 Oral hygiene       Must to Know         6.6 Anti microbial agent       Must to Know         6.7 Pit and fissure sealants       Must to Know         6.8 Restoration       Must to Know         6.9 Enameloplasty       Must to Know         7.1 Classification of hand instruments, rotary instruments-detail Features       Must to Know         7.2 Application, techniques       Must to Know         7.3 Sterilization of instruments       Must to Know         7.4 Speeds in operative dentistry       Must to Know         7.5 Powered cutting instruments       Must to Know         7.6 Hazards with cutting instruments       Must to Know         7.6 Hazards with cutting instruments       Must to Know         7.1 Classification of hand instruments       Must to Know         7.6 Hazards with cutting instruments       Must to Know         7.7 Cutting mechanism       Must to Know         7.1 Bladed and abrasive cutting       Must to Know         7.1 Bladed and abrasive cutting       Must to Know         7.12 Pulp and soft tissue protection       Must to Know         7.13 Aerosols       Must to Know         7.14 Sec	6.1 Fluoride exposure	Must to Know
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6.5 Oral hygiene       Must to Know         6.6 Anti microbial agent       Must to Know         6.7 Pit and fissure sealants       Must to Know         6.8 Restoration       Must to Know         6.9 Enameloplasty       Must to Know         7.1 Classification of hand instruments, rotary instruments-detail Features       Must to Know         7.2 Application, techniques       Must to Know         7.3 Sterilization of instruments       Must to Know         7.4 Speeds in operative dentistry       Must to Know         7.5 Powered cutting instruments       Must to Know         7.6 Hazards with cutting instruments       Must to Know         7.8 Sharpening of hand instruments       Must to Know         7.9 Dental burs       Must to Know         7.10 Bladed and abrasive cutting       Must to Know         7.11 Eye and ear inhalation       Must to Know         7.12 Pulp and soft tissue protection       Must to Know         7.13 Aerosols       Must to Know         7.14 Design characteristics       Must to Know         8. Biological considerations in operative dentistry       Must to Know         8. Biological considerations in operative dentistry       Must to Know         8. Biological considerations in operative dentistry       Must to Know         8. Biological consider	6.4 Salivary flow	Must to Know
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8.10 EpidemiologyDesirable to Know9. Gnathological concepts of restorations9.1 DefinitionMust to Know	8.9 Infection control for impressions	Must to Know
9. Gnathological concepts of restorations         9.1 Definition         Must to Know	8.10 Epidemiology	Desirable to Know
9.1 Definition Must to Know	9. Gnathological concepts of restorations	
	9.1 Definition	Must to Know

9.2 Classification of human teeth form	Must to Know
9.3 Radiology	Must to Know
9.4 Structure of teeth	Must to Know
9.5 Physiology of tooth form	Must to Know
9.6 Occlusion- general description, articulator	Must to Know
9.7 Tooth contacts during MD movement	Must to Know
9.8 Mechanics	Must to Know
10. Contact and contours	
10.1 Definitions	Must to Know
10.2 Types of contacts between teeth,	Must to Know
10.3 Hazards of faulty contact and contours.	Must to Know
11. Choice of materials	
11.1 Amalgam	Must to Know
11.2 Composites	Must to Know
11.3 Cements	Must to Know
11.4 Bonded restoration	Must to Know
11.5 Cast restoration	Must to Know
12. Tooth separation, wedges, matrices	
12.1 Capacity of motion	Must to Know
12.2 Types of separation	Must to Know
12.3 Classification	Must to Know
12.4 Uses	Must to Know
12.5 Application of matrices and wedges	Must to Know
13. Principles of cavity preparation	
13.1 Definition of tooth preparation	Must to Know
13.2 Need for restoration	Must to Know
13.3 Nomenclature	Must to Know
13.4 Objectives of tooth preparation	Must to Know
13.5 Stages and steps	Must to Know
13.6 Factors affecting tooth preparation	Must to Know
13.7 Pulp protection	Must to Know
13.8 Forces exerted during occlusion or mastication	Must to Know
13.8 Mechanical function of marginal ridges	Must to Know
13.9 Application of stress and their distribution	Must to Know
14. Finishing and polishing of restoration	
14.1 Micro and macro abrasion-burnishing	Must to Know
14.2 Objectives of finishing and polishing,	Must to Know
14.3 Health hazards during finishing and polishing	Must to Know
14.4 Finishing and polishing instruments	Must to Know
14.5 Abrasive materials.	Must to Know
15. Isolation of operative field	
15.1 Moisture from soft tissues	Must to Know
15.2 Direct and indirect methods with examples	Must to Know
15.3 Gingival retraction cords	Must to Know
15.4 Mechanical, chemical, surgical, electrosurgical means	Must to Know

# B. PRACTICAL PRE-CLINICAL WORK QUOTA:

Exercise	Work quota	
Plaster model work		
Class I +extension	6	
Class II	4	
Class III	2	
Class IV	1	
Class V	2	
ClassVI	1	
Exercises on typhodont teeth		
Class I	5	
Class I extension	2	
Class II (FLIPPED CLASSROOM)	10	
Class II mod	2	
Class V-GIC	2	
Class V amalgam	2	
Class III GIC	2	
Exercises on extracted teeth		
Class I	4	
Class I extension	2	

Class II	4
Class V	2
Cast restorations	
Class II-inlay with wax	
pattern,spruing, investing,	
Finishing &cementation on extracted	1
teeth	
Root canal treatment	
Maxillary central incisor –RCI	
with accesses opening, WL,	1
BMP,obturation&post-obturation	
Demonstration of class III & V comp teeth	oosite on extracted
Plaster work+typhodont+extracted	16+25+14=55
Peer to peer teaching and small	1
group discussion	

# C. Recommended books

Sr. No.	Title	Author	Publisher
1	Textbook of Dental Material Science	Phillip	Elsevier
2	Restorative Dental Materials	Craig	Elsevier Mosby
3	Arts and Science of Operative Dentistry	Sturdevant's	Mosby

### Reference books

Sr.	Title	Author	Publisher
10.			
1	Dental Materials	Hattrik	Saunders Elsevier
2	Atlas of Glass Ionomer Cement	Graham	Dunitz
3	Textbook of Operative Dentistry	Marzouk	IshiyakuEuroAmerica,Inc Publishers
4	Pre-clinic Manual of Conservative Dentistry	V.Gopikrishna	Emmess

## D. SCHEME OF EXAMINATION:

### INTERNAL EXAMINATION SCHEME:

		Third
		Internal
First Internal	Second Internal	(Theory/Pr
(Theory/Practical)	(Theory/Practical)	actical)
Max marks – 20	Max marks –	Max Marks –
Marks	20Marks	60Marks

## UNIVERSITY PRACTICAL EXAMINATION

Exam pattern for preclinical practical----- 100 marks

Internal-20

Practical-80

Class II amalgam cavity preparation, Matrix with retainer & base and Restoration, carving &

finishing	- 30
Spotters	- 20
Viva-voce	- 20
Journal	- 10

## **PROSTHODONTICS & CROWN AND**

### BRIDGE

Course outcomes assessed:

Were the students able to: Mark anatomical landmarks in edentulous casts, classify partially edentulous arches and correlate to clinical picture. Identify instruments and equipment used for clinical and laboratory prosthodontic procedures. Perform all lab procedures to make a conventional complete denture, removable interim partial denture. Perform tooth preparation and wax patterns for crowns on typhodont teeth

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION
1. Complete Denture	•
1.1 Applied Anatomy & Physiology	
1.1.1 Introduction	Must to Know
1.1.2 Biomechanics of the edentulous state	Good to Know
1.1.3 Residual ridge resorption	Good to Know
1.2 Communicating with the patient	
1.2.1 Understanding the patients	Must to Know
1.2.2 Mental attitude	Good to Know
1.2.3 Instructing the patients	Must to Know
1.3 Diagnosis and treatment planning for the patients:	
- With some teeth remaining	
- With no teeth remaining	
1.3.1 Systemic status	Must to Know
1.3.2 Local factor	Must to Know
1.3.3 Geriatric patient	Must to Know
1.3.4 Diagnostic procedures	Must to Know
1.3.5 Articulators – discussion	Must to Know
1.4 Improving the patient's denture foundation and ridge relation -	- an overview
1.4.1 Pre-operative examination	Must to Know
1.4.2 Initial hard tissue and soft tissue procedure	Must to Know
1.4.3 Secondary hard and soft tissue procedure	Good to Know
1.4.4 Implant procedure	Desirable to Know
1.4.5 Congenital deformities	Good to Know
1.4.6 Post-operative procedure	Must to Know
1.4.7 Principles of retention, support and stability	Must to Know
1.5 Impressions – detail	
1.5.1 Muscles of facial expression	Must to Know
1.5.2 Biologic considerations for maxillary and mandibular	Must to Know
impressions including anatomical landmarks and their	
interpretation	

1.5.3 Impression objectives	Must to Know
1.5.4 Impression material	Must to Know
1.5.5 Impression techniques	Must to Know
1.5.6 Maxillary and mandibular impression procedures:	Must to Know
1.5.6.1 Preliminary Impression	
1.5.6.2 Final Impression	
1.5.7 Laboratory procedures involved with impression	Must to Know
making (Beading & boxing, Cast preparation)	
1.6 Record bases and Occlusal rims – in detail	
1.6.1 Materials and techniques	Must to Know
1.6.2 Useful guidelines and ideal parameters	Must to Know
1.6.3 Recording and transferring bases and occlusal rims	Must to Know
1.7 Biological consideration in jaw relation & jaw movements – craniomandibular	
1.7 Biological consideration in Jaw relation & Jaw movements	– craniomandibular
Relations	- craniomandibular
1.7 Biological consideration in Jaw relation & Jaw movements         Relations         1.7.1 Maxillo-mandibular relation including vertical and	<ul> <li>Craniomandibular</li> <li>Must to Know</li> </ul>
1.7 Biological consideration in Jaw relation & Jaw movements Relations 1.7.1 Maxillo-mandibular relation including vertical and horizontal jaw Relations	- craniomandibular
<ul> <li>1.7 Biological consideration in Jaw relation &amp; Jaw movements Relations</li> <li>1.7.1 Maxillo-mandibular relation including vertical and horizontal jaw Relations</li> <li>2. Removable Partial Dentures</li> </ul>	<ul> <li>Craniomandibular</li> <li>Must to Know</li> </ul>
<ul> <li>1.7 Biological consideration in Jaw relation &amp; Jaw movements Relations</li> <li>1.7.1 Maxillo-mandibular relation including vertical and horizontal jaw Relations</li> <li>2. Removable Partial Dentures</li> <li>2.1 Introduction</li> </ul>	<ul> <li>Craniomandibular</li> <li>Must to Know</li> <li>Must to Know</li> </ul>
<ul> <li>1.7 Biological consideration in Jaw relation &amp; Jaw movements Relations</li> <li>1.7.1 Maxillo-mandibular relation including vertical and horizontal jaw Relations</li> <li>2. Removable Partial Dentures</li> <li>2.1 Introduction</li> <li>2.2 Classification(FLIPPED CLASSROOM)</li> </ul>	<ul> <li>Craniomandibular</li> <li>Must to Know</li> <li>Must to Know</li> <li>Must to Know</li> </ul>
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<ul> <li>1.7 Biological consideration in Jaw relation &amp; Jaw movements Relations</li> <li>1.7.1 Maxillo-mandibular relation including vertical and horizontal jaw Relations</li> <li>2. Removable Partial Dentures</li> <li>2.1 Introduction</li> <li>2.2 Classification(FLIPPED CLASSROOM)</li> <li>2.3 Components</li> <li>3. Fixed Partial Dentures</li> <li>3.1 Introduction</li> <li>3.2 Classification</li> </ul>	<ul> <li>Craniomandibular</li> <li>Must to Know</li> </ul>

## B. SYLLABUS FOR PRACTICALS:

### EXERCISES TO BE CONDUCTED IN II BDS

Part-I Complete Denture

- 1. Arrangement of teeth in class I relation. (Minimum 10 teeth arrangements)
- 2. Wax up, carving and polishing
- 3. Processing of waxed up denture (minimum 01)
- 4. Demonstration of arrangement of teeth for retrognathic ridge relation(class II) (01 teeth arrangement)
- 5. Demonstration of arrangement of teeth for prognathic ridge relation (class III) (01 teeth arrangement)
- 6. Repair of fractured complete denture (minimum 01 repair)
- 7. Demonstration for relining and rebasing complete dentures

Part-II Removable Partial Denture

- 1. Introduction to removable partial dentures
- 2. Components of removable partial dentures

- 3. Surveying of partially edentulous casts
- 4. Designing removable partial dentures
- 5. Clinical and laboratory steps in fabrication of cast partial denture.
- 6. Fabrication of anterior acrylic partial denture
- 7. Fabrication of posterior acrylic partial denture with clasps.

Part-III Fixed Partial Denture

- 1. Introduction to fixed partial denture
- 2. Steps in fabrication of fixed partial denture
- 3. Demonstration for preparation of anterior & posterior tooth to receive a porcelain jacket crown (FLIPPED CLASSROOM)
- 4. Preparation of maxillary central incisor typhodont tooth to receive porcelain jacket crown (mimimum 04 preparation)
- 5. Preparation of posterior typhodont tooth to receive complete metal crown. (mimimum 04 preparation)
- 6. Demonstration for preparation of anterior &posterior tooth to receive a partial veneer crown
- 7. Demonstration for fabrication of a dowel crown
- 8. Demonstration of casting
- 9. Fabrication of wax patterns (anterior and posterior) minimum 04 each.
- 10.EBES in Pre-clinical Prosthodontics is practiced as generation of PICO on manipulation techniques, literature search and reflective group discussions facilitated by teaching staff.

### C. RECOMMENDED BOOKS:

TITLE	AUTHOR
Dental lab Procedures Part I: Complete dentures	Rudd & Murrow
Dental lab Procedures Part II: Removable Partial	Rudd & Murrow
dentures	
Dental lab Procedures Part I: Fixed Partial	Rudd & Murrow
dentures	
Manual for Pre-clinical Prosthodontics	S Lakshmi
Essential Manual of PreClinical Prosthodontics	Dr. ParanjayPrajapati
	Dr. Sneha Kulkarni

### D. EXAM SCHEME:

The internal assessment marks in the subject of Pre-clinical Prosthodontics and shall be calculated out of 20 marks.

#### INTERNAL ASSESSMENT: 20 MARKS

- i. First internal (Theory/Practical): 20 Marks
- ii. Second internal (Theory/Practical): 20 Marks
- iii. Third Internal (Theory/Practical): 60 Marks
- b. University Exam:

(University Practicals-80 Marks + Internal-20 Marks=100 Marks)

1. The University Practical Examination will be of Total 80 marks and will consist of:

SR. NO	PARTICULARS	MARKS
1	Exercises: Total Duration-3 Hours	80
	i. Teeth arrangement for complete denture:	
	(40)	
	ii. Viva voce + Journal (40)	
2	Internal marks (40% - CCES + 60% - Average of all internal assessment)	20

### **THIRD BDS**

The change in III BDS practicals for all dental subjects shall be as following: Training of II BDS students on
1. Functioning of dental chairs
2. Aseptic and infection control in clinics

This will enable students to manage their dental practice more efficiently. GENERAL MEDICINE

Definition of the Subject: -

It is discipline of medical specialty which deals with diagnosis, treatment and prevention of adult disease. The specialty of General Medicine deals with management of patient who have undifferentiated or multi system disease process and is one of the core subjects in relation to medical education and research which has to be learnt by almost all discipline of medical specialty including dentistry.

Aim: - The broad goal of the teaching undergraduate dental students, the subject of Gen. Medicine is to have the knowledge, skills and behavioral attributes such that it would lead to function effectively with patients who come to them with dental problem with or without medical disorders.

Objective and scope of the subject: -

- (a) Knowledge : At the end of the course, the students shall be able to:
  - 1. Know and understand common medical disorders with or without dental problem.
  - **2.** Outline clinical symptoms, signs and complications of general and multisystem disorders like hypertension, diabetes, and other endocrinal disorders, genetic and

environmental medical disorders, nutriional disorders, infectious diseases including sexually transmitted diseases, tropical and other systemic disorders pertaining to cardiovascular, respiratory, gastrointestinal, neurological, hematological and immune system.

- **3.** Propose diagnostic as well as investigative procedures and ability to interpret them.
- **4.** Familiarize themselves with treatment protocol and management strategies of medical disorder such that they are able to know dosage schedule. Interaction and side effects of various drugs with their beneficial effect.
- **5.** Provide first level management of acute medical emergencies which is encountered in dental practice and able to decide timings and level of level of referral if required
- **6.** Recognize and correlate dental disorders and practices with multisystem and medical disorders in holistic, comprehensive and through manner

#### Course outcomes assessed:

Were the students able to: Explain special precautions/ contraindication of anaesthesia and various dental procedures in different systemic diseases. Explain Oral manifestations of systemic diseases. Explain Medical emergencies in dental practice. Able to record the arterial pulse, blood pressure. Able to diagnose through case history and general examination of the body, the diseases of the heart, lungs, kidneys, blood etc. Handle medical emergencies encountered in dental practice

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION	
1. Introduction		
1.1 Aims of medicine & Definitions of sings, Symptoms, Diagnosis, Differential diagnosis, treatment & prognosis/ Evidence based practice in medicine	Must to Know	
2. Infections		
2.1 Enteric fever	Must to Know	
2.2 AIDS/ Universal precaution consequences/management	Must to Know	
2.3 Herpes simplex	Must to Know	
2.4 Herpes Zoster	Must to Know	
2.5 Malaria	Must to Know	
2.6 Tetanus and lock jaw	Must to Know	
2.7 Diphtheria	Good to Know	
2.8 Infectious mononucleosis	Desirable to Know	
2.9 Mumps	Desirable to Know	
2.10 Measles	Desirable to Know	
2.11 Rubella	Desirable to Know	
2.12 Syphilis	Desirable to Know	
2.13 Prevention of Infectious diseases: vaccines, mask and various strategies.	Desirable to Know	
3. G.I.T		
3.1 Stomatitis and vitamin deficiency related oral lesions	Must to Know	
3.2 Gingival hyperplasia	Must to Know	
3.3 Acid peptic disease	Must to Know	
3.4 Jaundice	Must to Know	
3.5 Acute hepatitis	Must to Know	
3.6 Cirrhosis of liver	Must to Know	
3.7 Ascites	Must to Know	
3.8 Dysentery	Good to Know	
3.9 Amoebiasis	Good to Know	
3.10 Dysphasia	Desirable to Know	
3.11 Malabsorption	Desirable to Know	
3.12 Health care associated infection and their prevention	Desirable to Know	
4. CVS		
4.1 Acute rheumatic fever	Must to Know	
4.2 Rheumatic valvular heart disease	Must to Know	
4.3 Hypertension	Must to Know	
4.4 Ischemic heart disease/chest pain	Must to Know	
4.5 Infective endocarditic	Must to Know	
4.6 Common arrhythmias	Good to Know	
4.7 Congestive cardiac Failure	Good to Know	

4.8 Congenital heart disease	Desirable to Know
5. Respiratory System	
5.1 Pneumonia	Must to Know
5.2 COPD	Must to Know
5.3 Pulmonary TB	Must to Know
5.4 Bronchial asthma/Dyspnea and immunology	Must to Know
5.5 Pleural effusion	Good to Know
5.6 Lung Abscess	Desirable to Know
5.7 Pneumothorax	Desirable to Know
5.8 Bronchiectasis	Desirable to Know
5.9 Lung cancers	Desirable to Know
6. Haematology	
6.1 Iron deficiency anaemia	Must to Know
6.2 Megaloblastic anaemias	Must to Know
6.3 Hemolytic anaemia	Must to Know
6.4 Bleeding & clotting disorders	Must to Know
6.5 Oral manifestations of hematologic disorders	Must to Know
6.6 Leukemias	Good to Know
6.7 Lymphomas	Good to Know
6.8 Agranulocytosis	Good to Know
6.9 Splenomegaly	Good to Know
6.10 Generalised lymphadenopathy	Good to Know
6.11 Auto immune disorders including rheumatoid arthritis	Desirable to Know
7. Renal System	
7.1 Acute nephritis	Must to Know
7.2 Nephrotic syndrome	Must to Know
7.3 Renal Failure	Good to Know
8. Nutrition	
8.1 Avitaminosis	Must to Know
8.2 Balanced diet	Good to Know
8.3 PEM	Desirable to Know
9. CNS	
9.1 Facial palsy	Must to Know
9.2 Facial pain including trigeminal neuralgia	Must to Know
9.3 Epilepsy	Good to Know
9.4 Headache including migraine	Good to Know
9.5 Meningitis	Desirable to Know
9.6 Examination of comatose patient	Desirable to Know
9.7 Examination of cranial nerves	Desirable to Know
10. Endocrine	
10.1 Diabetes Mellitus	Must to Know
10.2 Hypothyroidism	Good to Know
10.3 Thyrotoxicosis	Good to Know
10.4 Calcium metabolism and parathyroid/flurosis	Good to Know
10.5 Addison's disease	Desirable to Know

10.6 Cushing's syndrome	Desirable to Know
10.7 Acromegaly	Desirable to Know
11. Critical Care	
11.1 Syncope	Must to Know
11.2 Cardiac arrest	Must to Know
11.3 CPR	Must to Know
11.4 Shock	Must to Know
11.5 Medical emergencies in dental practice	Must to Know
11.6 Anaphylactic Shock	Must to Know
11.7 Acute LVF	Good to Know
11.8 ARDS	Good to Know
11.9 Alcohol abuse, overdose and substance abuse	Desirable to Know

### **B. PRACTICALS:**

### C. RECOMMEND BOOKS:

Suggested General Medicine text books for 3<sup>rd</sup> BDS

Sr.No Name of book

- 1. Davidson's Text book of Medicine
- 2. API Text book of Medicine
- 3. Harrison's principal of internal Medicine

Suggested General Medicine Clinical books for 3<sup>rd</sup> BDS

- 4. Hutchinson's Medicine
- 5. Golwala's General Medicine

#### D. SCHEME OF EXAMINATION:

- i. First internal (Theory/Practical): 20 Marks
- ii. Second internal (Theory/Practical): 20 Marks
- iii. Third Internal (Theory/Practical): 60 Marks

As per the university rules

Practical & Clinical: (marks distribution)
• The University Practical Examination will be of Total 90 Marks and will consist of :

Sr.no	Particulars	Marks
1.	Long Case	45
2.	Short Case	25
3.	X-ray & Drug Spotters	20

## **GENERAL SURGERY**

#### Aims & Objectives:

To acquaint the student with various diseases, which may require surgical expertise and to train the student to analyse the history and be able to do a thorough physical examination of the patient. The diseases as related to head and neck region are to be given due importance, at the same time other relevant surgical problems are also to be given due the end of one year of study the student should have a good theoretical knowledge of various ailments, and be practically trained to differentiate benign and malignant diseases and be able to decide which patient requires further evaluation.

#### Course outcomes assessed:

Were the students able to: Diagnose diseases, which may require surgical expertise. Analyse the history and be able to do a thorough physical examination of the patient. Explain features and differential diagnosis, investigations and treatments of diseased conditions, differentiate benign and malignant diseases and be able to decide which patient requires further evaluation.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION
1. Principles of Surgery, Tissue care, Asepsis and anti sepsis, Theatre	Must to Know
technique, Sterilization, Suture materials, diathermy, Laser.	
2. Introduction – History of Surgery	Good to Know
3. Classification of Diseases, General Scheme of Studying a diseases-	Desirable to Know
Etio-Pathology, Clinical features, Investigations, Diagnosis,	
Management, Complications, Prognosis.	
4.Wounds- Classification, Clinical Assessment, Treatment,	Must to Know
Complications, wound healing	
5. Skin Grafting	Good to Know
6. Parathyroid - Hyperparathyrodism, Tetany, Calcium Metabolism	Desirable to Know
7. Inflammation and infection – Definition, Etiology, Pathology,	Must to Know
Classification	

8. Chronic Infections – Nonspecific, and Specific – Tuberculosis, Synhilis Actinomycosis Leprosy	Good to Know
9. Pituitary Gland	Desirable to Know
10. Acute Infections- Non-specific, and Specific – Aerobic and Anaerobic abscess, Cellilities. Carbuncle, Erysipelas, Anthrax, Gonorrhea, Gas Gangrene, Tetanus, CancrumOris, Ludwig's	Must to Know
11.AIDS	Good to Know
12. Diseases of Arteries and Veins in general - Varicose Veins Atherosclerosis, Anuersym, Carotid Body Tumours	, Desirable to Know
<ol> <li>Hemorrhage – Classification, emergency Management, Definitive Treatment, Assessment of Blood Loss.</li> </ol>	Must to Know
14. Bacteraemia, Septicemia, Pyaemia, Toxaemia	Good to Know
15. Nervous System - Nerve Injury, Regeneration, Repair, Nerve Grafting. Facial Nerve Palsy, Trigeminal Neuralgia	Desirable to Know
<ol> <li>Syncope, Shock ,Cardiac Arrest – Causes, Clinical Features, Haemodynamic Changes, emergency Care, Monitoring, Definitive Treatment, Septic Shock (warm shock), Anaphylaxis.</li> </ol>	Must to Know
17. Bleeding Disorders – Coagulation Mechanism	Good to Know
18. Principles of Anesthesia	Desirable to Know
<ol> <li>Tumours – Definition, Classification, Etiology of Cancer, Spread of Cancer, Early Diagnosis, Investigations, Modalities of Treatment and Prognosis, Recent Advances.</li> </ol>	Must to Know
20.Blood Group – Blood Transfusion – Complications of Transfusion and Management, Massive Transfusion.	Good to Know
21.Brief Surgical Anatomy of Pharynx, Esophagus, Paranasal. Diseases related to Obstruction to Ones in Pharynx and Esophagus.	Desirable to Know
22. Blood Fractions and their uses.	Good to Know
<ol> <li>Introduction to – Oncology, Radiotherapy, Surgery and Genetic Engineering.</li> </ol>	Desirable to Know
24.Diseases of Mouth, Lip, Tongue, Palate & Tonsils	
24.1 Ulcers, Stomatitis, Leukoplakia, Carcinoma of Lip, Check, Tongue	Must to Know
24.2 Ranula	Must to Know
24.3 Tonsilitis, Quinsy	Must to Know
<ol> <li>Ulcers – Definition, Classification, etiology, Nonseptic, Ulcers, Specific Ulcer – Tuberculous Ulcer, Syphilitic Ulcer, Malignant Ulcers – Squmous cell Carcinoma, Basal Cell Carcinoma, Malignant Melanoma, Marjolin's Ulcer, Diabetic Ulcer.</li> </ol>	Good to Know
26. Sinus and Fistula	Good to Know
27. Salivary Glands	
27.1 Acute and Chronic Infection- Parotid Abscess, Salivary Calculus	Must to Know
27.2Salivary Tumours – Classification, Mixed Parotid Tumours –	Must to Know

Carcinoma, Adenolymphoma, Sjogren's Disease	
28. Gangrene – Gas Gangrene, Dry Gangrene, Moist Gangrene –	Good to Know
Causes, Management.	
29.Cyst-Definition, Classification, Clinical Features, Complications,	Good to Know
Management.	
30. Neck Swellings – Midline and Lateral Swellings, Cystic and Solid Swellings : Classification, Differential diagnosis, Treatment	Must to Know
31. Common Cvst – Mucous Cvst, Sebaceous Cvst, Dermoid Cvst.	Good to Know
Ranula, Cystic Hygroma, Branchial Cyst, Thyroglossal Cyst,	
Ganglion.	
32. Facio – Maxillary Injuries	Must to Know
33. Common Being and Malignant Tumors of head and Neck Region –	Good to Know
Lipoma, Fibroma, Neurofibroma, Haemangioma, Lymphangioma	
Osteoma, Carcinoma, Sarcoma.	
34. Fractures of Mandible	Must to Know
35. Biopsy – Indication and Methods	Good to Know
36. Jaw Swellings – Equlis, Odontomes, Bone Cysts and Tumours,	Must to Know
Burkitfs Lymphoma	
37. Diseases of Lymphatic and Lymph nodes	
37.1Lymphangitis – Acute and Chronic, chronic Lymphoedema	Good to Know
37.2 Lympadenopathy – Classification	Good to Know
37.3 Inflammatory – Acute and Chronic, Non – specific and	Good to Know
specific – Tubercular Lymphadenitis, Cold abscess – Collar	
Stud Abscess	
37.4 Malignant Tumours: Primary ; Hodgkin's Diseases, Non	Good to Know
Hodgkin's Lymphoma	
37.5 Secondary carcinoma	Good to Know
38. Osteomyelitis of Mandible	Must to Know
39. Head Injury Management	Good to Know
40. Management of Severely Injures Patient - Resuscitation	Good to Know
41. Fractures and Dislocations – Causes, General Principles of	Good to Know
Management, Healing of Fractures and Complications	
42.Thyroid Gland – Development, Congenital anomalies, Classification	Good to Know
of goiters. Acute and Chronic Thyroditis, Hashimoto's Disease,	
Reidel's Thyroiditis, Hyperparathyrodism, Hypothyrodism,	
Adenoma, Carcinoma.	
43. Tracheostomy – Indications, Steps of Operation, Post Operative	Must to Know
Care	
44. Burns and Scalds	Good to Know
45. Development of Face – Cleft Lip and Palate repair	Good to Know

# B. PRACTICALS:

- 1. Clinical approach to the patient
- 2. History taking

- 3. Clinical Examination of
  - 1) Swelling
  - 2) Ulcer
  - 3) Gangrene
  - 4) Neck Swelling
  - 5) Oral Cavity Examination
  - 6) Tracheostomy
- 4. Common X rays of Head & Neck, Chest
- 5. Common ward Procedure appliances
- 6. Common Instruments in Surgery Identification & uses.
- 7. Common minor Operative Procedures. & Ward Procedures.

## C. RECOMMENDED BOOKS:

Title	Author	Publisher
A Manual on Clinical Surgery	Somen Das	Dr.S.Das Calcutta
Bailey & Love's Short	Charles V. M. Ann	Oxford University Press
Practice of Surgery		
Hamilton Baileys	Hamilton	Butterworth
Demonstrations of Physical	Bailey	Heinemann U.K.
signs in Clinical Surgery		

#### Reference Books:

- 1. Oxford Text Book of Surgery
- 2. Text Book of Surgery by Devita
- 3. Surgery by Sebastin
- 4. Surgery by somalal
- 5. Text Book of Surgery by Chatterjee
- 6. Surgical Anatomy by Heereggor
- 7. Diseases of Eye by Parson
- 8. Text Book of Ophthalmology by Vasudev Anand Rao

- 9. E.N.T. Diseases by Mohammed Muqbool
- 10. E.N.T. Diseases by N.C.Day
- 11. E.N.T. Diseases by K.K.Ramalingam

## D. SCHEME OF EXAMINATION:

- i. First internal (Theory/Practical): 20 Marks
- ii. Second internal (Theory/Practical): 20 Marks
- iii. Third Internal (Theory/Practical): 60 Marks

As per the university rules

Practical & Clinical : (distribution of marks)

Sr.no	Particulars	Marks
1.	Case History	10
2.	Clinical Examination	30
3.	Suggested Investigations	10
4.	Diasgnosis, DD	20
5.	Management	10

## **ORAL PATHOLOGY & MICROBIOLOGY**

Lectures are taken on various topics pertaining to Oral Pathology. These lectures are incorporated by literature evidences form published data in various scientific databases, pertaining to the subject taught.

The students take up peer teaching exercises during lectures and a topic ispriorly allocated to them for this.

Students are given assignments on completed topics wherein they are asked to incorporate best possible evidence.

Students are also encouraged to incorporate evidences in undergraduate seminar.

Lectures are taken on various topics pertaining to Oral Pathology. These lectures are incorporated by literature evidences form published data in various scientific databases, pertaining to the subject taught.

The students take up peer teaching exercises during lectures and a topic ispriorly allocated to them for this.

Students are given assignments on completed topics wherein they are asked to incorporate best possible evidence.

Students are also encouraged to incorporate evidences in undergraduate seminar.

Course outcomes assessed:

Were the students able to: Describe the different types of pathological processes, that involve the oral cavity. Describe the manifestations of common diseases, their diagnosis & correlation with clinical pathological processes. Explain the oral manifestations of systemic diseases should help in correlating with the systemic physical signs & laboratory findings. Explain the underlying biological principles governing treatment of oral diseases. Explain the principles of basic aspects of Forensic Odontology. Describe the laboratory procedures in histo-pathology. Identify the pathologies on basis of histopathological observations and correlate them with clinical picture.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIB	
	UTION	
1. Odontogenic tumours		
1.1 Benign tumors		
1.1.1 Odontogenic epithelium without odontogenic ectomesenchyme		
1.1.1.1 Ameloblastoma	Must to	
	Know	
1.1.1.2 Calcifying Epithelial Odontogenic Tumour	Must to	
	Know	
1.1.1.3 Adenomatoid Odontogenic Tumour	Must to	
	Know	
1.1.1.4 Squamous Odontogenic tumour	Desirable	
	to Know	
1.1.2 Odontogenic epithelium with Odontogenic ectomesenchyme		
1.1.2.1 Ameloblastic fibroma	Desirable	
	to Know	
1.1.2.2 Ameloblastic Fibro-odontoma, Odontoma	Desirable	
	to Know	
1.1.2.3 Ghost cell Tumour	Desirable	
	to Know	
1.1.3 Odontogenicectomesenchymewithorwithoutincludedodontogenicepithel	ium	
1.1.3.1 Peripheral and Central odontogenic fibroma	Desirable	
	to Know	
1.1.3.2 Odontogenic Myxoma	Desirable	
	to Know	
1.1.3.3 Benign cementoblastoma	Must to	
	Know	
1.2 Malignant tumors		
1.2.1 Metastasizing ameloblastoma	Good to	
	Know	
1.2.2.Ameloblastic carcinoma	Good to	
	Know	
1.2.3 Odontogenic sarcoma	Good to	
	Know	
2. Non- Odontogenic Tumours		
2.1 Benign Tumours of Epithelial Origin		
2.1.1 Papilloma	Must to	
	Know	
2.1.2 Keratoacathoma	Desirable	
	to Know	
2.1.3 Nevus	Desirable	
-	to Know	
2.2 Premalignant Lesions & Conditions		

2.2.1 Definition	Must	to
	Know	
2.2.2 Classification	Must	to
	Know	
2.2.3 Epithelial Dysplasia	Must	to
	Know	
2.2.4 Leukoplakia	Must	to
	Know	
2.2.5 Carcinoma in situ	Must	to
	Know	
2.2.5 Ervthroplakia	Must	to
	Know	
2.2.6 Oral Submucous Fibrosis	Must	to
	Know	
2.3 Malignant Tumours of Epithelial Origin	<u> </u>	
2.3.1 Basal Cell Carcinoma	Must	to
	Know	
2.3.2 Epidermoid Carcinoma	Must	to
	Know	
2.3.2.1 Epidemiology	Must	to
	Know	
2.3.2.2 Etiology	Must	to
	Know	
2.3.2.3 Clinical Features	Must	to
	Know	
2.3.2.4 Histology	Must	to
	Know	
2.3.2.5 Grading & TNM Staging	Must	to
	Know	
2.3.3 Verrucous Carcinoma	Must	to
	Know	l
2.3.4 Malignant Melanoma	Must	to
	Know	
2.3.5 Recent advances in diagnosis	Must	to
~	Know	
2.3.6 Management & Prevention of Oral Cancer	Desirat	ble
	to Knov	N
2.4 Benign tumours of connective tissue origin		
2.4.1 Fibroma	Must	to
	Know	
2.4.2 Giant Cell Fibroma	Must	to
	Know	
2.4.3 Peripheral & Central Ossifying Fibroma	Must	to
. , , , ,	Know	
2.4.4 Lipoma	Must	to
	Know	
	<u>.</u>	

	Must to
2.4.5 Hemangioma	Wust to
	Know
2.4.6 Chondroma	Must to
	Know
2.4.7 Osteoma	Desirable
	to Know
2.4.8 Osteoid Osteoma	Must to
	Know
2.4.9 Benign Osteoblastoma	Must to
	Know
2.4.10 Tori & Multiple Exostoses	Must to
	Know
2.5 Tumour like lesions of connective tissue origin	
2.5.1 Peripheral Ossifying Fibroma	Desirable
	to Know
2.6 Malignant tumours of Connective tissue origin	
2.6.1 Fibrosarcoma	Desirable
	to Know
2.6.2 Chondrosarcoma	Must to
	Know
2.6.3 Kaposi's Sarcoma	Must to
	Know
2.6.4 Ewing's Sarcoma	Must to
2.0.4 Ewing 5 Barbonia	Know
2.6.5 Osteosarcoma	Must to
2.0.0 001000110	Know
2.6.6.Lymphomas	Desirable
2.0.0 Lymphomas	to Know
2 6 6 1 Hodakin's lymphoma	Desirable
2.0.0.1 1 lought 3 lymphoma	to Know
2662 Non Hodgkins's lymphoma	Desirable
2.0.0.2 Non – Hougkins S lympholina	to Know
2.6.6.4 Durkitt's lumphame	Dosirabla
2.0.0.4 Burkiu S lympholna	to Know
	to Know
	to Know
2.6.7.2 Solitary Plasmacytoma	Desirable
	to Know
2.7 Benign tumours of Muscle tissue origin	
2.7.1 Leiomyoma	Desirable
	to Know
2.7.2 Rhabdomyoma	Desirable
	to Know
2.7.3 Congenital Epulis of New born	Desirable

	to Knov	N
2.7.4 Granular cell tumour	Desirat	ble
	to Knov	N
2.8 Benign & Malignant tumours of nerve tissue origin		
2.8.1 Neurofibroma& Neurofibromatosis	Good	to
	Know	
2.8.2 Schwamoma	Good	to
	Know	
2.8.3 Melanotic neuroectodermal tumour of infancy	Good	to
	Know	
2.8.4 Malignant Schwamoma	Good	to
	Know	
2.9 Metastatic tumours of Jaws & Soft tissue of oral cavity	Good	to
	Know	
3. Salivary gland tumours		
3.1 Neoplastic salivary gland diseases		
3.1.1 Benign		
3.1.1.1 Pleomorphic adenoma	Must	to
	Know	
3.1.1.2 Warthins tumour	Must	to
	Know	
3.1.1.3 Myoepithelioma	Good	to
	Know	
3.1.1.4 Canalicular adenoma	Good	to
	Know	
3.1.1.5 Oncocytoma	Good	to
	Know	
3.1.2 Malignant		
3.1.2.1 Adenoid Cystic Carcinoma	Must	to
	Know	
3.1.2.2 Mucoepidermoid Carcinoma	Must	to
·	Know	
3.1.2.3 Acinic Cell Carcinoma	Desirat	ole
	to Knov	N
3.1.2.4 Polymorphous Low Grade Adenocarcinoma	Desirat	ble
	to Knov	N
3.1.2. 5 Carcinoma ex Pleomorphic Adenoma	Desirat	ole
'	to Knov	N
3.2 Non neoplastic Salivary Gland Diseases		
3.2.1 Sialolithiasis	Must	to
	Know	
3.2.2 Sialosis, Sialadenitis	Must	to
	Know	
3.2.3 Xerostomia & Ptylism	Must	to
	Know	

3.2.4 Sjogren's Syndrome	Must to
2.0.5 Denim Lympheenitheliel Lesien	
3.2.5 Benign Lymphoepitheliai Lesion	Good to Know
3.2.6 Necrotising Sialometaplasia	Good to
	Know
4. Cysts of Oral & Paraoral Region	-
Classification, etiopathogenesis, clinical features, histopathology,	
laboratory& radiological features	
4.1 Odontogenic cysts	-
4.1.1 Odontogenic Keratocyst	Must to
	Know
4.1.2 Dentigerous Cyst	Must to
	Know
4.1.3 Primordial Cyst	Must to
	Know
4 1 4 Dental Lamina Cyst of Newborn	Must to
	Know
4 1 5 Gingival cyst of adults	Must to
	Know
4 1 6 Lateral periodontal cyst	Must to
	Know
4 1 7 Calcifying odontogenic cyst	Must to
	Know
4 1 8 Radicularcyst	Must to
	Know
4 2 Non-Odontogeniccysts	
4 2 1 Pseudo cysts of jaws	Desirable
	to Know
122 Aneurysmal hone	
cvet	Desirable
	to Know
4 2 3 Traumatic hone cyst	Desirable
	to Know
4 2 4 Soft tissue cysts of oral& paraoral region	Desirable
	to Know
5 Traumatic reactive & regressive lesions of Oral Cavity	
5 1 Pyogenic granuloma	Must to
	Know
5.2 Peripheral & Central Giant cell granuloma	Must to
0.2 Tempheral & Gentral Glant cell grandionia	Know
5 3 Exostoses	Desirable
	to Know
5.4 Fibrous Hyporplasia	Dosirable
	to Know
5.5 Traumatic Illeor	Dociroble
	to Know

5.6 Traumatic Neuroma	Desirable
	to Know
5.7 Attrition	Must to
	Know
5.8 Abrasion	Must to
	Know
5.9 Abfraction	Must to
	Know
5.10 Erosion	Desirable
	to Know
5 11 Bruxism	Desirable
	to Know
5 12 Hypercomentesis	Dosirable
5.12 Hypercementosis	to Know
E 12 Dentinal changes	Desirable
5.13 Dentinal changes	Desirable
	to Know
5.14 Pulp calcifications	Desirable
	to Know
5.15 Resorption of teeth	Good to
	Know
5.16 Radiation effects of oral cavity	Good to
	Know
5.17 Allergic reactions of the oral cavity	Good to
	Know
5.18 Angioedema	Good to
	Know
5.19 Stomatitis medicamentosa	Good to
	Know
5.20 Stomatitis venenata	Good to
5.20 Otomatitis Veneriata	Know
6 Migraphial infactions of and soft tissue Migraphialogy defenses machanism	
immunological concerto arel	sincluding
initiation aspects, oral interactions discusses of services hesterial viral	9 funeral
infantiestations, histopathogy and laboratory diagnosis of common bacterial, viral	& lungai
6.1 Bacterial	
6.1.1 Scarlet fever	Desirable
	to Know
6.1.2 Diphtheria	Desirable
	to Know
6.1.3 Tuberculosis	Must to
	Know
6.1.4 Syphilis	Must to
	Know
6.1.5 Actinomycoses & Its	1
complications	Desirable
•	to Know

6.1.6 Cancrum Oris

Desirable

	to Know
6.1.7 Tetanus	Desirable
	to Know
6.1.8 Noma	Desirable
	to Know
6.2 Viral	
6.2.1 Herpes Simplex	Must to
	Know
6.2.2 Varicella zoster	Desirable
	to Know
6.2.3 Measles	Desirable
	to Know
6.2.4 Mumps	Desirable
	to Know
6.2.5 HIV infection and Oral manifestation of AIDS	Must to
	Know
6.3 Fungal	
6.3.1 Candidiasis	Must to
	Know
6.3.2 Histoplasmosis	Good to
	Know
6.4 Immunological diseases	
6.4.1 Reccurent Aphthous stomatitis	Must to
	Know
6.4.2 Bechet's syndrome	Desirable
	to Know
6.4.3 Reiter's syndrome	Desirable
	to Know
6.4.4 Sarcoidosis	Good to
	Know
7. Common non – inflammatory disease involving jaws	
7.1 Fibrous dysplasia	Must to
	Know
7.2 Cherubism	Must to
	Know
7.3 Osteogenesis Imperfecta	Desirable
	to Know
7.4 Paget's bone disease	Must to
	Know
7.5 Cleidocranial dysplasia	Must to
	Know
7.6 Rickets	Desirable
	to Know
7.7 Achondroplasia	Good to
	Know

7.8 Marfan's syndrome	Good	to
	Know	
7.9 Down's syndrome	Desirat	ole
	to Knov	N
7.10 Histiocytosis X disease	Good	to
	Know	
8. Biopsy, Cytology & Healing of Wounds	Maria	4.5
8.1 Factors affecting healing of wounds Healing of extraction wound	Must	tO
	Know Desiret	
8.2 Dry socket	to Know	JIE
9.2 Pienov techniques	Must	
o.5 Biopsy lechniques	Know	10
8.4 Healing of biopsy wound	Must	to
0.4 Treating of biopsy would	Know	10
8.5 Exfoliative Cytology	Must	to
olo Extenditivo Oytology	Know	
8.5.1 Indications	Must	to
	Know	
8.5.2 Staining and Interpretation	Desirat	ole
	to Know	N
9. Systemic Diseases involving Oral Cavity		
9.1	Must	to
Brief review &oral manifestations, diagnosis & significance of common Blood,Nutritional Hormonal & Metabolic diseases of Oral cavity	Know	
, 9.2 Blooddy scrasias-Clinico-nathological aspects and oral manifestations	Must	to
	Know	.0
9.2.1 Anemias	Must	to
	Know	
9.3.2 Polycythemia	Desirat	ole
	to Know	N
9.3.3 Leukopenia	Must	to
	Know	
9.3.4 Neutropenia	Must	to
	Know	
9.3.5 Agranulocytosis	Must	to
	Know	
9.3.6 Chediak- Higashi syndrome	Desirab	le
	to Know	N
9.3.7 Leukocytosis	Must	to
	Know	4.5
9.3.8 Intectious mononucleosis	IVIUST	τΟ
	NUC	+0
9.3.9 Leukemias	Know	10
0.2.10 Durpuro Hoomonhilio	NUC	+0
	iviust	ω

	Know	
9.3 Oral aspects of Disturbances in Mineral Metabolism	Good	to
	Know	
9.4 Oral aspects of Avitaminosis and Hypervitaminoses	Good	to
	Know	
9.5 Oral Aspects of Endocrine Dysfunction	Must	to
	Know	
10. Mucocutenous Lesions		
10.1 Lichen Planus	Must	to
	Know	
10.2 Lupus Ervthematosus	Must	to
	Know	
10.3 Pemphiaus & Pemphiaoid lesions	Desiral	ole
	to Knov	W
10.4 Ervthema Multiforme	Must	to
	Know	
10.5 Psoriasis.Scleroderma	Good	to
	Know	
10.6 Ectodermal Dysplasia	Good	to
	Know	
10.7 Epidermolysis bullosa	Good	to
	Know	
10.8 White sponge nevus	Good	to
	Know	.0
11. Periodontal Diseases		
11.1 Stains	Must	to
	Know	
11.2 Calculus	Must	to
	Know	
11.3 Gingivitis	Must	to
	Know	
11.4 Gingival enlargements	Desiral	ole
	to Knov	N
11.5 ANUG	Must	to
	Know	
11.6 Chronic Desquamative gingivitis	Desiral	ble
	to Knov	N
11.7 Periodontitis and Juvenile periodontitis	Desiral	ble
	to Knov	N
11.8 Basic immunological mechanisms of periodontal disease to be highlighted	Good	to
The Basic initiations of periodonial alocado to be highlighted	Know	.0
12. Diseases of Temporomandibular Joint		
12 1 Ankylosis	Desiral	ble
	to Know	N
12.2 Luxation and Subluxation	Desiral	ble
	to Know	N
		V V

12.3 Summary of different types of arthritis & other developmental malformations	Good	to
	Know	-
12.4 Traumatic injuries	Desirat	ble
	to Know	N
12.5 Myofascial pain dysfunction syndrome (MPDS)	Must	to
	Know	
13. Diseases of Nerves		
13.1 Facial neuralgias – Trigeminal, Sphenopalatine & Glossopharyngeal	Must	to
neuralgias, VII nerve paralysis, Causalgia	Know	
13.2 Psychogenic facial pain	Good	to
	Know	
13.3 Burning mouth syndrome	Desirat	ole
	to Knov	N
14. Pigmentations of Oral tissues	Desirat	ole
	to Knov	N
15. Diseases of Maxillary Sinus	Desirat	ole
	to Knov	N
16. Principles of Forensic Odontology		
16.1 Introduction, definition, aim & scope	Must	to
	Know	
16.2 Sex and ethnic(racial) differences into morphology and histological age		
estimation	Must	to
	Know	
16.3 Determination of sex & blood groups from buccal mucosa/ 16.4 saliva	Desirat	ole
	to Knov	N
16.4Dental DNA methods Bitemarks, rugae patterns & lip prints	Must	to
	Know	
16.5Dental importance of poisons and corrosives	Good	to
	Know	
16.6 Overview of forensic medicine and toxicology	Good	to
	Know	

#### B. PRACTICALS:

Group discussions are taken to discuss the Oral Pathology slides. Students need to identify slides and also identify various pathologies of hard & soft tissue.

The students are detailed on various casts and specimens, pertaining to the practical topics.

They are also assigned topics for peer teaching.

A clinical problem is presented to them, following which they are asked to search for related databases for evidences related to the problem, critically analyze the evidences and find answers.

Students are asked to do Critical appraisal of different types of research papers as per the hierarchy of evidence.

Students also are taught to make use of evidence in diagnosing the pathology.

A Clinical scenario in written format with history is presented to the students and a slide given for microscopic identification to the students. This is followed during revision of slides during practical and then can be implemented in the internal practical examination

III BDS	III BDS ORAL PATHOLOGY		
1	Cysts	Dentigerous Cyst	
		Keratocyst	
		Calcified Odontogenic Cyst	
		Aneurismal Bone Cyst	
		Mucous Retention Cyst	
2	Diseases Of Bone	Ossifying Fibroma	
		Fibrous Dysplasia	
		Cemento-Ossifying Fibroma	
3 Benign And Malignant Tumors	Papilloma		
		Lymphangioma	
		Hyperkeratotic Lesion	
		Carcinoma In Situ	
		Oral Sub Mucous Fibrosis	
		Squamous Cell Carcinoma	
		Verrucous Carcinoma	
		Malignant Melanoma	
		Fibroma	
		Peripheral Giant Cell Granuloma	
		Central Giant Cell Granuloma	
		Hemangioma	
		Neurofibroma	

		Neurilemmoma
		Fibrosarcoma
4	Odontogenic Tumors	Follicular Ameloblastoma
		Plexiform Ameloblastoma
		Acanthomatous Ameloblastoma
		Granular Cell Ameloblastoma
		Unicystic Ameloblastoma
		Adenomatoid Odontogenic Tumor
		Pindborg's Tumor
		Ameloblastic Fibroma
		Odontoma
5	Salivary Gland Tumors	Pleomorphic Adenoma
		Cylindroma
		Warthin Tumor
6	Skin Lesions	Lichen Planus
		Pemphigus Vulgaris

## C. RECOMMENDED BOOKS:

S.N.	Author	Title	
1	Neville, Brad W	Oral & Maxillofacial Pathology	
2	Rajendran, R	Shafe	fer's text book of oral pathology
3	Cawson, R A & Odell, W	Esse	entials of oral pathology & oral medicine
4	Ghom, Anil Govindrao	Text	book of oral pathology
5	Regezi, Joseph a. (et. Al.)	Oral	Pathology Clinical pathologic correlations
Refer	ence books		
1	Shear,Mervyn&Speightpaul	Су	ysts of Oral & Maxillofacial regions
2	Jose, Maji	Ma co	anual of oral histology & oral pathology: blour atlas & text
3	Soames, J.V. &Southam, J.C.	Or	ral Pathology
4	Wood &Goaz	Di les	ifferential diagnosis of oral & maxillofacial sions
5	Bancroft, John & Gamble, Marilyn	Th	heory & practice of histological techniques
6	Barnes, Leon	Su Vo	urgical Pathology of the Head & Neck. ol.1

#### D. SCHEME OF EXAMINATION

#### INTERNAL EXAMINATION SCHEME -

- i. First internal (Theory/Practical): 20 Marks
- ii. Second internal (Theory/Practical): 20 Marks
- iii. Third Internal (Theory/Practical): 60 Marks

Theory as per the university rules

Practicals: (distribution of marks)

University Clinical Examination: 90 Marks

- Spotters (Specimen -identification & points in support-8x 5 Marks) 40 Marks
- Histopathology slides & one blood slide (Diagram,Labelling and salient features) 8x 5
   Marks) 40Marks
- Record book / Journal & Seminar 10 Marks

## **PROSTHODONTICS AND CROWN & BRIDGE**

#### Course outcomes assessed:

Were the students able to: Describe prosthetic needs of patients according to the existing biomechanics of the edentulous state. Diagnose and treat patients who are partially and completely edentulous (including geriatric patients) with complete and partial dentures. Perform clinical steps in treating patients with prosthetic needs and fabricate prostheses for all conventional prosthodontic modes of treatment. Identify cases requiring specialist prosthodontic treatment needs and refer them for further follow up. Plan and communicate treatment plans with special mention on success and failure criteria, factors and motivate patients on the significance of preventive prosthodontic care. Motivate the patient for proper Prosthodontic treatment, maintenance of oral and prosthesis hygiene. Participate in the implementation of the community outreach activities. Exhibit a high standard of professional ethics and conduct and apply these in all aspects of professional skill including evidence-based Prosthodontics from time to time.

#### A. COURSE CONTENT AND APPROACH TO THE SUBJECT

1. Complete Denture:	
1.1 Biologic considerations in jaw relation & jaw movements	
craniomandibular relations	MUST TO KNOW
1.1.1 Mandibular movements	MUST TO KNOW
1.1.2 Concept of occlusion – discussion in brief	MUST TO KNOW
1.2 Relating the patient to the articulator	
1.2.1 Face bow types and uses – discuss in brief	MUST TO KNOW
1.2.2 Face bow transfer procedure - discuss in brief	DESIRABLE TO KNOW
1.3 Recording the maxillo-mandibular relation	
1.3.1 Vertical relation	MUST TO KNOW
1.3.1.1 Freeway space concept	MUST TO KNOW
1.3.1.2 Methods of recording Vertical relation	MUST TO KNOW
1.3.1.3 Errors in recording Vertical relations	MUST TO KNOW
1.3.2 Centric relation records	MUST TO KNOW
1.3.2.1 Definitions	MUST TO KNOW
1.3.2.2 Rationale of Centric relation	MUST TO KNOW
1.3.2.3 Methods to record Centric relation	MUST TO KNOW
1.3.2.4 Gothic arch tracings	MUST TO KNOW
1.3.2.5 Errors in recording centric relation	MUST TO KNOW
1.3.2.6 Long centric	DESIRABLE TO KNOW

1.3.3 Eccentric relation records	GOOD TO KNOW
1.3.3.1 Lateral relation records	GOOD TO KNOW
1.3.3.2 Protrusive relation records	GOOD TO KNOW
1.4 Teeth selection and arrangement:	
1.4.1 Anterior teeth selection	
1.4.1.1 Size of anterior teeth	MUST TO KNOW
1.4.1.2 Shape of anterior teeth	MUST TO KNOW
1.4.1.3 Shade of anterior teeth	MUST TO KNOW
1.4.1.4 Dentogenic principles	MUST TO KNOW
1.4.1.5 Dynesthetic concept	MUST TO KNOW
1.4.2 Posterior teeth	
1.4.2.1 Size of posterior teeth	MUST TO KNOW
1.4.2.2 Form of posterior teeth	MUST TO KNOW
1.4.2.3 Shade of posterior teeth	MUST TO KNOW
1.4.3Esthetic and functional harmony	MUST TO KNOW
1.5 Relating inclination of teeth to concept of occlusion	
1.5.1 Anterior guidance	GOOD TO KNOW
1.5.2 Condylar guidance	GOOD TO KNOW
1.5.3Difference between natural dentition occlusion and	
complete denture occlusion	MUST TO KNOW
1.5.4 Curve of Spee and Curve of Wilson	MUST TO KNOW
1.5.5 Theories of Occlusion	MUST TO KNOW
1.6 Trial dentures	MUST TO KNOW
1.7 Laboratory procedures	
1.7.1 Rationale of remount procedure	MUST TO KNOW
1.7.2Plaster cast for clinical denture remount procedure	MUST TO KNOW
1.8 Denture insertion	
1.8.1 Insertion procedures	MUST TO KNOW
1.8.2 Clinical errors	MUST TO KNOW
1.8.3 Correcting occlusal disharmony	MUST TO KNOW
1.8.4 Selective grinding procedures	MUST TO KNOW
1.8.5 Instructions on denture use and maintenance	MUST TO KNOW
1.9 Treating problems associated with denture use – in brief	MUST TO KNOW
2. Removable Partial Denture:	
2.1 Examination, diagnosis & treatment planning & evaluation	
or diagnostic data	
2.2.1 Major connectors	
2.2.1.1 Definition	
2.2.1.2 Requirements	MUSTTOKNOW

2.2.1.3Types of maxillary major connectors	MUST TO KNOW
2.2.1.4Types of mandibular major connectors	MUST TO KNOW
2.2.2 Minor connectors	MUST TO KNOW
2.2.2.1 Definition	MUST TO KNOW
2.2.2.2 Requirements	MUST TO KNOW
2.2.2.3Types of minor connectors	MUST TO KNOW
2.2.3 Rest and rest seats	MUST TO KNOW
2.2.3.1 Definition	MUST TO KNOW
2.2.3.2 Requirements and design	MUST TO KNOW
2.2.3.3 Types of rests	MUST TO KNOW
2.2.4 Direct retainers	MUST TO KNOW
2.2.4.1 Definition	MUST TO KNOW
2.2.4.2 Requirements and design	MUST TO KNOW
2.2.4.3 Classification	MUST TO KNOW
2.2.4.4 Circumferential clasps	MUST TO KNOW
2.2.4.4.1 Design	MUST TO KNOW
2.2.4.4.2 Simple circlet clasp	MUST TO KNOW
2.2.4.4.3 Reverse circlet clasp	MUST TO KNOW
2.2.4.4.4 Embrasure clasp	MUST TO KNOW
2.2.4.4.5 Combination clasp	MUST TO KNOW
2.2.4.4.6 'C' clasp	MUST TO KNOW
2.2.4.4.7 Multiple circlet clasp	MUST TO KNOW
2.2.4.4.8 Ring clasp	MUST TO KNOW
2.2.4.4.9 Back action clasp	MUST TO KNOW
2.2.4.5 Bar clasps	MUST TO KNOW
2.2.4.5.1 I Bar clasp	MUST TO KNOW
2.2.4.5.2 Y Bar clasp	MUST TO KNOW
2.2.4.5.3 T Bar clasp	MUST TO KNOW
2.2.4.5.4 RPI system	MUST TO KNOW
2.2.5 Indirect retainers	
2.2.5.1 Definition	MUST TO KNOW
2.2.5.2 Requirements and design	MUST TO KNOW
2.2.5.3 Classification	MUST TO KNOW
2.2.6 Tooth replacement	
2.2.6.1 Definition	MUST TO KNOW
2.2.6.2 Requirements	MUST TO KNOW
2.2.6.3 Types	MUST TO KNOW
2.2.7 Denture bases	
2.2.7.1 Requirements	MUST TO KNOW

2.2.7.2 Types	MUST TO KNOW
2.3 Principles of RPD design	
2.3.1 Philosophies of RPD design	MUST TO KNOW
2.3.2 Configurations in RPD designs	MUST TO KNOW
2.4 Survey and design	
2.4.1 Surveyors	MUST TO KNOW
2.4.2 Surveying	MUST TO KNOW
2.5 Mouth preparations and master cast	MUST TO KNOW
2.6 Impression materials and functional impression	MUST TO KNOW
procedures for RPD	
2.7 Preliminary jaw relation and esthetic try-in for some	MUST TO KNOW
anterior replacement teeth	
2.8 Laboratory procedures for framework construction – in brief	DESIRABLE TO KNOW
2.9 Fitting the framework – in brief	DESIRABLE TO KNOW
2.10 Try-in of the RPD - in brief	DESIRABLE TO KNOW
2.11 Completion of the RPD - in brief	DESIRABLE TO KNOW
2.12 Inserting the RPD - in brief	DESIRABLE TO KNOW
2.13 Post insertion observations	MUST TO KNOW
2.14 Temporary acrylic partial dentures	MUST TO KNOW
2.15 Immediate removable partial denture	GOOD TO KNOW
2.16 Removable partial dentures opposing complete	GOOD TO KNOW
denture	
3. Fixed Partial Denture:	
3.1 Fundamentals of occlusion - in brief	MUST TO KNOW
3.2 Articulators - in brief	MUST TO KNOW
3.3 Treatment planning for single tooth restorations	MUST TO KNOW
3.4 Treatment planning for replacement of missing teeth	MUST TO KNOW
including selection and choice of abutment teeth	
3.5 Fixed partial denture configurations	MUST TO KNOW
3.6 Principles of tooth preparations	MUST TO KNOW
3.7 Preparation for full veneer crowns - in brief	MUST TO KNOW
3.8 Preparation for partial veneer crowns - in brief	MUST TO KNOW
3.9 Provisional restorations	MUST TO KNOW

A. Syllabus for Practical:

a. I term:

i. Verification of completion of all pre-clinical work in the journal.

- ii. Written assignment, viva & demonstration of all clinical and laboratory procedures.
- iii. Minimum1 Complete denture
- iv. 2 FPD Tooth preparation (complete metal) and impression making
- v. Peer teaching 02 per batch
- b. II term:
  - i. Demonstration for all clinical and laboratory steps for Removable partial denture
  - ii. Minimum 1 complete denture
  - iii. 02 FPD tooth preparation (complete metal) and impression making
  - iv. Demonstration of generation of a PICO question, search strategy literature search and appraisal through checklists
- B. Recommended Books:

Sr. No	Title	Author
1.	Syllabus of complete denture	Charles M Heartwell&
		Arthur O Rahn
2.	Prosthodontic treatment for edentulous patients	C O Boucher
3.	Essentials of complete denture prosthodontics	Sheldon Winkler
4.	Removable partial prosthodontics	McCracken
5.	Clinical removable partial prosthodontics	Stewart Rudd Kuebker
6.	Contemporary fixed prosthodontics	Rosensteil
7.	Prosthodontic Treatment for Edentulous	ZarbBolender
	Patients	
8.	Removable partial prosthodontics	Ernest L Miller & Joseph E.
		Grasso
9.	Fundamentals of fixed prosthodontics	Herbert Shillingburg
10.	Theory & practice of fixed prosthodontics	Tylman
11.	Dental lab Procedures: Complete dentures,	Rudd and Morrow
	removable partial prosthodontics, Fixed	

	Prosthodontics	
12.	Maxillofacial Prosthetics	Taylor
13.	Contemporary Implant dentistry	C E Misch

C. Examination Scheme

University Exams shall be conducted at the end of fourth BDS

# PERIODONTOLOGY

#### 1. DEFINITION:

1.1. The science that deals with the structures and behavior of the periodontium in health and in disease is called Periodontology, and the branch of dentistry concerned with prevention and treatment of periodontal disease is termed Periodontics.

#### 2. AIMS:

- 2.1. Provide the knowledge, skills and attitudes of the student fundamental to diagnosis and treatment of periodontics and related procedures to enable critical evaluation and problem solving for periodontal problems to allow independent practicebased on the highest level of available evidences.
- 2.2. Provide the knowledge, skills and attitudes Provide the knowledge relating to the contemporary practice of periodontics (including an appreciation of an interdisciplinary approach to comprehensive patient care), to allow communication with both specialist and non-specialist audiences
- 2.3. Produce students who are competent in the design and interpretation of original clinical research at the forefront of current dental research

## 3. OBJECTIVES:

3.1. The student shall acquire the skill to perform scaling, diagnostic tests of periodontal diseases; to use the instruments for periodontal therapy and maintenance of the same. The student shall develop attitude to impart the preventive measures namely, prevention of periodontal diseases and prevention of the progression of the disease. The student shall also develop an attitude to perform the treatment will full aseptic precautions, shall develop an attitude to prevent iatrogenic diseases; to conserve the tooth to the maximum possible time by maintaining periodontal health and to refer the patients who require specialist's care.

## 4. SCOPE:

4.1. Our specialty has expanded considerably with a lot of emphasis on microbiology, immunology, tissue engineering and periodontal medicine. The surgical aspects have seen tremendous advances both in the techniques and eqipments and materials.

#### Course outcomes assessed:

Were the students able to: Describe the anatomy and physiology of the periodontium and correlate it with health and diseased states. Describe the types, etiopathogenesis diagnosis and treatment plan for periodontal pathologies. Diagnose periodontal pathologies Perform dental scaling, diagnostic tests of periodontal diseases; use the instruments for periodontal therapy and maintenance of the same. Impart the preventive measures namely, the prevention of periodontal diseases and prevention of the progress of the disease. Perform the treatment with full aseptic precautions. Prevent iatrogenic diseases; to conserve the tooth to the maximum possible time by maintaining periodontal health. Refer the patients who require specialist's care.

# A. COURSE CONTENT AND APPROACH TO THE SUBJECT:

TOPIC	DISTRIBUTION
1. Historical Background	Desirable to Know
2. Normal Periodontium	Must to Know
2.1. Gingiva	
2.1.1. Definition	Must to Know
2.1.2. Clinical Features	Must to Know
2.1.3. Microscopic Features	Must to Know
2.1.4. Correlation of clinical and microscopic	Must to Know
features	
2.2. Periodontal Ligament	Must to Know
2.2.1. Definition	Must to Know
2.2.2. Periodontal fibers	Must to Know
2.2.3. Cellular elements	Must to Know
2.2.4. Ground substance	Must to Know
2.2.5. Functions of periodontal ligament	Must to Know
2.3. Cementum	Must to Know
2.3.1. Definition	Must to Know
2.3.2. Cementoenamel junction and	Must to Know

cementodentinal junction	
2.3.3. Clinical features of Cementum	Must to Know
2.3.4. Classification of Cementum	Must to Know
2.4. Alveolar Bone	Must to Know
2.4.1. Definition	Must to Know
2.4.2. Cells and intercellular matrix	Must to Know
2.4.3. Parts of alveolar bone	Must to Know
2.4.4. Clinical and radiographic features	Must to Know
2.4.5. Osseous topography	Must to Know
2.5. Aging & the Periodontium	Good to Know
2.5.1. Effects of aging on the periodontium	Good to Know
2.5.2. Effects of aging on the progression of	Good to Know
periodontal disease	
2.5.3. Aging and response to periodontal	Good to Know
treatment	
3. Classification of Periodontal Diseases	Must to Know
3.1. American academy of periodontology	Must to Know
classification (1999)	
2.2. Other elegation of periodental discoses	Desirable to Know
3.2. Other classification of periodonial diseases	
4. Epidemiology of Gingival & Periodontal Diseases	
4.1. Definition of epidemiology	Must to Know
4.2. Epidemiology of gingival diseases	Good to Know
4.3. Epidemiology of periodontal diseases	Good to Know
4.4. Periodontal indices	Good to know
5. Etiology of Periodontal Diseases	
5.1. Plaque	
5.1.1. Definition of plaque	Must to Know
5.1.2. Structure and composition of plaque	Must to Know
E 1.2 Formation of plaque	Must to Know

5.1.4. Physiologic properties of plaque	Good to Know
5.1.5. Micro-organisms associated with specific	Must to Know
periodontal diseases	
5.1.6. Various Plaque hypothesis	Good to Know
5.2. Calculus	
5.2.1. Definition of calculus	Must to Know
5.2.2. Classification and composition of calculus	Must to Know
5.2.3. Mode of attachment of calculus to tooth	Must to Know
5.2.4. Theories of calculus formation	Good to Know
5.2.5. Etiologic significance	Must to Know
5.3. Other Predisposing Factors with Periodontal	
Disease	
5.3.1. latrogenic factors	Good to Know
5.3.2. Malocclusion	Good to Know
5.3.3. Periodontal complications associated with	Good to Know
orthodontic therapy	
5.3.4. Extraction of impacted third molars	Desirable to Know
5.3.5. Habits and self-inflicted injuries	Desirable to Know
5.3.6. Tobacco use	Good to Know
5.3.7. Radiation therapy	Desirable to Know
5.3.8. Genetic Factors associated with	Desirable to Know
Periodontal Disease	
6. Host Response-Basic Concepts	
6.1. Microbial aspects	Good to Know
6.2. Immunologic aspects	Good to Know
6.3. Microbiology and immunology in gingival health	Good to know
6.4. Microbiology and immunology in periodontal	Good to know
diseases	
7. Smoking in Periodontal Diseases	
7.1. Effect of smoking on periodontal diseases	Good to know

7.2. Effect of smoking on response to periodontal	Good to know
treatment	
8. Influence of Systemic Disorders & Stress on the	
Periodontium	
8.1. Endocrine disorders and hormonal changes	
8.1.1. Diabetes mellitus	Must to know
8.1.2. Female sex hormones	Must to know
8.1.3. Corticosteroid hormones	Desirable to know
8.1.4. Hyperparathyroidism	Desirable to know
8.2. Hematologic disorders and immune deficiencies	
8.2.1. Leukemia	Good to Know
8.2.2. Anemia	Good to Know
8.2.3. Thrombocytopenia	Good to Know
8.2.4. Neutrophil disorders	Good to Know
8.2.5. Antibody deficiency disorders	Desirable to Know
8.3. Stress and psychosomatic disorders	Desirable to Know
8.4. Nutritional deficiencies	Desirable to Know
8.5. Other systemic conditions	
8.5.1. Hypophosphatasia	Desirable to Know
8.5.2. Congenital heart disease	Desirable to Know
8.5.3. Metal intoxications	Desirable to Know
9. Periodontal medicine	
9.1. Focal infection theory	Good to Know
9.2. Subgingival environment as a reservoir of	Good to Know
bacteria	
9.3. Periodontal diseases and coronary heart	Good to Know
diseases/atherosclerosis	
9.4. Periodontal diseases and stroke	Good to Know
9.5. Periodontal diseases and pregnancy outcomes	Must to Know
9.6. Periodontal diseases and diabetes mellitus	Must to Know

9.7. Periodontal diseases and COPD	Desirable to Know
10. Oral Malodor	
10.1. Definition	Must to Know
10.2. Classification	Must to Know
10.3. Etiology	Must to Know
10.4. Diagnosis	Must to Know
10.5. Treatment	Must to Know
11. Defense mechanism of the gingiva	
11.1. Sulcular fluid	Good to know
11.2. Leukocytes in dento-gingival area	Good to know
11.3. Saliva	Good to know
12. Gingival Inflammation	
12.1. Stages of gingivitis	Must to Know
13. Clinical features of gingivitis	
13.1. Course and duration	Must to Know
13.2. Clinical findings	Must to Know
14. Gingival Enlargement	
14.1. Inflammatory enlargement	Must to Know
14.2. Drug-induced enlargement	Must to Know
14.3. Idiopathic enlargement	Must to Know
14.4. Enlargement associated with systemic	Must to Know
diseases	
14.5. Neoplastic enlargement	Desirable to Know
14.6. False enlargement	Desirable to Know
15. Acute Gingival Infections	
15.1. Necrotizing ulcerative gingivitis	Must to Know
15.2. Primary herpetic gingivostomatitis	Must to Know
15.3. Pericoronitis	Must to Know
16. Desquamative Gingivitis	Good to Know
17. AIDS & Periodontium	

17.1. Pathogenesis	Good to Know
17.2. Classification and staging	Desirable to Know
17.3. Oral and periodontal manifestations of HIV infection	Must to Know
17.4. Dental treatment complications	Must to Know
17.5. Gingival and periodontal diseases in AIDS	Must to Know
17.6. Periodontal treatment protocol	Must to Know

## A. PRACTICALS:

## **DEMONSTRATIONS-**

- 1. History taking and clinical examination of the patients
- 2. Recording of different indices, Use of disclosing agents
- 3. Methods of using various scaling instruments and identification of periodontal surgical instruments (FLIPPED CLASSROOM)
- 4. Identifying a clinical problem, formulating a question and searching the relevant databases for the evidence (First 2 steps of Evidence Based Decision Making)

#### **Clinical Work Quota**

1. 10 cases- Diagnosis, treatment planning and discussion and total periodontal treatment

Cases with supporting evidence for it (related evidences searched, appraised and

discussed along with the history)

2. 15 complete cases / equivalent-Dental scaling, oral hygiene instructions

## B. RECOMMENDED BOOKS:

Refer to page no. 242

## C. SCHEME OF EXAMINATION:

Final Exams shall be conducted at the end of fourth BDS

## ORAL AND MAXILLOFACIAL SURGERY

Oral and maxillofacial surgery is the specialty of dentistry that includes the diagnosis ad surgical and adjunctive treatment of diseases, injuries and defects including both the functional and esthetic aspects of the hard and soft tissues of the oral and maxillofacial region

#### Aim:

To produce a graduate who is competent in performing extraction of teeth under both local and general anaesthesia, prevent and manage related complications, acquire a reasonable knowledge and understanding of the various diseases, injuries, infections occurring in the Oral & Maxillofacial region and offer evidence-based solutions to such of those common conditions and has an exposure in to the in-patient management of maxillofacial problems.

#### **Objectives:**

a.

Knowledge & Understanding:

At the end of the course and the clinical training the graduate is expected to -

- 1. Able to apply the knowledge gained in the related medical subjects like pathology, microbiology and general medicine in the management of patients with oral surgical problem.
- 2. Able to diagnose, manage and treat the patient on the basis of best available evidence. (Understand the principles of treatment of patients with oral surgical problems.
- 3. Knowledge of range of surgical treatments.
- 4. To promote evidence based decision making taking into consideration the requirement of a patient to have oral surgical specialist opinion or treatment.

5. Understand and apply the principles of evidence based dentistry in patient management.

6. Understanding of the protocols and complications associated with management

of major oral surgical procedures and principles involved in patient management

based on the best possible available evidence.

7. Should know ethical issues and communication ability.

#### Course outcomes assessed:

Were the students able to: Apply the knowledge gained in the related medical subjects like pathology, microbiology and general medicine in the management of patients with oral surgical problem. Diagnose, manage and treat (understand the principles of treatment of) patients with oral surgical problems. Explain range of surgical treatments. Ability to decide the requirement of a patient to have oral surgical specialist opinion or treatment. Explain the principles of in-patient management. Explain the management of major oral surgical procedures and

principles involved in patient management. Explain ethical issues. Examine any patient with an oral surgical problem in an orderly manner. Prescribe various clinical and laboratory investigations and is capable of formulating differential diagnosis. Extract teeth under both local and general anaesthesia. Perform minor oral surgical procedures under L.A. like frenectomy, alveolar procedures & biopsy etc. Assess, prevent and manage various complications during and after surgery. Provide primary care and manage medical emergencies in the dental office. Describe management of major oral surgical problems and principals involved in in-patient management.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT:

TOPIC	DISTRIBUTION
1. Trigeminal nerve,	
1.1 Course and Distribution	Must Know
2. Facial nerve,	
2.1 Course and Distribution	Must Know
3. Blood supply and lymphatic drainage of face and jaws,	
3.1 Arterial Supply	Must Know
3.2 Venous Drainage	Must Know
3.3 Lymphatic Drainage	Must Know
4. Applied anatomy of the mid face skeleton and mandible	
4.1 Applied Anatomy of Maxilla	Good Know
4.2 Applied Anatomy of Zygomatico Maxillary complex	Good Know
4.3 Applied Anatomy of Orbital Cavity	Desirable Know
4.4 Applied Anatomy of Nasal Cavity	Desirable Know
4.5 Applied Anatomy of Mandible	Must Know
5. Case history	
5.1Past illness and present medical illness	Must Know
5.2Types of pulse, respiration Effect of systemic factors over oral	Desirable Know
manifestations	
5.3 Differential Diagnosis	Good Know
6. Introduction, classification, mode of action, types, complication, use o	f vasoconstrictor and
armamentarium of L.A.	
6.1 Introduction of Local Anesthesia	Must Know
6.2 Classification of Local Anesthesia	Must Know
6.3 Mode of Action of Local Anesthesia	Must Know
6.4 Types of Local Anesthesia	Must Know
6.5 Complications of Local Anesthesia	Must Know
6.6 Use of Vasoconstrictors with Local Anesthesia	Must Know

6.7 Armamentariums used for Local Anesthesia	Must Know
7. Exodontia- Definition, indication and contraindication, types of extra	ctions-intra and trans-
alveolar, mechanical principles, complication, patient and o	operator positioning,
armamentarium	
7.1 Principles of Exodontia	Must Know
7.2 Method of Exodontia	
7.2.1 Forceps or Intra –alveolar or closed method	Must Know
7.2.2 Surgical or Trans-alveolar or open method	Must Know
7.3 Types of Movements & Forces	Must Know
7.4 Elevators used for Exodontia	Must Know
7.5 Indications & Contraindications of Exodontia	Must Know
7.6 Complication of Exodontia	Must Know
7.7 Extractions in medically compromised patients	Desirable to Know
8. Trismus	I
8.1 Types of Trismus	Must Know
8.2 Causes of Trismus	Good to Know
8.3 Management of Trismus	Desirable to Know
9. Healing of Extraction Socket	
9.1 Stages of Healing	Desirable to Know
9.2 Factors Affecting Healing	Desirable to Know
10. Management of medically compromised patient,	
10.1 Hypertensive Patient	Must Know
10.2 Cardiac conditions like angina, CCF,	Must Know
10.3 Diabetic Patient	Must Know
10.4 Thyroid Disorders	Must Know
10.5 Bleeding Disorders	Must Know
10.6 Patient on Steroid Therapy	Must Know
10.7 Tuberculosis	Must Know
10.8 HIV/ AIDS	Must Know
11. Management of unconscious patient and pregnant/lactating women	
11.1 Management of Unconscious Patient	Must Know
11.2 Management of Pregnant Woman	Must Know
11.3 Management of Lactating Woman	Desirable to Know
## B. CLINICAL WORK:

- a. Various local anaesthetic techniques including nerve blocks (as required for dental tooth extraction)
- b. Extraction

#### Quota of Work to Be Completed

3 <sup>rd</sup> year	Minimum of 05 patients extraction under local anesthesia
4 <sup>th</sup> year	Minimum of 10 patients extraction under local anesthesia with various
	nerve block techniques
Total	Minimum of 15 patients extraction

# C. RECOMMENDED BOOKS:

Refer page no. 249

# D. SCHEME OF EXMINATION:

FINAL Exams shall be conducted at the end of fourth BDS

# CONSERVATIVE DENTISTRY AND

# ENDODONTICS

## Definitions

## Operative Dentistry

"Art and science of the diagnosis, treatment and prognosis of defects of teeth that do not require full coverage restorations for correction. Such treatment should result in the restoration of proper tooth form, function and esthetic while remaining the physiologic integrity of the teeth in harmonious relationship with the adjacent hard and soft tissues, all of which should enhance the general health and welfare of the patient."

## Endodontics

"It is the branch of dentistry that is concerned with the morphology, physiology and pathology of the human dental pulp and peri-radicular tissues. Its study and practice encompass the basic clinical sciences including biology of the normal pulp; the etiology, diagnosis, prevention and treatment of disease and injures of the pulp; and associated peri-radicular conditions.

#### Aims and objectives

- A. Knowledge and understanding
- B. Skills and
- C. Attitudes
- A. Knowledge and understanding:

The graduate should acquire the following knowledge during the period of training.

- i. To take a detailed history, perform needed investigations, diagnose the disease conditions and manage the disease condition effectively.
- ii. To gain knowledge about aesthetic restorative material and to translate the same to patient's needs.
- iii. To gain the knowledge about endodontic treatment on the basis of scientific foundations.
- iv. To carry simple endodontic treatment.

#### Skills:

He should attain skills necessary for practice of dentistry as said above.

#### Attitudes:

i) Maintain a high standard of professional ethics and conduct and apply theses in all aspects of professional life.

- ii) Expected to participate in CDE programme to update the knowledge and professional skill from time to time.
- iii) To help and participate in the implementation of the national oral health policy.
- iv) He should be able to motivate the patient for proper dental treatment at the same time proper maintenance of oral hygiene.

Scope of the subject

# **Operative dentistry**

The scope of operative dentistry includes

- To know the condition of the affected tooth and other teeth.
- To examine not only the affected tooth but also the oral and systemic health of the patient.
- To diagnose the dental problem and the interaction of problem area with other tissue.
- Provide optimal treatment plan to restore the tooth to return to health and function and increase the overall well being of the patient.
- Thorough knowledge of dental material which can be used to restore the affected areas.
- To understand the biological basis and function of the various tooth tissue.
- To maintain the pulp vitality and occurrence of pulpal pathology.
- To have knowledge of dental anatomy and histology
- To understand the effect of the operative procedures on the treatment of other disciplines.
- An understanding and appreciation for infection control to safe guard both patient and the dentist against disease transmission.

## Endodontics

The scope of endodontics includes

- The differential diagnosis and the treatment of oral pain of pulpal or peri-radicular origin;
- Vital pulp therapy, such as pulp capping and pulpotomy;
- Non-surgical treatment of root canal system with or without peri-radicular pathosis of pulpal origin and the obturation of these root canal system;
- Selective surgical removal of pathological tissues resulting from pulpal pathosis;
- Repair procedures related to such surgical removal of pathological tissues;
- Intentional implantation and replantation of avulsed teeth;
- Surgical removal of tooth structure such as root-end resection and root end filing;
- Hemisection, bicuspidization and root resection;
- Endodontic implants;
- Bleaching of discoloured dentin and enamel;
- Retreatment of teeth previously treated endodontically.

 And treatment procedures related to coronal restorations by means of post and/or cores involving the root canal space.

#### Course outcomes assessed:

Were the students able to: Diagnose diseases of the teeth -Perform simple restorative work for decayed teeth using medium and high speed hand pieces to carry out restorative work. Describe aesthetic restorative material and to translate the same to patients needs. Explain endodontic treatment on the basis of scientific foundation. Identify endodontic instruments and materials needed for carrying out simple endodontic treatment. Perform simple endodontic treatment and emergency endodontic treatment. Explain treatment of luxated teeth.Exhibit a high standard of professional ethics and conduct and apply these in all aspects of professional life. Participate in CDE programme to update the knowledge and professional skill from time to time. Participate in the implementation of the national oral health policy. Motivate the patient for proper dental treatment, maintenance of oral hygiene and maintenance of the restorative work to prevent future damage.

# A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION
1. Dentinal hypersensitivity	-
1.1 Definition, causes, theories of pain	Must to Know
1.2 Clinical features, various anti-hypersensitive agents	Must to Know
1.3 Bio-active materials	Desirable to Know
2. Management of Deep Carious Lesions	
2.1 Direct and indirect pulp capping	Must to Know
2.2 Interim restoration	Must to Know
2.3 Rationale	Must to Know
2.4 interim restorative materials	Must to Know
2.5 prefabricated crowns	Good to Know
2.6 Indirect acrylic restoration	Good to Know
3. Pain control	
3.1 Local anesthesia, analgesia	Must to Know
3.2 Inhalation, sedation and hypnosis	Good to Know
4. Amalgam failure	
4.1 Causes of failure	Must to Know
4.2 Pain following restoration	Must to Know
4.3 Secondary caries, marginal leakage	Must to Know
4.4 Bulk fracture	Must to Know
4.5 Tooth fracture, dimensional change	Must to Know
4.6 Tarnish and corrosion	Must to Know
4.7 Steps/methods to prevent amalgam failure	Must to Know
5. Gingival Tissue Management	

5.1 Moisture and soft tissues management,	Must to Know
5.2 Biological width,	Must to Know
5.3 Gingival retraction cord,	Must to Know
5.4 Mechanical, chemical, surgical, electrosurgical means	Must to Know
6. Principles and scope and endodontics	
6.1 Application of rubber dam	Must to Know
6.2 Sterilization of instruments	Must to Know
6.3 Debridement, drainage	Must to Know
6.4 Chemoprophylaxis, immobilization	Must to Know
6.5 Avoidance of trauma, trephination	Must to Know
6.6 Chemical irritation	Must to Know
7. Rational of endodontic treatment	-
7.1 Reaction of pulp and peri-radicular tissue	Must to Know
7.2 Endodontic implication	Must to Know
7.3 Fish's theory and four zones of infection	Must to Know
8. Anatomy of pulp cavity	
8.1 Structure and function of dentin pulp complex	Must to Know
8.2 Development, morphologic zones of pulp, cells of pulp	Must to Know
8.3 Metabolism, connective tissue fibers, innervations	Must to Know
8.4 Ground substance, vascularity, repair	Must to Know
8.5 Check out for no. of canals, orifice, variation in no. of canals, c-	Must to Know
shape canals etc.	
8.6 Pulp calcification and age changes	Must to Know
9. Pulp protection	
9.1 Causes of pulpal injuries	Must to Know
9.2 Uses of varnish	Must to Know
9.3 Liners and bases,	Must to Know
9.4 Direct and indirect pulp capping,	Must to Know
9.5 Pulpotomy	Must to Know
9.6 Pulp capping agents	Must to Know
9.7 Direct bonding of pulp exposure,	Good to Know
9.8 MTA	Good to Know
10. Diagnosis and treatment planning	
10.1 Definition	Must Know
10.2 History taking	Must Know
10.3 Clinical examination	Must Know
10.4 Pulp vitality test	Must Know
10.5 Radiograph	Must Know
10.6 Diagnosis of acute and chronic lesions	Must Know
10.7 Emergency management, diagnosis of crack tooth and root	Must Know
fractures	
10.8 General considerations	Must Know
10.9 Treatment planning sequence	Must Know
10.10 Interdisciplinary consideration	Good to Know
10.11 Indication for endodontic treatment.	Must Know

11. Pulpal diseases	
11.1 Introduction,	Must Know
11.2 Classification,	Must Know
11.3 Diagnosis and their management	Must Know
12. Periapical diseases	
12.1 Introduction,	Must Know
12.2 Classification,	Must Know
12.3 Diagnosis and their management	Must Know

# B. PRACTICAL -

Clinical exercises

Term		Type of exercise	Number
		Simple Class I preparation for silver amalgam	5
First term	Extracted teeth	Class I preparation for silver amalgam with modifications(buccal and palatal	5
		Class V preparation for silver amalgam	5
	Patient work	Simple Class I preparation and restoration	5
		Class V GIC restoration	3
	Extracted teeth	Simple Class I preparation for Silver amalgam	05
		Class I preparation with modifications(Palatal / lingual/buccal extensions) base and band application followed by restoration with silver amalgam	05
Second term		Class V preparation for silver amalgam	2
		Class V preparation for composite	2
	Patient work	Simple Class I preparation and restoration	5
		Class V GIC restoration	3

\*Demonstration of class I and Class V composite restoration to be completed in first term of posting.

\*Management of deep carious lesion

\* Before second term viva for composite is mandatory.

Students should use the PICO format to search the relevant articles categorized according to the level of evidence to help them in formulating strategies for clinical application of restorative materials.

## C. RECOMMENDED BOOKS:

Refer page no. 131

## D. SCHEME OF EXAMINATION:

FINAL Exams shall be conducted at the end of fourth BDS

# ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS

# 1. DEFINITION:

American Association of Orthodontics- The area of Dentistry concerned with the supervision, guidance, and correction of the growing and matured dentofacial structures, including those conditions that require movement of teeth or correction of malrelationships and malformations of related structures by the adjustment of relationship between and among teeth and facial bones by the application of forces and/or the stimulation and redirection of the functional forces within the craniofacial complex.

British Society of Orthodontics- Orthodontics includes the study of growth and development of jaws and face particularly, and the body generally as influencing the position of the teeth; the study of action and reaction of internal and external influences on the development and the prevention and correction of arrested and perverted development.

#### AIM:

The dental graduate student should acquire adequate knowledge, necessary skills and reasonable attitudes which are required for carrying out the prescribed activities in the subject of Orthodontics and Dentofacial Orthopaedics.

## OBJECTIVE:

Undergraduate program in orthodontics is designed to enable the qualifying dental surgeon to diagnose, analyse and treat common orthodontic problems by preventive, interceptive and corrective orthodontic procedures. The following basic instructional procedures will be adapted to achieve the above objectives.

## SCOPE OF THE SUBJECT:

The Dental graduate will be able to diagnose the type of malocclusion and treat simple malocclusions with removable Orthodontic appliances based on highest level of evidence.

## COURSE OUTCOMES ASSESSED:

Were the students able to: -Diagnose, analyse and treat common orthodontic problems by preventive, interceptive and corrective orthodontic procedures. Analyse and Interpret Radiographs for orthodontic diagnosis. Explain principles and fabrication of intra-oral and extra-oral appliances. Fabricate and deliver simple orthodontic appliances

# B. COURSE CONTENTS AND APPROACH TO THE SUBJECT:

TOPIC	DISTRIBUTION
1. Introduction to Orthodontics	
<ul> <li>1.1 Definition of Orthodontics</li> </ul>	Must to Know
1.2 Division of orthodontic	Must to Know
1.3 Goals of orthodontic treatment	Must to Know
1.4 Need for orthodontic treatment	Must to Know
1.5 Unfavorable sequelae of malocclusion	Must to Know
1.6 Scope of orthodontic treatment	Must to Know
1.7 History of orthodontics	Desirable to Know
1.8 Orthodontic indices	Good to Know
2. Growth and Development	
<ul> <li>2.1 Introduction to Growth and Development</li> </ul>	Must to Know
<ul> <li>2.2 Growth spurts and differential growth</li> </ul>	Must to Know
<ul> <li>2.3 Methods of measuring growth</li> </ul>	Must to Know
• 2.4 Growth theories – Genetic, Sicher's, Scott's, Moss's,	Must to Know
Petrovics, Multifactorial	
<ul> <li>2.5 Genetic and epigenetic factors in gorwth</li> </ul>	Must to Know
<ul> <li>2.5 Scammons Growth curve</li> </ul>	Must to Know
<ul> <li>2.6 Cephalocaudal gradiant of growth</li> </ul>	Must to Know
2.7 Osteogenesis	Desirable to Know
<ul> <li>2.8 Methods of studying gowth</li> </ul>	Good to Know
<ul> <li>2.9 Factors affecting growth and development</li> </ul>	Good to Know
3. Morphologic Development of craniofacial structures	
<ul> <li>3.1 Methods of bone growth</li> </ul>	Must to Know
<ul> <li>3.2 Prenantal growth of craniofacial structures</li> </ul>	Must to Know
3.3 Post natal growth of cranial base, maxilla, mandible	Must to Know
dental arches and occlusion.	
4. Development of occlusion	Γ
3.1 Introduction	Must to Know
3.2 Development of tooth	Must to Know
3.3 Sequence of eruption	Must to Know
3.4 Pre deciduous dentition	Must to Know
3.5 Deciduous dentition	Must to Know
3.6 Permanent dentition	Must to Know
3.7 Establishment of occlusion	Must to Know
<ul> <li>3.8 Self correcting malocclusions at different stages of</li> </ul>	Must to Know
dentition	

3.9 Dental age	Good to Know
<ul> <li>Wolff's law of transformation of bone</li> </ul>	Desirable to Know
Trajectories of force	Desirable to Know
5. Normal Occlusion	
Definition	Must to Know
Terminology used	Must to Know
Compensatory curves	Must to Know
<ul> <li>Andrew's six keys to occusion</li> </ul>	Must to Know
Ideal vs normal occlusion	Must to Know
Dynamics of occlusion	Desirable to Know
Canine guidance	Desirable to Know
Anterior guidance	Desirable to Know
Posterior guidance	Desirable to Know
Mutually protected occlusion	Desirable to Know
Gnathology	Good to Know
Centric relation	Good to Know
Centric occlusion	Good to Know
Role of TMJ in occlusion age changes in occlusion	Good to Know
Natural vs artificial occlusion	Good to Know

# C. CLINICAL SYLLABUS:

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Making upper Alginate impression

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Making lower Alginate impression

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Study model preparation

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- Model Analysis
- Pont's analysis
- Ashley Howe's Analysis
- Carey's Analysis
- Bolton's Analysis
- Moyer's Mixed Dentition Analysis

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D. RECOMMENDED BOOKS:

TITLE	AUTHOR
William R. Profit – Contemporary	Orthodontics
Orthodontics For Dental Students	White And Gardiner
Handbook Of Orthodontics	Moyers R.E
Orthodontics - Principles And Practice	Graber T.M.
Design, Construction And Use Of	Adams C.P
Removable Appliances	
Clinical Orthodontics: Vol 1 & 2	Salzmann

**Reference Books** 

TITLE	AUTHOR
Introduction to Orthodontic	Laura Mitchell
Rakosi Orthodontic Diagnostic Atlas	Rakosi
Removable Orthodontic Appliances	Issacson

# E. EXAM SCHEME:

University Exams shall be conducted at the end of IV BDS

#### **PEDODONTICS & PREVENTIVE DENTISTRY**

- Definition:- "An age-defined specialty providing primary and comprehensive, preventive and therapeutic oral health care for infants and children through adolescence, including those with special health care needs (American Academy of Pediatric dentistry)"
- Aim:-
  - During training in Paediatric dentistry, students should acquire knowledge regarding preventive measures, diagnosis of oral pathologies in oral cavity of children, necessary skills and reasonable attitude for preventive and clinical management with emphasis on treatment needs for children with disabilities with best and relevant evidence.
- Objectives:-

The Objectives are dealt under three headings, Knowledge and Understanding, Skills, and Attitudes

- Knowledge and Understanding: the graduate student should acquire the following during the period of training.
  - Adequate knowledge of the scientific foundations on which paediatric dentistry is based and good understanding of various relevant scientific methods, principles of biological functions and ability to evaluate and analyse scientifically various established facts and data.
  - Adequate knowledge of the development, structure and function of teeth ,mouth and jaws and associated tissues both in health and disease in children and their relationship and effect on general state of child's health with psychological and social well-being of the patient.
  - To understand the behaviour of the child in health and sickness as well as influence of the natural and social environment on the state of oral health.
- Skills: Graduate should be able to demonstrate the following skills necessary for practice in paediatric dentistry.
  - Promote oral health and help to prevent oral diseases in children.
  - Control pain and anxiety amongst the child patient during dental treatment with best available evidence.
  - Diagnose and manage various common dental problems encountered in children keeping in mind the expectations and the right of the child to receive the best possible treatment available based on best evidence.
  - Prevent and manage complications if encountered while carrying out various surgical and other procedures in children with best evidence.

- Attitude: Should develop during the training period
  - Willingness to apply the current knowledge of dentistry in the best interest of the patient and community.
  - Maintain a high standard of professional ethics and conduct and apply this in all aspects of professional life.
  - Seek to improve awareness and provide possible solutions for oral health problems and needs for special children.
  - Willingness to participate in the Evidence based CDE programs to update knowledge and professional skills from time to time.
  - Help and participate in the implementation of the National Oral Health Policy.
- Scope of the subject:-
  - Pediatric dentistry encompasses all aspects f oral health care of children and adolescents. It is based on basic knowledge of various specialties of dentistry like cariology, dental radiology, oral medicine, preventive and restorative dentistry, oral surgery and rehabilitation, child psychology, endodontics, periodontics, preventive and interceptive orthodontics, special care dentistry, immunology, neonatology and allied health sciences.
  - Pediatric dentistry also includes treatment and early diagnosis of oral diseases and conditions found in child and adolescent besides preventive approach.
  - Present trends in the scope of paediatric dentistry
    - Preventive and public health dentistry.
    - Child psychology and management
    - Advanced restorative dentistry
    - Preventive and interceptive orthodontics
    - Special care dentistry
    - Child abuse and neglect (Forensic Pedodontics)
    - Genetics in pediatric dentistry

#### Course outcomes assessed: Were the students able to:

CO1-Perform a proper clinical history, methodologically examine the child patient, and perform essential diagnostic procedures, interpret them, and arrive at a reasonable diagnosis to treat appropriately. CO2-Treat dental diseases which occurring child patient.

CO3-Repair and restore the lost / tooth structure to maintain harmony between both hard and soft tissues of the oral cavity.

CO4-Manage the disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.

CO5-Manage efficiently life-threatening conditions with emphasis on basic life support measure.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

TOPIC	DISTRIBUTION	
1. Introduction, definition, scope & importance of Pedodontics		
1.1 Definition, Aim, scope, Objectives and Importance of	Must to Know	
Pedodontics		
1.2 Adequate Knowledge of scientific foundations on which	Must to Know	
paediatric dentistry is based & good understanding of various		
relevant scientific methods & Principles		
2. Setting up of Paediatric dental clinic		
2.1 Modifications for handicapped child	Good to Know	
2.2 To know the setting & functioning of a paediatric dental clinic	Good to Know	
3. Case History Recording		
3.1 Outline of principles of examination, diagnosis, and treatment	Must to Know	
planning		
3.2 Able to record a case history from pedodontics point of view	Must to Know	
4. Growth & Development of dentition		
4.1 Development of teeth and associated structures	Must to Know	
4.2 Eruption and shedding of teeth	Must to Know	
4.3 Teething disorders and their management	Must to Know	
4.4 Chronology of eruption of teeth	Desirable to Know	
4.5 Adequate knowledge of the development of dentition from birth	Must to Know	
through adolescence		
5. Development of Occlusion from birth through adolescence		
5.1 Pre-deciduous Stage	Must to Know	
5.2 Mixed dentition	Must to Know	
5.3 Deciduous dentition stage	Must to Know	
5.4 Permanent dentition stage	Must to Know	
5.5 Understanding the sequence & Eruption of each tooth & its role	Good to Know	
In the development of occlusion		
6. Infant oral health care		
6.1 Pre birth parent counseling	Desirable to Know	
6.2 Guiding parents in different techniques of oral hygiene	Good to Know	
maintenance		
6.3 Learn the Harmful effects of non-maintenance of proper oral	Good to Know	
nygiene		
7. Plt & Fissure sealants & preventive resin restoration		
7.1 HISTORY, CLASSIFICATION, INDICATIONS, CONTRAINDICATIONS, METHOD OF	IVIUST TO KNOW	
application	O a a d ta Kr	
1.2 Learn indication, types & application of pit & fissure sealants –	Good to Know	
rippea classroom		

8. Applied Morphology & Histology of deciduous & permanent teeth

8.1 Morphology & histological differences in crown, root, enamel, dentin, cementum& pulp between primary & permanent teeth	Must to Know
8.2 Learn morphological features of each deciduous tooth in detail – Flipped classroom	Must to Know
9. Importance of first permanent molar	
9.1 Learn eruption pathway & importance of first permanent molar in establishing occlusion	Good to Know
10. Dental caries	
10.1 Historical background	Good to Know
10.2 Definition, etiology & pathogenesis	Must to Know
10.3 Caries pattern in Primary, young permanent and permanent teeth in children	Good to Know
11. Rampant caries and early childhood caries	
11.1 Definition, aetiology, pathogenesis, Clinical features, Complications & Management.	Good to Know
11.2 Role of diet and nutrition in dental caries	Desirable to Know
11.3 Dietary modifications & diet counseling	Desirable to Know
11.4 Caries activity, tests, caries prediction, caries susceptibility & their clinical application	Desirable to Know
11.5 Clinically able to classify a carious lesion	Must to Know
12. Oral surgical procedures in children	
12.1 Indications and contraindications of extractions of primary and permanent teeth in children	Good to Know
12.2 Knowledge of local and general anesthesia	Must to Know
12.3 Minor surgical procedures in children	Desirable to Know
12.4 Learn about the basic surgical procedures & Local Anesthesia techniques in pediatric dentistry	Good to Know

#### B. CLINICAL WORK:

- 1. Diagrams Cavity preparation
- 2. Case history recording and chair side discussions
- 3. Cases
- 4. Seminar

Quota for third year

- 1. Restorations: -
  - 1.1. Class1 and Class 2 10
- 2. Preventive: -
  - 2.1. Oral Prophylaxis 10

- 2.2. Fluoride application 08
- 3. Extractions 10
- 4. Clinical History taking 03
- 5. Education and Motivation
  - C. RECOMMENDED BOOKS: Refer to page no.276
  - D. SCHEME OF EXAMINATION:

CLINICAL / PRACTICAL POSTING AND EXAMINATION -

FINAL Exams shall be conducted at the end of fourth BDS

#### PUBLIC HEALTH DENTISTRY

#### DEFINITION OF THE SUBJECT:

Public Health Dentistry is a specialty of dentistry concerned with the oral health of a population rather than individuals. It has been defined as the science and art of preventing oral diseases, promoting oral health and improving the quality of life through the organised efforts of the community.

#### 3.AIM AND OBJECTIVES AND SCOPE OF THE SUBJECT:

I. AIM:

To prevent and control oral diseases and promote oral health through organized community efforts

- II. OBJECTIVES:
- A. Knowledge:

At the conclusion of the course the student shall have knowledge of the basis of public health, preventive dentistry, public health problems in India, Nutrition, Environment and their role in health, basics of dental statistics, epidemiological methods, National oral health policy with emphasis on oral health policy.

#### B. Skill and Attitude Development:

At the conclusion of the course, the students shall have required at the skill of identifying health problems affecting the society, conducting health surveys, conducting health education classes and deciding health strategies by critical appraisal of evidence. Students should develop a positive attitude towards the problems of the society and must take responsibilities in providing health.

#### C. Effective Communication:

At the conclusions of the course, the students should be able to communicate the needs of the community efficiently, inform the society of all the recent methodologies in preventing oral disease with substantial scientific evidence

#### III. SCOPE OF THE SUBJECT:

The subject has wide scope as described by the following key areas of dental public health practice.

1. Oral health surveillance

2. Assessing the evidence on oral health and dental interventions, programmes and services

- 3. Policy and strategy development and implementation
- 4. Strategic leadership and collaborative working for health

- 5. Oral health improvement
- 6. Health and public protection
- 7. Developing and monitoring quality dental services
- 8. Dental Public Health intelligence
- 9. Academic Dental Public Health
- 10. Appropriate and evidence- based decision-making and judgement
- 11. Appropriate attitudes, ethical understanding and legal responsibilities
- 12. Role within the Health Service
- 13. Personnel Development

#### Course outcomes assessed: Were the students able to:

CO1-Describe the basis of public health, preventive dentistry, public health problems in India, Nutrition, Environment and their role in health, basics of dental statistics, epidemiological methods, National oral health policy with emphasis on oral health policy.

CO2-Identify health problems affecting the society, conducting health surveys, conducting health education classes and decide health strategies.

CO3-Exhibit a positive attitude towards the problems of the society and must take responsibilities in providing health.

CO4-Communicate the needs of the community efficiently, inform the society of all the recent methodologies in preventing oral disease

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

#### APPROACH TO THE SUBJECT

TOPIC	APPROACH

## 1. INTRODUCTION TO PUBLIC HEALTH DENTISTRY

1.1 Definition of dentistry	Must know
1.2 Pioneers of dentistry	Desirable to know
1.3 History of dentistry	Must know
1.3.1 Milestones in the field of dentistry	Good to know
1.3.2 Historical dates	Good to know
1.3.3 Dentistry in ancient times	Good to know
1.4.Aim, scope and objectives of dentistry	Must know
1.4.1 Dentistry in future	Good to know
2. PUBLIC HEALTH DENTISTRY	
2.1Health and disease	Must know
2.1.1 Concepts, philosophy, definition and characteristics	Must know

2.2 Public health	Must know
2.2.1Definition, concepts and history of public health	Must know
2.3 General epidemiology	Must know
2.3.1 Definition, objectives, methods, uses and screening for disease	Must know
2.3.2 Investigation of an epidemic	Desirable to know
2.3.3 Quarantine procedures	Good to know
2.4. Public health administration	Must know
2.4.1 Priority, establishment, manpower, health management	Must know
2.4.2 infectious disease epidemiology	Desirable to know
2.4.3 Control of epidemics	Good to know
2.5 Health care delivery system	Must know
2.5.1 Centre and state, oral health policy, primary health care, national health programmes, health organizations and agencies	Must know
2.5.2 Health care delivery systems of other countries	Desirable to know
2.6 Behavioral science	Must know
2.6.1 Definition of sociology, anthropology and psychology and their role in health and oral health of community	Must know
2.7 Health economics	Desirable to know
3. DENTAL PUBLIC HEALTH	
3.1 Introduction to dental public health	Must know
3.1.1 Definition and difference between community and clinical health	Must know
3.2 Epidemiology of dental diseases dental caries, periodontal diseases, malocclusion, dental fluorosis and oral cancer.	Must know
3.2.1 Epidemiological studies related to oral diseases, etiology and risk factors for oral diseases	Must know
3.3 Survey procedures	Must know
3.3.1 Planning, implementation and evaluation, WHO oral health survey methods 1997, indices for dental diseases.	Must know
3.4 Delivery of dental care	Must know
3.4.1 Dental auxiliaries( operating and non- operating), incremental and	Must know
3.5 Comprehensive health care, School dental health	Must know
3.6 Payments of dental care	Must know
3.6.1 Methods of payments, dental insurance, Government plans	Must know
3.7 Preventive dentistry	Must know
3.7.1 Definition, levels, role of individual,community and profession	Must know

3.7.2 Fluorides in dentistry, plaque conti	rol programmes	Must know
4. Dentist Act 1948 with amendment		
4.1.1 Objectives, functions, membership of IDA (FLIPPED CLASSR	composition, registration and OOM)	Must know
	and State Denta	
4.2 Dental Council of India Composition and responsibilities	Councils	Must know
4.2.1 Objectives, functions and compos state DCI (FLIPPED CLASSROOM)	sition of centre and	Must know
4.3 Indian Dental Association, Head Of branches (FLIPPED CLASSROOM)	fice, State, Local and	Must know

#### **B. PRACTICAL**

Preparation of oral health education material

Assuming Leadership role in organizing and solving Community Health Problems Discussion and Demonstration of Dental Indices

## C. RECOMMENDED BOOK:

Refer to Page no. 272

D. SCHEME OF EXAMINATION: FINAL Exams shall be conduct end of fourth BDS

# ORAL MEDICINE AND RADIOLOGY

## ORAL MEDICINE:

Oral Medicine is the specialty of dentistry that is concerned with the oral health care of medically compromised patients and with the diagnosis and nonsurgical management of medically related disorders or conditions affecting the oral and maxillofacial region. The practice of oral medicine will provide optimal health to all people through the diagnosis and management of oral diseases.

## ORAL DIAGNOSIS:

Oral Diagnosis is art of using scientific knowledge of identifying oral disease process and distinguishing one disease from other.

## ORAL RADIOLOGY:

Radiology is a science dealing with x-rays and their uses in diagnosis and treatment of diseases in relation to oro-facial diseases.

## 1. AIM:

- To train the student to diagnose the common disorders of Oro-facial region by clinical examination and with the help of such investigations as may be required and medical management of Oro-facial disorders with drugs and physical agents.
- To train the student about the importance, role, use and techniques of Radiographs and other imaging methods in Diagnosis.
- To train the student about the Principles of the Clinical and Radiographic aspects of Forensic Odontology.
- To train the student to ensure higher competence in both general & special areas of Oral Medicine & Radiology.
- To prepare the student for teaching, research and clinical abilities including prevention of various oral & maxillofacial lesions.
- To train the student to apply evidence-based knowledge for the diagnosis and treatment of oral diseases.

# 2. OBJECTIVES:

At the end of curriculum, the student should be able to acquire -

- Knowledge: Theoretical, Clinical and practical knowledge of all orofacial lesions, diagnostic procedures pertaining to them and latest information of imaging modules and recent advances in treatment modalities.
- Skills : Three important skills need to be imparted -

- Diagnostic skill in recognition of oral lesions and their management.
- Research skills in handling scientific problems pertaining to oral treatment.
- Clinical and Didactic skills in encouraging younger doctors to attain learning objectives.
- Evidence Searching Skills using various databases for treatment protocol of various oral diseases.
- Evidence based diagnostic skills in using the latest gold-standard investigative procedures.
- Critical Appraisal of available evidence for diagnosis and Implementation of best clinical evidence in the management of individual patients.
- Evaluation of the evidence implemented to the patients.

#### • ATTITUDE:

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- The positive mental attitude and the persistence of continued learning need to be inculcated.
- Inculcating positive approach towards newer learning methodologies and treatment modalities based on clinical evidence

## COURSE OUTCOMES ASSESSED:

Were the students able to Describe the disorders of Orofacial region. Diagnose the common disorders of Orofacial region by clinical examination and with the help of such investigations as may be required and medical management of oro-facial disorders with drugs and physical agents. Describe the role, use and techniques of radiographs/digital radiograph and other imaging methods in diagnosis. Take radiographs for intra-oral conditions and interpret them to arrive at radiographic diagnosis. Explain the principles of the clinical and radiographic aspects of Forensic Odontology.

# A. COURSE CONTENT AND APPROACH TO SUBJECT:1. APPROACH TO THE SUBJECT OF ORAL MEDICINE

TOPIC	DISTRIBUTION
1. Introduction to Oral Medicine	
1.1. Definition and Scope	Must to Know
1.2. Clinical Applications	Must to Know
2. Principles of Oral Diagnosis	
2.1. Definition.	Must to Know
2.2. Importance and Various types of diagnosis	Must to Know
3. Behavioral Sciences	
3.1. Introduction	Good to Know
3.2. Social Sciences	Good to Know
3.3. Health behavior and lifestyle	Good to Know

3.4. Theories of behavior change	Good to Know
3.5. Life style and oral health	Good to Know
3.6. Social stratification and oral health	Good to Know
3.7. Risk behavior	Good to Know
3.8. Utilization of dental services	Good to Know
3.9. Conclusion	Good to Know
4. Jurisprudence and Ethics in Medicine and Dentistry	-
4.1. Introduction	Good to Know
4.2. History	Good to Know
4.3. Ethical Principles	Good to Know
4.4. Ethical rules for dentist	Good to Know
4.5. Declaration of Geneva	Good to Know
4.6. World medical association international code of medical ethics	Good to Know
4.7. Ethics in dental research	Good to Know
4.8. The Nuremberg code	Good to Know
4.9. Declaration of Helsinki	Good to Know
4.10. Ethical guidelines for biomedical research on human	Good to Know
participants – By the Indian Council of Medical	
Research (ICMR)	
4.11. Conclusion	Good to Know
5. Clinical Case history and components	
5.1. Importance of Clinical Case History	Must to Know
5.2. Vital Statistics	Must to Know
5.3. Chef Complaint	Must to Know
5.4. History of Present Illness	Must to Know
5.5. Past & Present Medical History	Must to Know
5.6. Past and Present Dental History	Must to Know
5.7. Personal History	Must to Know
5.8. General Examination	Must to Know
5.8.1. Extraoral Examination	
5.8.2. Intraoral Examination	
5.9. Examination of Area of Chief Complaint	Must to Know
5.10. Provisional / Clinical Diagnosis	Must to Know
5 11 Differential Diagnosis	Must to Know
5 12 Laboratory Investigations	Must to Know
	Must to Know
5.13. Final Diagnosis	Must to Know
5.14. Treatment Plan	Must to Know
5.14.1. Emergency Treatment	
5. 14.2. Planneu Treatment	
6.1. What is Referral	Good to Know
6.2. Need for referring patients	Good to Know

6.3. Methods for referring patients	Good to Know
6.3.1. Conventional referrals	
6.3.2. Information and Communication Technology	
referrals	
6.4. Dental Reference	Good to Know
6.5. Medical Reference	Good to Know
7. Regressive changes and teeth staining	
7.1. Attrition	Desirable to Know
7.2. Abrasion	Desirable to Know
7.3. Erosion	Desirable to Know
7.4. Abfraction	Desirable to Know
7.5. Intrinsic stains	Desirable to Know
7.6. Extrinsic stains	Desirable to Know
8. Developmental Anomalies of Jaw and Teeth	
8.1. Developmental Anomalies involving size of jaw	Must to know
8.2. Developmental Anomalies involving shape of jaw	Must to know
8.3. Developmental Anomalies involving size of tooth	Must to know
8.4. Developmental Anomalies involving shape of tooth	Must to know
8.5. Developmental Anomalies involving number of tooth	Must to know
8.6. Developmental Anomalies involving structure of tooth	Must to know
8.7. Developmental Anomalies involving eruption of tooth	Must to know
8.8. Names of associated syndromes	Good to know
9. Spread of Infection:	
9.1. Inflammation and infection	Must to know
9.2. Focus of infection	Must to know
9.3. Focal infection	Must to know
9.4. Facial space infections	Must to know
9.5. Oral sepsis and its effect on general system	Must to know
10. Pharmaco-therapeutics:	
10.1 General therapeutic measures- drugs commonly used	Good to know
in Oral Medicine	
10.1.1. Antibiotics	Good to know
10.1.2. Chemotherapeutic agents	Good to know
10.1.3. Anti-inflammatory and analgesic drugs	Good to know
10.1.4. Corticosteroids	Good to know
10.1.5. Antiviral drugs	Good to know
10.1.6. Antifungal drugs	Good to know
10.1.7. Anti-tubercular drugs	Good to know
10.1.8. Antihistamines	Good to know
10.1.9. Immunomodulators	Good to know
10.1.10. Immunosuppressive drugs	Good to know
10.1.11. Sialogogues and antisialogogues	Good to know
11. Geriatric Dentistry	-
11.1. Concept of Aging	Good to know

11.2. Geriatric Patient Assessment	Good to know
11.3. Age related Systemic Changes	Good to know
11.4. Age related Oral Changes	Good to know
11.5. Institutionalized Older Adults	Good to know
11.6. Summary	Good to know
12. Pediatric Dentistry	
12.1. Evaluation of Pediatric Patient	Good to know
12.2. Medical and Dental Issues Associated with	Good to know
Craniofacial Abnormalities	
12.3. Developmental Variations of Normal Structures	Good to know
12.4. Diseases of Tongue	Good to know
12.5. Diseases of Gingiva and Periodontium	Good to know
12.6. Salivary Gland Pathology	Good to know
12.7. Diseases with altered Immune System	Good to know
12.8. Infections	Good to know
13. Pigmented Lesions of the Oral Mucosa -	
13.1 Hemangioma	Must to Know
13.2 Varix	Must to Know
13.3 Angiosarcoma	Desirable to Know
13.4 Kaposi's Sarcoma	Desirable to Know
13.5 Hereditary Hemorrhagic Telangiectasia	Desirable to Know
13.6 Café au Lait Pigmentation	Desirable to Know
13.7 Smoker's Melanosis	Must to Know
13.8 Ecchymosis	Must to Know
13.9 Petechia	Must to Know
13.10 Graphite Tattoo	Desirable to Know

# 2. APPROACH TO THE SUBJECT OF ORAL RADIOLOGY

TOPIC	DISTRIBUTION	
1. Introduction to Oral Radiology		
1.1. History	Good to know	
1.2. Origin	Good to know	
1.3. Definitions	Good to know	
1.4. Scope	Good to know	
1.5. Limitations	Good to know	
2. Radiation physics		
2.1 Atomic structure & ionization of radiation	Must to Know	
2.2 Different types of radiation	Must to Know	
2.3 Details of parts of x- ray machine	Must to Know	
2.4 Electromagnetic spectrum	Must to Know	
2.5 Bremstrauhlung radiation	Must to Know	
2.6 Characteristic radiation	Must to Know	

2.7 Exposure time, current, voltage	Must to Know
2.8 Filtration	Must to Know
2.9 Collimation	Must to Know
2.10 Inverse-square law	Must to Know
2.11 Different dosimeters	Must to Know
2.12 Wave theory & quantum theory	Desirable to Know
2.13 Details about power supply	Desirable to Know
2.14 Photoelectric, Compton and coherent scattering	Desirable to Know
2.15 Half wave rectification	Good to Know
2.16 Different units of radiation	Good to Know
3. Radiation biology	
3.1 Radiolysis of water, direct & indirect effects	Must to Know
3.2 Stochastic & deterministic effects	Must to Know
3.3 Late somatic effects	Must to Know
3.4 Radiation effect at cellular level	Desirable to Know
3.5 Radiation effect at tissue and organ level	Desirable to Know
3.6 Modifying factors	Desirable to Know
3.7 Effect of whole body irradiation	Good to Know
4. Radiation safety and protection	
4.1 Sources of radiation	Must to Know
4.2 Dose limits	Must to Know
4.3 Estimates of risks	Must to Know
4.4 Methods of dose reduction	Must to Know
4.5 Various equipments to reduce the exposure and dose	Must to Know
4.6 Methods of protection of environment	Desirable to Know
4.7 Radiology department design	Desirable to Know
4.8 NCRP & ICRP guidelines of radiation protection	Good to Know
5. Quality assurance and infection control	
5.1 Importance of Radiographic quality assurance	Must to Know
5.2 Schedule of Radiographic quality assurance procedure	Must to Know
5.3 Key steps in radiographic Infection control	Must to Know
5.4 Universal precautions	Desirable to Know
5.5 Coin test	Good to Know
6. Radiographic Techniques	
6.1 All intraoral radiographic technique procedures (FLIPPED	Must to Know
CLASSROOM)	
6.2 Principles, indications, advantages, disadvantages,	Must to Know
contraindications	
6.3 All film holding instruments (FLIPPED CLASSROOM)	Desirable to Know
6.4 Radiographic examination of children	Good to Know
6.5 Special considerations Radiographic techniques for	Good to Know
endodontics	
6.6 Radiographic techniques in pregnancy	Good to Know
6.7 Radiographic techniques for edentulous patients	Good to Know
6.8 Different extraoral views, their indications, advantages,	Must to Know

disadvantages, uses, principles	
6.9 Technique & Evaluation of image	Desirable to Know
6.10 Interpretation	Good to Know
6.11 Panoramic Radiography	
6.11.1 Indications, advantages, disadvantages, principle	Must to Know
6.11.2 The image layer	Must to Know
6.11.3 Panoramic machines	Must to Know
6.11.4 Patient positioning and head alignment (FLIPPED	Must to Know
CLASSROOM)	
6.11.5 Errors	Desirable to Know
6.11.6 Ghost image	Desirable to Know
6.11.7 Different image receptors	Desirable to Know
6.11.8 Interpretation of opg	Good to Know
7. Factors Affecting Ideal Radiographs:	
7.1. K.V.P. and mA of X-ray machine	Must to Know
7.2. Filters	Must to Know
7.3. Collimation	Must to Know
7.4. Intensifying screens	Must to Know
7.5. Grids	Must to Know
7.6. X-ray films	Must to Know
7.7. Exposure time	Must to Know
7.8. Techniques	Must to Know
7.9. Dark room	Must to Know
7.10. Safe light	Must to Know
7.11. Developer and Fixer solutions	Must to Know
7.12. Film Processing (FLIPPED CLASSROOM)	Must to Know
7.13. Storage of Films	Good to Know
7.14. Image Characteristics	Good to Know
8. Normal radiographic anatomy	
8.1 Radiographic appearance of Teeth Supporting structures, Maxilla, Mandible	Must to Know
8 2 Cervical burn out	Desirable to Know
8 3 Y line of Ennis	Desirable to Know
8.4 Differentiating points between normal anatomy & jaw	Desirable to Know
pathologies.	
8.5 Radiographic appearance of different Restorative	Good to Know
materials	
9. Faulty Radiographs and Artifacts in Radiographs	
9.1 Common Problems in Film Exposure and Development	Must to Know
9.1.1 Light Radiographs	Must to Know
9.1.2 Dark Radiographs	Must to Know
9.1.2 Insufficient Contrast	Must to Know
9.1.3 Film Fog	Must to Know

9.1.4 Dark Spots or Lines	Must to Know
9.1.5 Light Spots	Must to Know
9.1.6 Yellow or Brown Stains	Must to Know
9.1.7 Blurring	Must to Know
9.1.8 Partial Images	Must to Know
9.1.9 Emulsion Peel	Must to Know
10. Principles of radiographic interpretation	
10.1 Role in radiographs in disease detection and monitoring	Must to Know
10.2 Guidelines for ordering radiographs	Must to Know
10.3 Common dental radiographic examinations	Desirable to Know
10.4 Special considerations	Good to Know
10.5 Ideal viewing conditions	Must to Know
10.6 Systematic radiographic analysis of intraoral radiographs	Must to Know
10.6 Analysis of intraosseous lesion: Aunt Minnie and step- by- step method	Desirable to Know
10.7 Systematic radiographic analysis of intraoral radiographs	Good to Know
10.8 Lamina dura in health & disease	Good to Know
11. Dental caries	
11.1 Radiographic appearance of all types of caries	Must to Know
11.2 Radiographic classification	Must to Know
11.3 Use of bitewing radiograph	Must to Know
11.4 Radiographic interpretation of caries	Must to Know
11.5 Alternative diagnostic tools to detect caries	Desirable to Know
11.6 Differentiation of secondary caries from caries	Good to Know
12. Periodontal diseases	
12.1 Indications of radiographs in periodontal diseases	Must to Know
12.2 Limitations of radiographs in periodontal diseases	Must to Know
12.3 General radiographic features of periodontal disease	Must to Know
12.4 Radiographic classification of periodontal disease	Must to Know
12.5 Dental considerations with periodontal diseases	Desirable to Know
12.6 Effect of systemic diseases on periodontium	Must to Know
12.7 Digital subtraction radiography	Must to Know
13. Inflammatory lesions of the jaws	
13.1 Clinical and radiographic features of Periapical & pericoronal infection	Must to Know
13.2 D/D of different inflammatory lesions of jaw	Must to Know
13.3 Clinical and radiographic features of osteomyelitis	Desirable to Know
13.4 Clinical and radiographic features of osteoradionecrosis	Good to Know
14. Developmental disturbances of the face, jaws and teeth	
14.1 Classification, general & radiographic features of Developmental disturbances of the face jaws and teeth	Must to Know
14.2 Genetics	Desirable to Know

# B. PRACTICAL / CLINICAL SCHEME FOR III BDS

Under practical / clinical scheme for III BDS, a. Examination of Trigeminal and Facial Nerves as writing assignment – in III BDS first term b. Discussion on Pulp, periapical & periodontal diseases and Prescribing Intraoral Radiographs - in III

BDS second term c. Demonstration of Clinical examination of pathology (Swelling, PMDs, Malignancy, Ulcer etc.) - in III

BDS second term d. Peer teaching on topics General physical examination and Extraoral examination - in III BDS second term

# Ill year 1<sup>st</sup> term

- 1. Demonstration on Patient shall be given to every Clinical Posting batch during the Clinical posting:
  - 1.1. OPD
    - 1.1.1 . Introduction
    - 1.1.2 . Importance of case history
    - 1.1.3 . Patient Positioning on dental chair
    - 1.1.4 . Dental and Oral Examination
    - 1.1.5 . Recording of OPD Case Paper
  - 1.2. Radiology
    - 1.2.1. Introduction
    - 1.2.2. Importance of Dental Radiographs
    - 1.2.3. Patient Positioning on dental chair
    - 1.2.4. Dental Radiograph taking procedure and techniques
    - 1.2.5. Processing of Radiograph
    - 1.2.6. Interpretation of Radiograph
    - 1.2.7. Faults / Artifacts on Radiographs
    - 1.2.8. Prescribing Intra-oral radiograph
- Each student shall be given a writing assignment during the Clinical Posting: 2.1. Case History – Description and Importance
   Head and Neck Lymph nodes

- 2.3. Salivary Glands
- 2.4. Muscles of Mastication
- 2.5. Temporomandibular Joint
- 2.6. X-ray films
- 2.7. Processing solutions and techniques
- 2.8. IOPAR Technique
- 2.9. Dark room
- 3. Each student shall perform clinical examination and shall take Intraoral Periapical Radiographs during the clinical posting. The record for the same shall be maintained in the Record / Log book.

#### III BDS Second Term:

- a. Demonstration shall be given to every Clinical Posting batch during the Clinical posting of III BDS Second Term on:
  - 1.1. Medicine Prescription writing
  - 1.2. Prescribing Intraoral & Extraoral Radiographs and Advanced Imaging Modalities
- b. Each student shall be given a Writing Assignment during the Clinical posting:
  - 2.1. Swelling
  - 2.2. Oral Ulcer
  - 2.3. Classification and Five trade names of NSAIDs
  - 2.4. Classification and Five trade names of Antibiotics
  - 2.5. Classification and Five trade names of Antioxidants
  - 2.6. Classification, Contraindications and Five trade names of Corticosteroids
  - 2.7. Five trade names of Gum Paints, Mouthwash, Topical Anesthetic & Antiseptic gel / cream and Dental Antihypersensitivity toothpaste
  - 2.8. Schematic diagrams of radiographic anatomical landmarks of maxilla and mandible
- 3. The Student shall be trained to arrive at Proper Diagnosis by following a Scientific and Systematic procedure of History taking and Examination of the Oro-facial region.
  - C. RECOMMENDED BOOKS:

Refer page no. 216

D. SCHEME OF EXAMINATION:

FINAL Exams shall be conducted at the end of fourth BDS

# FOURTH BDS ORAL MEDICINE AND RADIOLOGY

# A. COURSE CONTENT AND APPROACH TO THE SUBJECT: 1. APPROACH TO THE SUBJECT OF ORAL MEDICINE

The change in IV BDS Oral Medicine & Radiology theory syllabus shall be as following:

1. Introduction of Biomedical waste management chapter under the section of

**Environmental Science** 

These will enable students to handle the material waste with caution.

COURSE OUTCOMES ASSESSED:

Were the students able to-Describe the disorders of Orofacial region. Diagnose the common disorders of Orofacial region by clinical examination and with the help of such investigations as may be required and medical management of oro-facial disorders with drugs and physical agents. Describe the role, use and techniques of radiographs/digital radiograph and other imaging methods in diagnosis. Take radiographs for intra-oral conditions and interpret them to arrive at radiographic diagnosis. Explain the principles of the clinical and radiographic aspects of Forensic Odontology.

TOPIC	DISTRIBUTION
1. Infectious Diseases	
1.1 C/F,O/M investigations, D/D & treatment - TB, syphilis,	Must to Know
hepatitis, AIDS	
1.2 C/F,O/M investigations, D/D & treatment of	Desirable to Know
actinomycosis, other STDs	
<ol> <li>C/F,O/M investigations, D/D &amp; treatment of protozoal</li> </ol>	Good to Know
infection	
2. Red and White Lesions of Oral Mucosa - Definitions and Burke	et,s classification,
C/F, investigations, D/D & treatment	
2.1 Leukoedema	Must to Know
2.2 White Sponge Nevus	Desirable to Know

2.3 Linea Alba (White Line)	Must to Know
2.4 Frictional (Traumatic) Keratosis	Must to Know
2.5 Cheek Chewing	Must to Know
2.6 Chemical Injuries of the Oral Mucosa	Desirable to Know
2.7 Actinic Keratosis (Cheilitis)	Good to Know
2.8 Smokeless Tobacco–Induced Keratosis	Must to Know
2.9 Oral Hairy Leukoplakia	Desirable to Know
2.10 Candidiasis	Must to Know
2.11 Mucous Patches	Good to Know
2.12 Leukoplakia	Must to Know
2.13 Erythroplakia	Must to Know
2.14 Oral lichen planus	Must to Know
2.15 Lupus Erythomatosus	Good to Know
3. Ulcerative, vesicular, and Bullous lesions - Definitions of all su	face lesions. C/F,
investigations, D/D & treatment	
3.1 Primary Herpes Simplex Virus Infections	Must to Know
3.2 Coxsackievirus Infections	Desirable to Know
3.3 Varicella-Zoster Virus Infection	Must to Know
3.4 Erythema Multiforme	Must to Know
3.5 Contact Allergic Stomatitis	Must to Know
3.6 Oral Ulcers Secondary to Cancer Chemotherapy	Desirable to Know
3.7 Acute Necrotizing Ulcerative Gingivitis	Desirable to Know
3.8 Recurrent Aphthous Stomatitis	Must to Know
3.9 Behçet's Syndrome	Desirable to Know
3.10 Pemphigus	Must to Know
3.11 Subepithelial Bullous Dermatoses	Good to Know
3.12 Histoplasmosis	Good to Know
4. Oral Cancer	
4.1 Epidemiology, etiology & risk factors	Must to Know
4.2 Precancerous lesions & conditions	Must to Know
4.3 C/F and D/D of all Head & Neck cancers	Must to Know
4.4 Imaging and all treatment modalities	Must to Know
4.5 Tumor biology	Desirable to Know
4.6 Nutrition: risk and prophylaxis	Desirable to Know
4.7 Viruses in oral cancer	Good to Know
4.8 Regimens of radiotherapy and chemotherapy	Good to Know
4.9 Complications of treatment and their management	Good to Know
5. Diseases of Tongue:	
5.1. Developmental	Must to know
5.2. Inflammatory	Must to know
5.3. Nutritional and Metabolic	Must to know
5.4. Neoplastic	Must to know
5.5. Miscellaneous	Must to know
6. Salivary Gland Diseases	
6.1 Anatomy & physiology, functions of saliva	Must to Know

6.2 classification of salivary gland disorders	Must to Know
6.3 C/F of salivary gland disorders	Must to Know
6.4 Diagnostic approaches to the patient with salivary gland	Must to Know
disease	
6.5 Basic imaging methods	Must to Know
6.6 C/F	Must to Know
6.7 Investigations	Must to Know
6.8 D/D	Must to Know
6.9 Treatment of Specific diseases and disorders of the	Must to Know
Salivary glands	
6.10 Xerostomia	Must to Know
6.11 Salivary gland tumors	Must to Know
6.12 Medicinal treatment of sialorrhoea and xerostomia	Desirable to Know
6.13 Methods of saliva collection	Good to Know
6.14 advanced imaging modalities like sialography	Good to Know
6.15 Scintigraphy	Good to Know
6.16 CT	Good to Know
6.17 MRI	Good to Know
7. Temporo-Mandibular Joint Disorders	
7.1. Functional Anatomy	Must to know
7.2. Etiology, Epidemiology & Classification	Must to know
7.3. Assessment	Must to know
7.4. General Clinical Characteristics	Must to know
7.5. Specific Disorders and their Management	Must to know
7.6. Arthritis of the Temporo-mandibular Joint	Must to know
7.7. Developmental Defects & Trauma	Must to know
8. Maxillary sinus disorders:	
8.1. Developmental Disorders	Must to know
8.2. Inflammatory Disorders	Must to know
8.3. Cystic Disorders	Must to know
8.4. Neoplasm	Must to know
8.5. Trauma	Must to know
8.6. Miscellaneous	Must to know
9. Oral Manifestations of:	
9.1. Metabolic Disorders	Good to know
9.2. Endocrine disorders	Good to know
9.3. Nutritional deficiency	Good to know
10. Oro-Facial Pain:	
10.1. Pain arising from diseases of oro-facial tissues	Must to know
10.2. Pain arising due to CNS diseases	Must to know
10.3. Referred Pain	Must to know
11. Hematologic Diseases	
11.1 Physiology of blood	Must to Know
11.2 Clinical & lab findings	Must to Know
11.3 Classification of hematologic disorders	Must to Know

11.4 General and oral manifestation	Must to Know
11.5 Investigations & treatment of RBC & WBC disorders	Must to Know
11.6 Leukemias	Must to Know
11.7 General and oral manifestation of Lymphomas	Desirable to Know
11.8 Multiple myeloma	Desirable to Know
11.9 Different chemotherapeutic regimens for leukemia and	Good to Know
their complications	
12. Bleeding and clotting disorders - Vessel Wall Disorders, Plate	let Disorders,
Coagulation Disorders	
12.1 Physiology of blood coagulation	Must to Know
12.2 clinical & lab findings	Must to Know
12.3 classification of bleeding & clotting disorders	Must to Know
12.4 Clinical Features	Must to Know
12.5 Oral manifestations	Must to Know
12.5 Investigations	Must to Know
12.6 D/D	Must to Know
12.7 Treatment	Must to Know
12.8 C/F, investigations, D/D & treatment of Fibrinolytic	Desirable to Know
Disorders	
12.9 PT, INR, dented management of patients with bleeding	Good to Know
& clotting disorders	
13. Cervicofacial Lymphadenopathy	Must to Know
14. Management of Dental Problems In Medically Compromised	patients:
14.1. Physiological changes: Puberty, Pregnancy and	Desirable to know
Menopause	
14.2. Patients suffering with Cardiac, Respiratory, Liver,	Desirable to know
Kidney, Bleeding Disorders, Hypertension, Diabetes,	
AIDS and Post-irradiated Patients.	
15. Allergy:	
15.1. Local allergic reactions	Must to Know
15.2. Anaphylaxis	Must to Know
15.3. Serum sickness	Must to Know
15.3.1. Local allergic manifestations to food drugs &	Must to Know
chemicals.	
15.3.2. Systemic allergic manifestations to food	Must to Know
drugs & chemicals	
16. Neuromuscular Diseases	
16.1 Types, causes, C/F, investigations and management of	Must to Know
Facial palsy, Epilepsy along with recent updates	
16.2 Dental considerations in patients with epilepsy	Desirable to Know
16.3 Muscular atrophy	Good to Know
17. Forensic Odontology:	
17.1. Medico legal aspects of Oro-facial injuries	Good to know
17.2. Identification of Bite marks	Good to know
17.3. Determination of Age and Sex	Good to know

17.4. Identification of cadavers by Dental Appliances,	Good to know
Restorations and Tissue remnants	
17.5. Role of Dentist in Forensic Science	Good to know
18. Benign Tumors of the Oral Cavity - Definition of tumor, ham	artomas, choriostoma
and terratoma with examples. Classification of odontogenic and non-odontogenic	
benign tumors, C/F, investigations, D/D & treatment	
18.1 Pyogenic Granuloma	Must to Know
18.2 Hemangioma and Angiomatous Syndromes	Must to Know
18.3 Lymphangioma	Desirable to Know
18.4 Giant Cell Granuloma (Peripheral and Central)	Must to Know
18.5 Fibrous Dysplasia of Bone	Good to Know
18.6 Albright's Syndrome	Good to Know
19. Environmental Science including Biomedical Waste Management	
19.1. Introduction	Good to Know
19.2. What is Bio- Medical Waste	Good to Know
19.3. Risk from Bio- Medical Waste	Good to Know
19.4. Environmental Hazard	Good to Know
19.5. Occupational Hazard	Good to Know
19.6. Public Health Hazard	Good to Know
19.7. Legal Provision	Good to Know
19.8. Treatment and Disposal Methodology	Good to Know

# 2. APPROACH TO THE SUBJECT OF DIFFERENTIAL DIAGNOSIS

TOPIC	DISTRIBUTION
Soft tissue lesions	
1.1. White lesions of oral mucosa	Must to Know
1.2. Solitary oral ulcers and fissures	Must to Know
1.3. Peripheral oral exophytic lesions	Good to Know
1.4. Pits, fistulas and draining lesions	Good to Know
1.5. Intraoral brownish, bluish or black conditions	Good to Know
1.6. Solitary red lesions	Good to Know
1.7. Generalized red conditions and multiple ulcerations	Good to Know
1.8. Red conditions of the tongue	Good to Know
1.9. Yellow conditions of the oral mucosa	Good to Know
Bony lesions	
2.1. Radiolucencies of Jaws	
2.1.1. Anatomic radiolucencies	Must to Know
2.1.2. Periapical radiolucencies	Must to Know

2.1.3. Pericoronalradiolucencies	Must to Know
2.1.4. Solitary cystlike radiolucency not necessarily	Good to Know
containing teeth	
2.1.5. Multiple separate well defined radiolucency	Good to Know
2.1.6. Generalized rarefactions of jawbones	Good to Know
2.2. Mixed radiolucent-radiopaque lesions	Good to Know
2.2.1. Mixed radiolucent-radiopaque lesions	Good to Know
associated with teeth	
2.2.2. Mixed radiolucent-radiopaque lesions not	Good to Know
necessarily containing teeth	
2.3. Radiopacities of the jawbones	Good to Know
2.3.1. Anatomic radiopacities	Good to Know
2.3.2. Periapical radiopacities	Good to Know
2.3.3. Solitary radiopacities not necessarily	Good to Know
containing tooth	
2.3.4. Multiple separate radiopacities	Good to Know
2.3.5. Generalized radiopacities	Good to Know

# 3. APPROACH TO THE SUBJECT OF ORAL RADIOLOGY

The change in IV BDS Oral Medicine & Radiology theory syllabus shall be as following:

1. Introduction of Radiological waste management chapter under the section of Environmental Science

These will enable students to handle the material waste with caution.

TOPIC	DISTRIBUTION
1. Radiographic Techniques:	
1. Extra oral radiographic examination	
1.1 Different extraoral views, their indications, advantages,	Must to Know
disadvantages, uses, principles	
1.2Technique & Evaluation of image	Desirable to Know
1.3Interpretation	Good to Know
1.2. Trauma Radiography	
1.2.1. Traumatic injuries of the teeth	Good to Know
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1.2.2. Traumatic injuries to facial bones	Good to Know
1.2.2.1. Mandibular fractures	Good to Know
1.2.2.2. Midfacial fractures including maxillary fractures	Good to Know
1.2.3. Monitoring the healing of fractures	Good to Know
1.3 Digital imaging	
1.3.1 Principles, advantages & disadvantages over conventional radiography	Must to Know
1.3.2 Digital detectors	Must to Know
1.3.3 Digital image display	Must to Know
1.3.4 Characteristics of digital detectors	Desirable to Know
1.3.5 Characteristics of image, storage	Good to Know
1.3.6 Teleradiology	Good to Know
1.4 Specialized radiographic techniques	
1.4.1Principles,advantages & disadvantages over conventional radiography	Must to Know
1.4.2 Indications & contraindications	Must to Know
1.4.3 Parts of machines	Must to Know
1.4.4 Different dyes used in Specialized radiographic technique	Desirable to Know
1.4.5 Radioisotopes	Good to Know
1.4.6 Contrast imaging	Good to Know
1.4.7 USG transducers	Good to Know
2. Principles and Complications of Radiotherapy in oro-facial malignancies.	Good to Know
3. Contrast Radiography & Basic Knowledge of Radio-Active Isotopes.	Good to Know
4. Orofacial implants	
4.1 Importance of imaging, commonly used R/GIC techniques, indications, prescribing proper radiographs.	Must to Know
4.2 Preoperative planning Intra operative and post operative assessment	Desirable to Know
4.3 Radiographs signs of failure of implants	Good to Know
4.4 Imaging stents	Good to Know
4.5 Basic knowledge about CBCT	Good to Know
5. Radiography in Forensic Odontology [Based on EBES]	
5.1. Radiographic Age Estimation	Good to Know
5.2. Post-Mortem Radiographic Methods	Good to Know
6. Guidelines for prescribing radiographs	
6.1 Role in radiographs in disease detection and monitoring	Must to Know
6.2 Guidelines for ordering radiographs	Must to Know
6.3 Common dental radiographic examinations	Desirable to Know
6.5 Special considerations	Good to Know
7. Principles of radiographic interpretation	

7.1 Ideal viewing conditions	Must to Know
7.2 Systematic radiographic analysis of intraoral radiographs	Must to Know
7.3 Analysis of intraosseous lesion: Aunt Minnie and step-by-	Desirable to Know
step method	
7.4 Systematic radiographic analysis of intraoral radiographs	Good to Know
7.5 Lamina dura in health & disease	Good to Know
8. Dental caries	
8.1 Radiographic appearance of all types of caries	Must to Know
8.2 Radiographic classification	Must to Know
8.3 Use of bitewing radiograph	Must to Know
8.4 Radiographic interpretation of caries	Must to Know
8.5 Alternative diagnostic tools to detect caries	Desirable to Know
8.6 Differentiation of secondary caries from caries	Good to Know
9. Periodontal diseases	
9.1 Indications of radiographs in periodontal diseases	Must to Know
9.2 Limitations of radiographs in periodontal diseases	Must to Know
9.3 General radiographic features of periodontal disease	Must to Know
9.4 Radiographic classification of periodontal disease	Must to Know
9.5 Dental considerations with periodontal diseases	Desirable to Know
9.6 Effect of systemic diseases on periodontium	Must to Know
9.7 Digital subtraction radiography	Must to Know
10. Dental anomalies	
10.1 Developmental abnormalities number of teeth, Size of	Must to Know
teeth, number of teeth, Shape of teeth	
10.2 Syndromes associated with these abnormalities	Desirable to Know
10.3 Genetic factors associated with these anamolies	Good to Know
11. Inflammatory lesions of the jaws	
11.1 Clinical and radiographic features of periapical&pericoronal infection	Must to Know
11.2 D/D of different inflammatory lesions of jaw	Must to Know
11.3 Clinical and radiographic features of osteomyelitis	Desirable to Know
11.4 Clinical and radiographic features of osteoradionecrosis	Good to Know
12. Cysts of the jaws	
12.1 Definition, classification, theories of cyst enlargement	Must to Know
12.2 Radiographic features of Odontogenic cyst & Non	Must to Know
odontogenic cyst	
12.3 Syndromes associated with cysts	Desirable to Know
12.4 Malignant potential of differed cysts,	Good to Know
12.5 Complications of cyst	Good to Know
13. Benign tumours of the jaws	
13.1 Definition, classification, radiographic features of	Must to Know
benign tumors, odontogenictumours, Non	
odontogenictumours	
13.2 Hyperplasias	Desirable to Know
13.3 Indications of different radiographs	Good to Know

13.4 Malignant potential	Good to Know
14. Malignant diseases of the jaws	
14.1 General features and radiographic features of	Must to Know
malignancies of jaws	
14.2 Radiographic D/D of malignancies	Desirable to Know
14.3 Metastatic tumors, Malignancy of the hematopoetic	Good to Know
system	
15. Diseases of bone manifested in the jaws	
15.1 General and radiographic features of bone dysplasias	Must to Know
15.2 Syndromes associate with bone dysplasias	Desirable to Know
15.3 Genetic factors with bone dysplasias	Good to Know
16. Systemic diseases manifested in the jaws	
16.1 General features of systemic diseases, radiographic Must to Know	
changes in jaws.	
16.2 Differentiation form other jaw lesions Desirable to Know	
16.3 Pathophysiology for changes in jaws	Good to Know
17. Radiographic Waste Disposal	
17.1. Introduction	Good to Know
17.2. What is Radiographic Waste	Good to Know
17.3. Risk from Radiographic Waste Good to	
17.4. Disposal of Lead waste	Good to Know
17.5. Disposal of X-ray system cleaners	Good to Know
17.6. Disposal of Processing solutions	Good to Know
17.7. Disposal of Dental films	Good to Know

## B. PRACTICAL / CLINICAL:

Under practical / clinical scheme for IV BDS, a. Discussion on Ideal and Faulty radiographs - in IV BDS first term b. Peer teaching on topics Radiation physics, biology & protection; Intraoral Radiography techniques

and Anatomical Landmarks in IOPA - in IV BDS first term c. Discussion on Scope and recent advances in Oral Medicine and Radiology - in IV BDS second term

#### IV BDS First Term

- 1. The students, during the clinical posting, shall be given demonstration on:
  - 1.1. Clinical examination of Normal Structure and Pathology (Swelling, OPMDs, Oral Malignancy, Oral Ulcer etc.)
  - 1.2. Evidence based Literature Search for developing Search Skills
- 2. Each student shall be given a writing assignment during the clinical posting:
  - 2.1. Treatment of Oral Submucous Fibrosis
  - 2.2. Treatment of Oral Leukoplakia
  - 2.3. Treatment of Oral Lichen Planus
  - 2.4. Treatment of Recurrent Apthous Stomatitis
  - 2.5. Treatment of Oral Candidiasis
- 3. The students after identifying the clinical problem will formulate questions and will search the relevant databases for the evidence.
- 4. The Critical appraisal for different types of research papers as per the Hierarchy of Evidence will be undertaken by each student.
- 5. Role-modeling shall be practiced under the supervision of Department Teaching Faculty, especially during the clinical case discussions.
- 6. Each student shall perform clinical examination and shall take Intraoral Periapical Radiographs during the clinical postings of III and IV BDS. The record for the same shall be maintained in the record / log book.

## IV BDS Second Term

- 1. The students, during the clinical posting, shall be given demonstration on:
  - 1.1. Electric Pulp Testing
  - 1.2. Toluidine blue solution test for OPMD's and Oral Malignancy
  - 1.3. Digital OPG procedure
- 2. Each student shall be given a writing assignment during the clinical posting on: 2.1. Tooth vitality
  - 2.2. Vital staining and other Oral Cancer Screening Aids
  - 2.3. Indications for Intra-oral and Extra-oral Radiographs

## C. RECOMMENDED BOOKS:

Sr. No.	Title	Author	Publisher
1.	Burkit's Oral Medicine, Diagnosis and Treatment	Greenberg Glick	J.B. Lippincott
2.	Oral Radiology	White & Pharoah	Mosby Elsevier

3.	Differential Diagnosis of Oral &	Norman K.Goaz	Mosby Elsevier
	Maxillofacial Lesions	Paul Wood	

# Books for References: I. Oral Medicine

Sr. No.	Title	Author	Publisher
1.	Principles of Oral Diagnosis	Coleman	Mosby Year Book
2.	Oral Manifestations of Systemic Diseases	Jones	W.B. Saunders company
3.	Clinical Methods	Hutchinson	
4,	Oral Pathology	Shafers	
5.	Tobacco related Oral Mucosal Lesions and Conditions	Fali Mehta	
6.	Synopsis of Oral Pathology	S.N.Bhaskar	
7.	Principles and Practice of Radiographic Interpretation	H.M.Worth	
8.	Radiographic Interpretation for the Dentist	S.N.Bhaskar	
9.	Park		
10.	Soben Peter		

# II. Oral And Maxillofacial Radiology

Sr.	Title	Author	Publisher
No.			
1.	Oral Radiology	White &Goaz	Mosby year Book
2.	Dental Radiology	Wuehrmann	C.V. Mosby
			Company
3.	Oral Roentgenographic Diagnosis	Stafne	W.B.Saunders Co
4.	A Guide to Dental Radiography	Rita Mason	

#### D. SCHEME OF EXAMINATION: INTERNAL EXAMINATION SCHEME -

- i. First internal (Theory/Practical): 20 Marks
- ii. Second internal (Theory/Practical): 20 Marks
- iii. Third Internal(Theory/Practical): 60 Marks

#### University Practical/Clinical Examination

Long Case history Chair Side Examination Radiology – IOPA Spotter

These will enable students to develop analytical thinking.

S. No	Particulars	Marks
1	Long Case history	40
2	Chair-side Examination	10
3	Radiology – Intraoral Periapical Radiograph	
	1. Technique - Film Placement & X-ray tube	1
	head angulation (07 mks.)	20
	2. Processing of Film (06 mks.)	
	3. Interpretation of Radiograph (07 mks.)	
4	Spotters (Five Spotters)	20
Total		90
5	Viva voce	20

#### **PROSTHODONTICS AND CROWN & BRIDGE**

- 1. Geriatric Oral Health Related quality of life
- 2. Forensic Prosthodontics

The change in IV BDS Prosthodontics theory exams shall be as following:

1. To introduce - Implant Prosthodontic as treatment option

These will enable students to keep up-to-date with the current practices in prosthodontics.

The change in IV BDS Prosthodontics theory shall be as following:

1. Prosthodontic Management of TMJ disorder

These will enable students to keep up-to-date with the current practices in prosthodontics

#### COURSE OUTCOMES ASSESSED:

Were the students able to: Describe prosthetic needs of patients according to the existing biomechanics of the edentulous state.Diagnose and treat patients who are partially and completely edentulous (including geriatric patients) with complete and partial dentures Perform clinical steps in treating patients with prosthetic needs and fabricate prostheses for all conventional prosthodontic modes of treatment Identify cases requiring specialist prosthodontic treatment needs and refer them for further follow upPlan and communicate treatment plans with special mention on success and failure criteria, factors and motivate patients on the significance of preventive prosthodontic care.-Motivate the patient for proper Prosthodontic treatment, maintenance of oral and prosthesis hygiene Participate in the implementation of the community outreach activities. Exhibit a high standard of professional ethics and conduct and apply these in all aspects of professional life. Participate in CDE programme to update the knowledge and professional skill including evidence based Prosthodontics from time to time.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT:

TOPIC DISTRIBUTION	
1. Complete Denture	
1.1 Biological consideration in jaw relation & jaw movemen	ts – craniomandibular
relations	
1.1.1 Mandibular movements	Desirable to Know
1.1.2 Concept of occlusion – Discussion in brief	Desirable to Know
1.2 Relating the patient to the articulator	
1.2.1 Face bow types and uses – discuss in brief	Desirable to Know
1.2.2 Face bow transfer procedure - discuss in	Good to Know
brief	
1.3 Recording the maxillo-mandibular relation	
1.3.1 Vertical relation	Must to Know
1.3.2 Centric relation records	Must to Know
1.3.3 Eccentric relation records	Good to Know
1.3.4 Lateral relation records	Good to Know
1.4 Teeth selection and arrangement	
1.4.1 Anterior teeth	Must to Know
1.4.2 Posterior teeth	Must to Know
1.4.3 Esthetic and functional harmony	Desirable to Know
1.5 Relating inclination of teeth to concept of occlusion – in	brief
1.5.1 Neutrocentric concept	Desirable to Know
1.5.2 Balanced occlusion concept	Must to Know
1.5.3 Lingualized Occlusion concept	
1.6 Trial Dentures	Must to Know
1.7 Laboratory procedures	
1.7.1 Wax contouring	Must to Know
1.7.2 Investing of dentures	Must to Know
1.7.3 Preparing of mould	Must to Know
1.7.4 Preparing and packing of acrylic resin	Must to Know
1.7.5 Processing of dentures	Must to Know
1.7.6 Recovery of dentures - Lab remount procedures	Must to Know
1.7.7 Recovering the complete denture from the cast	Must to Know
1.7.8 Finishing and polishing the complete denture	Must to Know

1.7.9 Plaster cast for clinical denture remount	Desirable to Know
procedure	
1.8 Denture insertion	
1.8.1 Insertion procedures	Must to Know
1.8.2 Clinical errors	Must to Know
1.8.3 Correcting occlusal disharmony	Must to Know
1.8.4 Selective grinding procedures	Must to Know
1.9 Problems with associated denture use – in brief	Must to Know
2. Removable Partial Dentures	
2.1 Examination, diagnosis & treatment planning &	Must to Know
evaluation of diagnostic Data	
2.2 Components of RPD	Must to Know
2.2.1 Major connectors	Must to Know
2.2.2 Winor connectors	Must to Know
2.2.3 Rest and rest seats	Must to Know
2.2.4 Direct retainers	Must to Know
2.2.5 Indirect retainers	Must to Know
2.2.6 Tooth replacement	Must to Know
2.3 Principles of RPD design	Must to Know
2.4 Survey and design – in brief	
2.4.1 Surveyors	Must to Know
2.4.2 Surveying	Must to Know
2.4.3 Designing	Must to Know
2.5 Mouth preparation and master cast	Must to Know
2.6 Impression materials and procedures for RPD	Must to Know
2.7 Preliminary jaw relation and esthetic try-in for some	Must to Know
anterior replacement teeth	
2.8 Laboratory procedures for framework construction –	Desirable to Know
2.0 Eitting the framework in brief	Desirable to Know
2.0 Try-in of the PPD - in brief	Must to Know
2.10 Try-III of the RPD - in brief	Desirable to Know
2.12 Incorting the PPD in brief	Must to Know
2.12 Inserting the KFD - In blief	Desirable to Know
2.13 FOST INSERTION ODSERVATIONS	Must to Know
2.14 Temporary acrylic partial dentures	Nust to Know
2.15 immediale removable partial denture	Desirable to Know
denture	Desirable to Know
3. Fixed Partial Denture	
3.1 Fundamentals of occlusion - in brief	Must to Know
3.2 Articulators - in brief	Must to Know
3.3 Treatment planning for single tooth restorations	Must to Know
3.4 Treatment planning for replacement of missing teeth	Must to Know
including selection and choice of abutment teeth	
3.5 Fixed partial denture configuirations	Must to Know

3.6 Principles of tooth preparations	Must to Know	
3.7 Preparation for full veneer crowns - in brief Desirable to k		
3.8 Preparation for partial veneer crowns - in brief	Desirable to Know	
3.9 Provisional restorations Must to Know		
3.10 Fluid control and soft tissue management(Gingival	Must to Know	
Retraction Procedure – FLIPPED CLASSROOM)		
3.11 Impressions	Must to Know	
3.12 Working casts and dies	Desirable to Know	
3.13 Wax patterns	Desirable to Know	
3.14 Pontics and edentulous ridges	Must to Know	
3.15 Esthetic considerations	Desirable to Know	
3.16 Finishing and cementation	Desirable to Know	
4. Topics to be covered in brief	•	
4.1 Solder joints and other connectors	Desirable to Know	
4.2 All – ceramic restorations	Good to Know	
4.3 Metal ceramic restorations	Desirable to Know	
4.4 Preparations of intra-coronal restorations	Good to Know	
4.5 Preparations for extensively damaged teeth	Good to Know	
4.6 Preparations for periodontally weakened teeth	Good to Know	
4.7 The functionally generated path technique Good to Know		
4.8 Investing and casting Must to Know		
4.9 Resin – bonded FPD	Desirable to Know	
4.10 Occlusion in complete dentures	Must to Know	
4.11 Treating abused tissues	Must to Know	
4.12 Relining and rebasing of dentures	Must to Know	
4.13 Immediate complete dentures	Must to Know	
4.14 The single complete denture	Desirable to Know	
4.15 Overdentures	Must to Know	
4.16 Dental implants in complete denture Must to Know		
4.17 Maxillofacial prosthetics Desirable to		
4.18 Geriatric oral health related quality of life Desirable to		
4.19 Computer aided designing and computer aided Desirable to		
milling		
4.20 Forensic Prosthodontics	Desirable to Know	
4.21 Herbal Prosthodontics	Desirable to Know	
4.22 Prosthodontic Management of TMJ disorder	Desirable to Know	
4.23 Implant prosthodontic	Desirable to Know	

# B. SYLLABUS FOR PRACTICALS:

## Quota of Work To Be Completed

4 <sup>th</sup> year 1 <sup>st</sup> term	Minimum1 Complete denture.
	<ul> <li>1 Removable Partial Denture</li> </ul>
	<ul> <li>02 FPD Tooth preparation (Metal Ceramic Maxillary)</li> </ul>
	<ul> <li>End posting assessment as a Clinical step and viva (25 marks)</li> </ul>
	<ul> <li>Generation of a PICO question, search strategy literature search and appraisal through checklists</li> </ul>
4 <sup>th</sup> year 2 <sup>st</sup> term	Minimum1 Complete denture.
	<ul> <li>1 Removable Partial Denture</li> </ul>
	<ul> <li>02 FPD Tooth preparation (Metal Ceramic Mandibular) and impression making</li> </ul>
	<ul> <li>End posting assessment as a Clinical step and viva (25 marks)</li> </ul>
	<ul> <li>1 Seminar presentation with PICO and evidence based evaluation of articles concerned to the seminar topic</li> </ul>
Total	04 Complete dentures
	<ul> <li>02 Removable Partial dentures</li> </ul>
	<ul> <li>08 FPD Tooth preparations</li> </ul>
	<ul> <li>1 Seminar presentation with PICO and evidence based evaluation of articles concerned to the seminar topic</li> </ul>

# C. RECOMMENDED BOOKS FOR READING:

Sr. No	Title	Author
1.	Syllabus of complete denture	CharlesM Heartwell&
		Arthur O Rahn
2.	Prosthodontic treatment for edentulous	C O Boucher
	patients	
3.	Essentials of complete denture prosthodontics	Sheldon Winkler
4.	Removable partial prosthodontics	McCracken
5.	Clinical removable partial prosthodontics	Stewart Rudd Kuebker
6.	Contemporary fixed prosthodontics	Rosensteil

7.	Prosthodontic Treatment for Edentulous	ZarbBolender
	Patients	
8.	Removable partial prosthodontics	Ernest L Miller & Joseph E.
		Grasso
9.	Fundamentals of fixed prosthodontics	Herbert Shillingburg
10.	Theory & practice of fixed prosthodontics	Tylman
11.	Dental lab Procedures: Complete dentures,	Rudd and Morrow
	removable partial prosthodontics, Fixed	
	Prosthodontics	
12.	Maxillofacial Prosthetics	Taylor
13.	Contemporary Implant dentistry	C E Misch

#### D. EXAM SCHEME:

a. INTERNAL EXAM

- First internal (Theory/Practical): 20 Marks
- Second internal (Theory/Practical): 20 Marks
- Third Internal (Theory/Practical): 60 Marks

#### b. UNIVERSITY EXAM

Practical Examination will be of Total 90 marks and will consist of:

Clinical / Practical:

1. To restructure clinical prosthodontics evaluation pattern by incorporating OSCE/OSPE in place of spotters

- 2. Upper and lower arch complete primary impression
- 3. FPD tooth preparation on typhodonts

These will enable students develop analytical thinking.

SR. NO	PARTICULARS	MARKS
1	Spotters /OSPE- 10 X 2	20
2	Case History	05
3	Exercise No 1: Complete denture Prosthodontics: Upper and lower arch complete denture Primary impression	20+20=40
4	Exercise No. 2: Fixed Prosthodontics FPD tooth preparation on typhodont	25
	TOTAL	90

#### PERIODONTOLOGY

#### COURSE OUTCOMES ASSESSED:

Were the students able to describe the anatomy and physiology of the periodontium and correlate it with health and diseased states. Describe the types, etiopathogenesis diagnosis and treatment plan for periodontal pathologies. Diagnose periodontal pathologies perform dental scaling, diagnostic tests of periodontal diseases; use the instruments for periodontal therapy and maintenance of the same. Impart the preventive measures namely, the prevention of periodontal diseases and prevention of the progress of the disease. Perform the treatment with full aseptic precautions. Prevent iatrogenic diseases; to conserve the tooth to the maximum possible time by maintaining periodontal health. Refer the patients who require specialist's care.

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT:

TOPIC	DISTRIBUTION
1. Periodontal Pocket	
1.1. Definition	Must to Know
1.2. Classification	Must to Know
1.3. Clinical features	Must to Know
1.4. Pathogenesis	Must to Know
1.5. Histopathology	Must to Know
1.6. Relationship of attachment loss and bone loss to	Must to Know
pocket depth	
1.7. Differences between suprabony and infrabony	Must to Know
pockets	
1.8. Periodontal abscess	Must to Know
1.9. Periodontal cyst	Desirable to Know
2. Patterns of Bone Loss	
2.1. Normal bone morphology	Must to Know
2.2. Classification of bone defects	Must to Know
3. Trauma From Occlusion	
3.1. Definition	Must to Know

3.2. Classification	Must to Know
3.3. Stages of tissue response	Must to Know
3.4. Effect of TFO on periodontal disease	Must to Know
progression	
3.5. Pathologic tooth migration	Must to Know
4. Chronic Periodontitis	
4.1. Clinical features	Must to Know
4.2. Risk factors	Good to Know
5. Necrotizing Ulcerative Periodontitis	
5.1. Clinical features	Must to Know
5.2. Etiology	Must to Know
6. Aggressive Periodontitis	
6.1. Definition	Must to Know
6.2. Classification	Must to Know
6.3. Localized aggressive periodontitis	
6.3.1. Clinical characteristics	Must to Know
6.3.2. Radiographic findings	Must to Know
6.3.3.Prevalence and distribution by age and	Desirable to Know
gender	
6.4. Generalized aggressive periodontitis	
6.4.1. Clinical characteristics	Must to Know
6.4.2. Radiographic findings	Must to Know
6.4.3.Prevalence and distribution by age and	Desirable to Know
gender	
6.5. Risk factors for aggressive periodontitis	
6.5.1. Microbiologic factors	Good to Know
6.5.2. Immunologic factors	Desirable to Know
6.5.3. Genetic factors	Desirable to Know
6.5.4. Environmental factors	Desirable to Know
7. Diagnosis	

7.1. Clinical diagnosis	Must to Know
7.2. Advanced Diagnostic Techniques	Must to Know
8. Radiographic Aids in Diagnosis of Periodontal	Must to Know
Diseases	
9. Prognosis	
9.1. Definition	Must to Know
9.2. Types of prognosis	
9.2.1. Overall versus individual prognosis	Must to Know
9.3. Factors affecting prognosis	
9.3.1. Overall clinical factors	Good to Know
9.3.2. Systemic and environmental factors	Good to Know
9.3.3. Local factors	Good to Know
9.3.4. Prosthetic and restorative factors	Good to Know
10. Treatment Plan	
10.1. Phases of treatment plan	Must to Know
11. Rationale For Periodontal Treatment	Must to Know
12. Periodontal therapy in female patients	
12.1. Puberty	Good to Know
12.2. Menses	Good to Know
12.3. Periodontal manifestations of pregnancy and	Must to Know
its management	
12.4. Oral contraceptives	Good to Know
12.5. Menopause	Good to Know
13. Periodontal Treatment of Medically Compromised	
Patients	
13.1. Cardiovascular diseases	
13.1.1. Hypertension	Must to Know
13.1.2. Ischemic heart diseases	Must to Know
13.1.3. Congestive heart failure	Must to Know
13.1.4. Cardiac pacemakers and defibrillators	Good to Know

13.1.5. Infective endocarditis	Good to Know
13.1.6. Cerebrovascular accidents	Good to Know
13.2. Endocrine disorders	
13.2.1. Diabetes mellitus	Must to Know
13.2.2. Thyroid and parathyroid disorders	Desirable to Know
13.2.3. Adrenal insufficiency	Desirable to Know
13.3. Renal diseases	Desirable to Know
13.4. Liver diseases	Desirable to Know
13.5. Pulmonary diseases	Desirable to Know
13.6. Immunosuppression and chemotherapy	Desirable to Know
13.7. Radiation therapy	Desirable to Know
13.8. Hematological disorders	
13.8.1. Coagulation disorders	Good to Know
13.8.2. Thrombocytopenic purpuras	Good to Know
13.8.3. Non-thrombocytopenic purpuras	Good to Know
13.8.4. Leukemia	Good to Know
13.8.5. Agranulocytosis	Desirable to Know
13.9. Infectious diseases	
13.9.1. Hepatitis	Good to Know
13.9.2. HIV and AIDS	Good to Know
13.9.3. Tuberculosis	Good to know
14. Treatment of aggressive and atypical forms of	
periodontitis	
14.1. Management of Aggressive periodontitis	Must to Know
14.2. Periodontitis refractory to treatment	Good to Know
14.3. Necrotizing ulcerative periodontitis	Must to Know
15. Treatment of acute gingival diseases	
15.1. Acute necrotizing ulcerative gingivitis	Must to Know
15.2. Acute pericoronitis	Must to Know
15.3. Acute herpetic gingivostomatitis	Must to Know

15.4. Gingival and periodontal abscess	Must to Know
16. Plaque control	
16.1. Mechanical plaque control	Must to Know
16.2. Chemical plaque control	Must to Know
17. Periodontal instruments	
17.1. Classification and description	Must to Know
18. General Principles of periodontal instrumentation	
18.1. Accessibility	Must to Know
18.2. Visibility, illumination and retraction	Must to Know
18.3. Condition and sharpness of instrument	Must to Know
18.4. Maintaining a clean field	Must to Know
18.5. Instrument stabilization	Must to Know
18.6. Instrument activation	Must to Know
19. Chemotherapeutic agents	
19.1. Definitions	Must to Know
19.2. Systemic administration of antibiotics	Must to Know
19.3. Serial and combination therapy	Must to Know
19.4. Local drug delivery	Must to Know
20. Host modulation therapy	
20.1. Definition and rationale	Good to Know
20.2. Systemically administered agents	Desirable to Know
20.3. Locally administered agents	Desirable to Know
20.4. Sub-antimicrobial dose doxycycline	Desirable to Know
20.5. Emerging host modulation therapies	Desirable to Know
21. Sonic and ultrasonic instrumentation	
21.1. Mechanism of action	Must to Know
21.2. Types of power instruments	Must to Know
21.3. Efficacy and clinical outcomes	Must to Know

21.4. Efficiency	Must to Know
21.5. Special considerations	
21.5.1. Aerosol production	Must to Know
21.5.2. Cardiac pacemakers	Must to Know
22. Supragingival and subgingival irrigation	Good to Know
23. Occlusal evaluation and therapy	Good to Know
24. Perio-endodontic continuum	
24.1. Pathogenesis	Good to Know
24.2. Classification	Good to Know
24.3. Management	Good to Know
25. General principles of periodontal surgery	
25.1. Surgical instruments	Good to Know
25.2. Patient preparation	Good to Know
25.3. Sterilization, disinfection and asepsis	Good to Know
25.4. Management of emergency	Good to Know
25.5. Periodontal dressings	Good to Know
25.6. Management of post-operative pain and	Good to Know
bleeding	
26. Gingival surgical techniques	
26.1. Gingival curettage	Good to Know
26.2. Gingivectomy	Good to Know
26.3. Treatment of gingival enlargement	Good to Know
27. Periodontal flaps	
27.1. Definition and classification of flap	Must to Know
27.2. Designs of flap	Must to Know
27.3. Incisions	
27.3.1. Horizontal incisions	Must to know
27.3.2. Vertical incisions	Must to know
27.3.3. Interdental incisions	Must to know
27.4. Suturing techniques	Good to Know

27.5. Flap Techniques for Pocket Therapy	
27.5.1. Techniques for access and pocket	Must to know
depth reduction/elimination	
27.5.1.1. Modified Widman flap	Must to know
27.5.1.2. Undisplaced Flap	Must to know
27.5.1.3. Apically Displaced Flap	Must to know
27.5.2. Flap For Reconstructive Surgery	
27.5.2.1. Papilla Preservation Flap	Good to Know
27.5.2.2. Conventional Flap	Good to Know
27.5.3. Distal Molar Surgery	Desirable to Know
28. Resective osseous surgery	
28.1. Rationale	Good to Know
28.2. Terminology	Good to Know
28.3. Osseous resection technique	
28.3.1. Instrumentation	Good to Know
28.3.2. Vertical grooving	Good to Know
28.3.3. Radicular blending	Good to Know
28.3.4. Flattening interproximal bone	Good to Know
28.3.5. Gradualizing marginal bone	Good to Know
29. Reconstructive periodontal surgery	
29.1. Non-graft associated procedures	Desirable to Know
29.2. Graft materials and procedures	Good to Know
29.3. Combined techniques	Desirable to Know
30. Furcation involvement and its treatment	
30.1. Definition	Must to know
30.2. Etiologic factors	Must to know
30.3. Diagnosis and Classification	Must to know
30.4. Local anatomic factors	Must to know
30.5. Treatment	Must to know
31. Periodontal plastic and esthetic surgeries	

31.1. Terminologies	Good to Know
31.2. Objectives	Good to Know
31.2.1. Problems associated with attached	Good to Know
gingival	
31.2.2. Problems associated with shallow	Good to Know
vestibule	
31.2.3. Problems associated with aberrant	Good to Know
frenum	
31.3. Etiology of marginal tissue recession	Good to Know
31.4. Factors affecting surgical outcome	Desirable to Know
31.5. Techniques to increase attached gingiva	Must to know
31.6. Techniques to deepen vestibule	Good to Know
31.7. Techniques to remove frenum	Good to Know
32. Perio-restorative interrelationship	
32.1. Biologic width	Good to Know
33. Dental implants	
33.1. Basic concepts	Good to know
33.2. Periodontal perspective	Good to know
34. Recent advances in surgical technology	
34.1. Lasers	Good to know
34.2. Microsurgery	Good to know

## **B. PRACTICAL SYLLABUS:**

- 1. Polishing of teeth
- 2. Demonstration to patients about different oral hygiene aids
- 3. Surgical procedures- Gingivectomy, Gingivoplasty and Periodontal flap treatments.
- 4. Problem based learning
  - Critical Appraisal of different types of research papers as per the Hierarchy of Evidence. (Third Step of Evidence Based Decision Making).

 Application of the Evidence in local population. (Fourth Step of Evidence Based Decision Making)

#### Clinical Work Quota

- 15 cases- Diagnosis, treatment planning and discussion and total periodontal treatment Cases with supporting evidence for it (related evidences searched, appraised and discussed along with the history)
- 4. 25 complete cases / equivalent-Dental scaling, oral hygiene instructions –
  10 cases- Cases treated with implementing principals of EBDM starting from question formation to appraisal and application of evidence for the particular patient.
- 5. 5 cases Assistance in periodontal surgery.

1. Consideration of one case in II term posting for end-term after intimation to the students. Case history – 10 marks, clinical exercise – 10 marks and viva voce – 5 marks (total – 25 marks)

A work record should be maintained by all the students and should be submitted at the time of examination after due certification from the Head of Department. Students should have to complete the work prescribed by the concerned department from time to time and should submit a certified record for evaluation.

## C. RECOMMENDED BOOKS:

TITLE		AUTHOR	PUBLISHER
Carranza's	Clinical	Newman	-
Periodontology			

#### **REFERENCE BOOKS**:

TITLE

AUTHOR

PUBLISHER

Clinical Periodontology	Jan Lindhe	-
Periodontics	Eley& Manson	-
Periodontics	Rose & Mealey	-
Decision making in periodontics	Hall	-
Periodontal Medicine	Genco	-
Implant Dentistry	Misch	-

#### D. SCHEME OF EXAMINATION

#### INTERNAL PRACTICAL EXAMINATION SCHEME

The internal Practical examinations in the subject of Periodontology, shall be conducted as under:

- i. First internal (Theory/Practical): 20 Marks
- ii. Second internal (Theory/Practical): 20 Marks
- iii. Third Internal (Theory/Practical): 60 Marks

#### UNIVERSITY EXAM:

Theory: As per the university rules Clinical: As per the university rule. Details of marking pattern will be as below:

1. Change in marking scheme for university practical examination shall be as given below:

#### Total marks: 90

- 1. Spotters: 20 marks (10\*2)
- 2. Case history, Diagnosis and treatment planning: 30 marks
  - 2.1. Case history: 15 marks
  - 2.2. Diagnosis : 5 marks
  - 2.3. Treatment planning: 10 marks
- 3. Segmental scaling: 30 marks
  - 3.1. Sterilization & Asepsis: 5
  - 3.2. Armamentarium: 5 marks
  - 3.3. Principles of Instrumentation: 10 marks
  - 3.4. Completeness of scaling: 10
- 4. Journal: 10 marks

## ORAL & MAXILLOFACIAL SURGERY

#### COURSE OUTCOMES ASSESSED:

Were the students able to Apply the knowledge gained in the related medical subjects like pathology, microbiology and general medicine in the management of patients with oral surgical problem. Diagnose, manage and treat (understand the principles of treatment of) patients with oral surgical problems. Explain range of surgical treatments. Ability to decide the requirement of a patient to have oral surgical specialist opinion or treatment. Explain the principles of in-patient management. Explain the management of major oral surgical procedures and principals involved in patient management. Explain ethical issues Examine any patient with an oral surgical problem in an orderly manner. Prescribe various clinical and laboratory investigations and is capable of formulating differential diagnosis. Extract teeth under both local and general anaesthesia. Perform minor oral surgical procedures under L.A. like frenectomy, alveolar procedures & biopsy etc. Assess, prevent and manage various complications during and after surgery. Provide primary care and manage medical emergencies in the dental office. Describe management of major oral surgical problems and principals involved in in-patient management.

## A. THEORY SYLLABUS TOPICS WITH DISTRIBUTION:

TOPIC	DISTRIBUTION		
1. Principles of Surgery and Incisions			
1.1 Asepsis	Must Know		
1.1.1 Definition, measures to prevent infection during	Must Know		
surgery			
1.1.2 Preparation of patient	Must Know		
1.2 Pre anesthetic considerations,	Must Know		
1.3 Pre medication : Purpose & Drugs Used	Must Know		
1.4 Anaesthetic considerations	Must Know		
1.4.1 Anaesthetic Considerations - Local	Must Know		
1.4.2 Anaesthetic Considerations - Local with	Must Know		
Sedation			
2. Flap Designing			
2.1 Triangular Flap	Desirable to Know		
2.2 Trapezoidal Flap	Good to Know		
2.3 Semilunar Flap	Good to Know		
3. Infection Control			
3.1 Sterilization	Must Know		

3.2 Disinfection	Must Know
3.3 Hospital Acquired Infection	Must Know
4. Control of Haemorrhage	
4.1 Aetiological Factors	Must Know
4.2 Factors Affecting	Must Know
4.3 Methods of Control	Must know
5. Blood Transfusion	
5.1 Types of Blood Group	Must Know
5.2 Antigenicity	Must Know
5.3 Indications of Blood Transfusion	Must know
5.4 Complications of Blood Transfusion	Must Know
6. Wound management and principles of suturing	•
6.1 Primary Healing	Must Know
6.2 Secondary Healing	Must Know
6.3 Types of Suture Materials	Must know
6.4 Principles and Types of Suturing	Must Know
6.5 Types of Wounds	Must Know
7. Local anesthesia-various nerve blocks	•
7.1 Inferior Alveolar Nerve Block	Must Know
7.2 Posterior Superior Alveolar Nerve Block	Must Know
7.3 Inferior Orbital Nerve Block	Must know
7.4 Mental Nerve Block	Must Know
8. Laboratory investigation	
8.1 Biopsy	Must know
8.2 FNAC	Must know
8.3 Haematological Investigations	Must know
8.4 Organ Specific Investigations	Must know
9. Infections of the maxillofacial region	
9.1 Ludwig's Angina	Must know
9.2 Osteomyelitis	Must know
9.3 Space Infection	Must know
9.4 Osteoradionecrosis	Must know
9.5 Management with HBO	Must know
9.6 Principals of Antibiotics	Must know
10. Third molar and canine impaction	
10.1 Diagnosis and Treatment Planning	Must know
10.2 Classification	Must know
10.3 Incision Designs	Must know
10.4 Surgical Techniques for Removal	Must know
11 Emergency drugs	
11.1 Adrenaline	Must know
11.2 Atropine	Must know
11.3 Salbutamol	Desirable to Know
11.4 Diazepam	Must know
11.5 Mefentamine	Must know

11.6 Hydrocortisone	Must know		
11.7 Dexona	Must know		
11.8 Avil	Desirable to Know		
12 Maxillofacial trauma	·		
12.1 Mandibular Fracture	Must know		
12.2 Mid Face Fracture	Must know		
12.3 Condylar Fracture	Must know		
12.4 Zygomatic Complex Fracture	Must know		
12.5 Nasoethmoid Complex Fracture	Must know		
13 Cysts of maxillofacial region			
13.1 Etiology and Classification of Cyst	Must know		
13.2 Enucleation	Must know		
13.3 Marsupialisation	Must know		
14 Maxillary sinus and its clinical implications	•		
14.1 Surgical anatomy of sinus	Must know		
14.2 Sinusitis	Must know		
14.3 Caldwell luc procedure,	Must know		
14.4 Removal of foreign body	Must know		
14.5 Nasal Antrostomy	Must know		
14.6 Closure of OAF	Must know		
15 TMJ disorders	•		
15.1 Anatomy	Must know		
15.2 Incision Design	Must know		
15.3 MPDS	Must know		
15.4 TMJ Ankylosis	Must know		
15.5 Tumors of TMJ	Must know		
16Salivary gland disorders			
16.1 Anatomic Considerations	Must know		
16.2 Mucocele	Must know		
16.3 Ranula	Must know		
17 Preprosthetic surgery			
17.1 Corrective Procedures	Must know		
17.2 Alveoloplasty	Must know		
17.3 Reduction of Maxillary Tuberosity,	Must know		
17.4 Frenectomy	Must know		
17.5 Removal of Tori	Must know		
17.6 Ridge extension procedures: indications and various surgical procedures	Must know		
18 Dentofacial deformities and their correction			

18.1 classification and clinical features	Must know
18.2 maxillary procedures	Good to know
18.3 Mandibular procedures	Good to know
19 cleft lip and palate	
19.1 aetiology and classification	Must know
19.2 cleft lip repair	Good to know
19.3 palatoplasty	Good to know
20 Neurological disorders	
20.1 Trigeminal neuralgia	Must know
20.2 Facial nerve paralysis	Must know
20.3 Nerve injuries	Good to know
21 Tumours of oral cavity	
21.1 Benign odontogenic and non-odontogenic	Must know
tumours	
21.2 Biopsy	Must know
21.3 oral cancer	Must know
22. Oral implantology	Must know
23.Medical jurisprudence and medicolegal considerations	Good to know
24. Biomedical Waste management	Must to know

Formal and structured evidence-based education is integrated in theory which incorporates at least one or two evidences related to the lecture being taken.

#### B. PRACTICAL/ CLINICAL :

- i. VARIOUS THEORY TOPICS WILL BE DISCUSSED
- ii. CLINICALS: During the clinical postings the students are required to appear for daily discussions on various pre-decided topics for which they are asked to systematically search and find best available evidences and produce during discussions either in electronic form or print form

3 <sup>rd</sup> year	Minimum of 05patients extraction under local anaesthesia
4 <sup>th</sup> year	Minimum of 10 patients extraction under local anaesthesia with various nerve block techniques

TotalMinimum of 15 patients extractionPreclinical suturing exercise	
	Preclinical wiring exercise

# C. RECOMMENDED BOOKS:

	1
TITLE	AUTHOR
Impacted teeth	Alling John F
Principles of oral and maxillofacial surgery ; Vol.1,2 & 3	Peterson LJ
Text book of oral and maxillofacial surgery	Srinivasan B.
Handbook of medical emergencies in the dental office	Malamed SF.
Killeys Fractures of the mandible	Banks P.
Killeys fractures of the middle 3rd of the facial skeleton	Banks P.
The maxillary sinus and its dental implications	McGovanda
Killey and kays outline of oral surgery - part -1	Seward GR

Essentials of safe dentistry for the medically compromised patients	Mc Carthy FM
Oral & maxillofacial surgery, Vol 2	Laskin DM
Extraction of teeth	Howe, GL
Minor Oral Surgery	Howe, GL
Contemporary oral and maxillofacial surgery	Peterson I.J. &EA
Oral and maxillofacial infections	Topazian RG & Goldberg MH

#### D. SCHEME OF EXAMINATION:

- I. First internal (Theory/Practical)- 20 Marks
- II. Second Internal (Theory/Practical) 20 Marks
- III. Third Internal (Theory/Practical) 60 Marks

University Examination:

Theory: As per the university examination scheme

Practical & / Clinical: 90 Marks Extraction 35 Local anaesthesia 15 Chair side viva 20 Spotters 20

## **CONSERVATIVE & ENDODONTICS**

1. Management anatomic complexities in Endodontics – as desirable to know

These will enable students to keep up-to-date with the current practices in endodontics.

#### COURSE OUTCOMES ASSESSED:

Were the students able to: Diagnose diseases of the teeth Perform simple restorative work for decayed teeth using medium and high speed hand pieces to carry out restorative work. Describe aesthetic restorative material and to translate the same to patients needs. Explain endodontic treatment on the basis of scientific foundation. Identify endodontic instruments and materials needed for carrying out simple endodontic treatment. Perform simple endodontic treatment and emergency endodontic treatment. Explain treatment of luxated teeth Exhibit a high standard of professional ethics and conduct and apply these in all aspects of professional life. Participate in CDE programme to update the knowledge and professional skill from time to time. Participate in the implementation of the national oral health policy. Motivate the patient for proper dental treatment, maintenance of oral hygiene and maintenance of the restorative work to prevent future damage.

S.no	Topics	Sub-topics	Distribution
		Operative	
1	Adhesion	Need for bonding,	Must know
		types of bonding,	Must know
		clinical factors affecting bonding	Must know
		advantage & disadvantages of bonding	Must know
		acid etch techniques	Must know
		Enamel bonding &dentin bonding agents.	Must know
		Formation and thickness of smear layer	Good to know

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

		removal of smear layer	Good to know
		acid etching,	Good to know
		conditioning,	Good to know
		bonding,	Good to know
2	Smear layer	primers,	Good to know
	,	Smear plugs and smear units.	Good to know
		Difference between tooth preparation for	Must know
		amalgam and composites	
		types of composite restoration,	Must know
		conventional, beveled conventional,	Must know
	Cavity preparation	modified, facial/ lingual slot,	
3	for composite	Pulp protection.	Must know
	for composite		
			Must know
		Resin composites	Must know
		GIC	Must know
		maintenance of contacts.	Must know
4	Anterior	Finishing	Must know
-	Destarations	gingival health.	Must know
	Restorations		
		Definition, classifications, composition and	Must know
		properties, condensation types	
		Cavity preparation, castable glass ceramics	Good to know
		Porcelain laminates and veneers	Good to know
5	Dental ceramics		
		Artistic elements	Good to know
		Alteration of embrasures	Good to know
		Correction of diastema	Good to know
6	Smile design	Treatment of discolored tooth	Good to know
		Pontics	Good to know
		Material qualities	Must know
		Indications and contraindications	Must know
		Advantages and disadvantages	Must know
		Initial procedures	Must know
7	Cast restorations	Tooth preparation for inlays and onlays	Must know
		Restorative technique	Must know

		Principles of cavity preparation	Must know
		Basic concepts of cavity design	Must know
		Path of insertion, taper, bevels, flares	Must know
		Secondary retention features	Must know
	Difference between	Indications and contraindications	Must know
8	amalgam and inlay	Advantages and disadvantages	Must know
	preparation	Factors affecting retention of cast	Must know
		restoration	
		Rationale, requisites	Must know
	Temporization or	Various interim restorative materials	Must know
9	inter restoration	Indirect acrylic resin	Must know
		Classification	Must know
		Properties, principles of manipulation	Must know
		Types, annealing, degassing	Must know
		Condensation and compaction	Must know
		Biological properties	Must know
		Indication and contraindication	Must know
10	Direct filling gold	Cavity preparation	Must know
		Rationale for uses of pins	Must know
		Indications, advantages, disadvantages	Must know
		Classification, principles of pin placement	Must know
		Pin hole preparation, pin binding	Must know
		Trimming and removal, pin amalgam	Must know
		foundation	
11	Pin amalgam	Pin restoration in various cavities	Must know
	restorations	Pin supported tooth restorations	Must know
		Failures	Must know
		Attrition, abrasion, erosion, fractures	Must know
		Discoloration, enamel/dentin Hypoplasia	Must know
		Hypo calcification and fluorosis	Must know
		Causes, clinical features, differential	Must know
		diagnosis, treatment	
12	Non carious lesions		
		Endodontics	
		Theory of focal infection	Must know
		Organism responsible for in pulpal and	Must know

		periapical infection,	
	Microbiology	Methods to identify oral micro flora,	Must know
13		histopathology	
		Bio film.	Good to know
14	Endodontic instruments	Classification-hand instruments, rotary	Must know
		Instruments for pulp space preparation	Mustkoow
		obturation	
		Instrument design	Must know
		Sonic and ultrasonic instruments	Must know
		Effectiveness and wear of instruments	Must know
		Principles, instruments used, laws	Must know
		Canal orifice identification	Must know
		Access opening of individual tooth	Must know
15	Access preparation	Challenges faced	Must know
		Definitions, needs	Must know
		Objectives	Must know
		Anatomy of root apex	Must know
		Determination of working length	Must know
		Methods of determination of working length	Must know
		Apex locators	Must know
		Hand and engine driven instruments	Must know
	Biomechanical preparations	Irrigants and irrigation techniques	Must know
		Disinfectants	Must know
		Dentin surface modifiers	Must know
		Lubricants	Must know
16		Concepts and strategies, techniques for	Must know
		canal preparation & cleaning instrument in	
		size sequence, adequate enlargement of	
		root canals mishaps & its management.	
		Activity of irrigants, ideal properties	Must know
	Irrigation solution in endodontics	Passive dentistry	Must know
		Smear layer interference technique	Must know
		Irrigation and disinfection materials and their	Must know
17		actions	
		Endodontic sealers	Must know
		Zinc oxide eugenol cements	Must know
		Chloropercha	Must know
		Polymers	Must know

		Calcium hydroxide	Must know
18	Root canal sealers	GIC	Must know
		Silicon based sealer	Must know
		Sealer with formaldehyde	Must know
		Properties	Must know
		Recent advances	Must know
		various intracanal medicaments used in root canal treatment	Must know
		mechanism of action	Must know
	Intracanal	duration of application	Must know
19	modicamonte	complications and its management	Must know
	medicaments.	Precautions	Must know
		Requirement of an ideal root canal filling material	Must know
		When to obdurate	Must know
		Composition of gutta-percha	Must know
		Classification of G P cones	Must know
		Obturation methods using	Must know
		guttapercha( Thermoplasticized G P,Thermofill,MCspaden)	
		Recent advances in obturating methods	Good to know
20	Obturation of root	Obturating methods for open apex(Reverse	Must know
	canal system	cone,rollcone,Apexification,revascularization	
		,Apical Plug etc)	
		Intercommunication between pulpal and	Mustknow
	Endo perio relation	periodontal tissues	Must Know
		Influence of pulpal pathology and vice versa	Must know
		Theoretic pathways of osseous lesion	Must know
21		formation	Mast Know
		Differential diagnosis	Must know
		Radiology alternatives	Must know
		Causes of discoloration	Must know
		Indication	Must know
		Case selection	Must know
		Vital and non vital bleaching methods	Must know
		Bleaching agents	Must know

		Microbrasion	Must know
22	Management of	Recent advances	Good to know
	discolored tooth	Oral prophylaxis	Must know
		Oral hygiene instructions	Must know
		Complications	Must know
		· ·	
		Classification of fractured teeth	Must know
		Causes of injury	Must know
		Symptoms, diagnosis	Must know
		Sequelae of each type of fracture	Must know
		Avulsion	Must know
		Role of storage media	Must know
		Types of storage media	Must know
		Splinting, instructions	Must know
		Endodontic emergency	Must know
		Management of soft tissue	Must know
23	Traumatic injuries	Adjunctive therapy	Must know
		Endodontic therapy	Must know
		Ledges	Must know
		Perforation	Must know
	Endodontic mishaps	Instrument aspiration,	Must know
		Breakage of instruments	Must know
24		Missed canals	Must know
		Over extended filling	Must know
		Vertical root fracture	Must know
		Crown fracture management	Must know
		Tissue emphysema	Must know
		Masserians kit	Good to know
		Definition	Must know
		Types (internal resorption and external	Must know
		resorption, intrusion, subluxation,	
	Root resorption	concussion)	
		Theories	Must know
25		Physiologic and pathologic resorption	Must know
		Causes and clinical features	Must know
		Radiological features, histological features	Must know
		Management	Must know
		Objectives	Must know
		Indications	Must know
		Contraindications	Must know
		Local and general considerations	Must know
		Preoperative consultation	Must know
	Premedication	Must know	
--	--	--	
	Surgical instruments	Must know	
	Sterilization	Must know	
	Consent	Must know	
	Technique	Must know	
	LA	Must know	
	Post operative care	Must know	
	Flap design and preparation	Must know	
Endodontic	Heamostasis procedure	Must know	
surgeries	Asepsis	Must know	
	GTR	Good to know	
	Repair	Must know	
	Techniques of apicectomy	Must know	
	Retrograde filling	Must know	
	Hemisection	Must know	
	Radisection	Must know	
	Techniques for root implantations	Good to know	
	Complication	Must know	
	Microscope and endodontic laser	Good to know	
Newer advances	Laser Doppler flowmetry.	Good to know	
		Must know	
	Introduction only	Must know	
Lasers in	Types – PAP etc	Must know	
conservative and	Uses	Must know	
endodontics			
	Physics of magnification	Desirable to know	
	Dental loops	Must know	
Magnification	Microscopes(introduction only)	Good to know	
Professional		Desirable to know	
association dentist			
act 1948 And its			
act 1948 And its amendment 1993		5	
act 1948 And its amendment 1993 Duties towards		Desirable to know	
act 1948 And its amendment 1993 Duties towards government like		Desirable to know	
act 1948 And its amendment 1993 Duties towards government like payments of		Desirable to know	
act 1948 And its amendment 1993 Duties towards government like payments of professional tax,		Desirable to know	
act 1948 And its amendment 1993 Duties towards government like payments of professional tax, income tax		Desirable to know	
act 1948 And its amendment 1993 Duties towards government like payments of professional tax, income tax		Desirable to know Must know	
association dentist act 1948 And its amendment 1993 Duties towards government like payments of professional tax, income tax		Desirable to know Must know	
act 1948 And its amendment 1993 Duties towards government like payments of professional tax, income tax Ethics		Desirable to know Must know	
	Endodontic surgeries Newer advances Lasers in conservative and endodontics Magnification Professional	Premedication         Surgical instruments         Sterilization         Consent         Technique         LA         Post operative care         Flap design and preparation         Heamostasis procedure         Asepsis         GTR         Repair         Techniques of apicectomy         Retrograde filling         Hemisection         Radisection         Techniques for root implantations         Complication         Newer advances         Introduction only         Lasers         in         Types – PAP etc         conservative         endodontics         Physics of magnification         Dental loops         Magnification         Microscopes(introduction only)	

	including radiographic waste management	
34	Forensic odontology in relation to conservative dentistry &endodontics	Desirable to know
35	Regenrative Endodontics	Desirable to know
36	Management of anatomical varioations/complexi ties of root canal	Desirable to know

# A. Clinical exercises to be completed in final B.D.S course

Term	Exercise break up	Work quota
First term/ posting	Works on extracted teeth	
	1. Class II Mo/Do amalgam	10
	2. Root canal treatment on anterior/ single rooted	
	teeth (viva compulsory)	1 (anterior)
	Works on patients	· · · ·
	1. Class II amalgam	06
	2. Class I amalgam/class I compound	05
	3. Class V GIC	03
	4. Case history	05
	5. Vital pulp therapy in any 1 of the above	05
	restorations	
Second term/posting	Work on extracted teeth	
	<ol> <li>Class IComposite/GICRestorations</li> </ol>	02
	2. Class V composite restorations	
	3. Root canal treatment	02
		01
	Work on patients	
	1. Class II amalgam	06+any quota
	2. Class I GIC/composite	reamaining in
	3. Root canal treatment on anteriors/single	first term
	rooted teeth	03*
		05
	Peer to peer teaching and small group discussion	1 each

\*Composite restorations will be allocated only if student has finished with silver amalgam quota

P.S:

- 1. All students are required to complete the said quota of clinical/preclinical work
- 2. All students will have to compulsorily appear for a viva before taking any new case/ exercise taught during the posting on a patient
- 3. All students are also expected to complete the said model work with respect to new exercises introduced in each term
- 4. Demonstrations will be given on the exercises that are new to the mentioned term and year
- 5. For getting demonstration for root canal treatment all other exercises must be complete
- 6. Composite patients will only be allotted if amalgam exercises are complete.

7. Students have to necessarily learn to evaluate the veracity based on critical appraisal checklist categorized according to the best available level of evidence.

Sr.	Title	Author	Publisher
no.			
1	Arts and Science of Operative Dentistry	Sturdevant's	Mosby
2	Textbook of Operative Dentistry	Marzouk	IshiyakuEuroAmerica, Inc Publishers
3	Fundamentals of operative dentistry	James summit	Quintessence
4	Endodontic Practice	Grossman	Wolter Kluwer
5	Pathway of Pulp	Cohen Stephen	Elsevier Mosby
6	Endodontic Therapy	FranklinWeine	Quintessence

### B. Recommended Books

Reference books

Sr.	Title	Author	Publisher
no.			
1	Textbook of Dental Material Science	Phillip	Elsevier
2	Textbook of Operative Dentistry	Vimal Sikri	Cbs
3	Clinical Operative Dentistry Principles & practice	Ramya Raghu	Emmess
4	Textbook of Endodontics	Vimal Sikri	Elsevier
5	Textbook of Endodontics	Nisha Garg	Elsevier

# C. SCHEME OF EXAMINATION

### INTERNAL EXAMINATION SCHEME

- I. First internal (Theory/Practical)- 20 Marks
- II. Second Internal (Theory/Practical)- 20 Marks
- III. Third Internal (Theory/Practical)- 60 Marks

#### UNIVERSITY EXAMINATION SCHEME:

Theory As per the university rules

Practical Examination pattern

Management of any patient attending the department with carious vital posterior or anterior

tooth for any of the following procedures:

Operative procedure,

- 1) Class I Compound (Buccal or palatal extension in molar teeth)
- 2) Class II

Marks distribution

Cavity Preparation	40
Base, matrix band & Retainer application	30
Restoration	30
Total	90

Endodontic procedure,

3) Non-vital anterior tooth; Root Canal Treatment

Case history	10
Access cavity Preparation	40
Rubber dam application	15
Working length determination	25
Total	90

# **ORTHODONTICS & DENTOFACIAL ORTHOPAEDICS**

#### 1. Forensic Orthodontics- as desirable to know

These will enable students to keep up-to-date with the current practices in Orthodontics.

### COURSE OUTCOMES ASSESSED:

Were the students able to: Diagnose, analyse and treat common orthodontic problems by preventive, interceptive and corrective orthodontic procedures. Analyse and Interpret Radiographs for orthodontic diagnosis. Explain principles and fabrication of intra-oral and extra-oral appliances. Fabricate and deliver simple orthodontic appliances

## A. COURSE CONTENT AND APPROACH TO THE SUBJECT

S.no.	Topics	Subtopics	Distribution
1	Functional development	Definition	Must Know
	stomatognathic system	Muscle of mastication	
		Trajectorial theory of bone formation	
		Swallowing pattern	
		Buccinators mechanism	Desirable to Know
		Various movements and positions of	
		mandible	
		Speech and malocclusion clinical	Good to Know
		implications	
2	Malocclusion	Definition	Must Know
		Classification	
		Description of dental, skeletal and	
		functional	
		Angle's	
		Simon's	
		Lischer's	
		Deway's	
		Ackerman proffit	
		WHO classification	Desirable to Know

		British standard algosification	
		Bolloord's classification	
		Orthodoptic indiaco	Cood to Know
		Normal functions	Good to Know
3	Stomatognathic system	Abnormal functions	Must Know
		Abhormal functions	
_			
4	Etiology of malocclusion		Must Know
		Factors – local and general	
		Graper s	
		Promit s Mayar'a	
		Moyer's	
		Etiology of diaatema, crowding,	
		spacing, open and deep bite, class	
		II and III malocclusion and	
		anterior/posterior cross-bite.	
		Role of genetics in malocclusion	Desirable to Know
		Butter's field theory	Good to Know
		Equilibrium theory	
5	Child psychology		Must Know
		Theones Friekcop's theory	
		Sigmondfrued's	
		Baylov's theory	
		Paviov S lifeory	
		Frankol's rating types of	Desirable to Know
		conditioning	Desirable to Know
		Motivation of child	Cood to Know
6	Orthodontic diagnosis	Diagnostic aids	Must Know
•		Classification	
		Clinical examination of the patient	
		Role of intraoral radiographs	
		Hand wrist radiographs	
		Facial photographs	
		Importance of case history	Desirable to Know
		Smile analysis	
		Diagnosis and treatment planning of	
		patients	
		Panaromic radiographs	Good to Know
		Occlusograms	
		EMG	
		C.T. scan	
		Photocephalograms	
•		r nete copria ograme	
7	Anchorage	Definition	Must Know

		Types of anchorage	
		TAD'S	Good to Know
8	Orthodontic appliances	Classification of removable and functional appliances Methods of space application	Must Know
		Orthodontic materials Principles of soldering and welding	
9	Preventive Orthodontics	Definition Procedures undertaken Advantages and disadvantages	Must Know
10	Interceptive Orthodontics	Definition Various procedure Serial extractions Role of muscle	Must Know
11	Methods of space gaining	The various methods of gaining space Indications of ectraction of various teethExtractions	Must Know
12	Model analysis	Classification Bolton's ratio Ashlweyhowe's index Linder harth's index Carey's index	Must Know
		Korkhous analysis Mixed dentition analysis	Desirable to Know
		Occlusograms Peck and peck index Kesling set up	Good to Know
13	Cephalometrics	Definition Development of cephalograms Landmark plane identification Cephalometric tracing Down's analysis Steiner's analysis Tweed's analysis Role of cephalogram in diagnosis and treatment plan	Must Know
		I echnique of taking cephalograms Rickett's analysis Mcnamara's analysis Witt's analysis VTO Holdaway's soft tissue analysis	Desirable to Know Good to Know
14	Biology of tooth movement	Computerised cephalometric system Theories of tooth movement Stages of tooth movement	Must Know

		Biological reaction to mild force Biological reaction to heavy force Deleterious effects of heavy orthodontic force Types of orthodontic forces	
		Biochemical chain of reactions after application of orthodontic forces	Desirable to Know
		Clinical implications Root resorption Orthopedic forces	Good to Know
15	Removable orthodontic appliances	Components Types of clasps and use Types of bows and use Types of springs and use	Must Know
		Expansion appliances Principles Indications of arch expansion Types of devices RME and SME	Good to Know
16	Fixes orthodontic appliances	Definition Indications and contraindications Components of fixed orthodontic appliances Edgewise, begg's and straight wire appliance	Must Know
17	Extraoral orthopedic applinaces	Headgear Facemask Chin cup	Must Know
18	Myofunctional appliances	Definition and principles Muscle exercices Activator Bionator Frankel appliance Twin block Fixed functional appliances	Must Know
19	Management of cleft lip and palate	Embryology Classification Role of orthodontist	Good to Know
20	Surgical orthodontics	Classification Correction of – Mandibular prognathism and	Must Know

		retrognathism Maxillary prognathism amd retrognathism Anterior open bite and deep bite Cross bite	
21	Treatment planning	Deep bite Open bite Cross bite Class II malocclusion Class III malocclusion	Must Know
22	Retention and relapse	Need for retention Causes for relapse Types of retention devices Theories of retention	Must Know
23	Forensic orthodontics	Use of orthodontic records for human identification, Identifying individuals by rugae area, intercanine width, and lower canines as aid in the identification process	Good to Know

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## I. CLINICAL SYLLABUS

- ≻ Case History taking
- Case discussion
- Discussion on the given topic
- Cephalometric tracings
  - Down's Analysis
  - Steiner's Analysis
  - Tweed's Analysis

#### **II. PRACTICAL SYLLABUS**

- Adam's clasp an anterior teeth Gauge 0.7mm
- Modified Adams clasp on upper arch Gauge 0.7mm
- High labial bow with Apron Spring on upper arch
  - (Gauge of labial bow 0.9mm, Apron spring 0.3mm)
- Coffin spring on upper arch Gauge 1mm
- > Appliance construction -
  - Upper and lower Hawley's appliance
  - Anterior bite plane
  - Habit breaking appliance

- Posterior bite plane with Z-spring
- Activator
- Catlans appliance
- Upper expansion plate

# C. RECOMMENDED BOOKS:

TITLE	AUTHOR
William R. Profit – Contemporary	Orthodontics
Orthodontics For Dental Students	White And Gardiner
Handbook Of Orthodontics	Moyers R.E
Orthodontics - Principles And Practice	Graber T.M.
Design, Construction And Use Of	Adams C.P
Removable Appliances	
Clinical Orthodontics: Vol 1 & 2	Salzmann

**Reference Books** 

TITLE	AUTHOR
Introduction to Orthodontic	Laura Mitchell
Rakosi Orthodontic Diagnostic Atlas	Rakosi
Removable Orthodontic Appliances	Issacson

## D. SCHEME OF EXAMINATION

### INTERNAL EXAMINATION SCHEME

I. First internal (Theory/Practical)- 20 Marks

- II. Second Internal (Theory/Practical)- 20 Marks
- III. Third Internal (Theory/Practical) 60 Marks

Theory As per the university rules

Practical's / Clinical: (distribution of marks)

Total Marks: 90 Marks

Subdivision:

- i. Spotters 10 x 2 marks = 20 marks
- ii. Wire bending
- iii. Model Analysis

45 marks

25 marks

## **PEDODONTICS & PREVENTIVE DENTISTRY**

# COURSE OUTCOMES ASSESSED:

Were the students able to Perform a proper clinical history, methodologically examine the child patient, and perform essential diagnostic procedures, interpret them, and arrive at a reasonable diagnosis to treat appropriately. Treat dental diseases which occurring child patient. Repair and restore the lost / tooth structure to maintain harmony between both hard and soft tissues of the oral cavity. Manage the disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions. Manage efficiently life-threatening conditions with emphasis on basic life support measure.

# A. COURSE CONTENT AND APPROACH TO THE SUBJECT

#### 1. Forensic Paediatric Dentistry - as desirable to know

These will enable students to stay up-to-date with advances in paediatric practice.

Topics	Distribution
1. Child Abuse & Neglect	Must know
1.1. Classification, Etiology, Identification, Management.	Must know
1.2. Learn about the different types of child abuse & its implications in pediatric dentistry.	Good to know
2. Child psychology	Good to know
2.1.1. Definition	Good to know

2.1.2. Theories of child psychology.	Good to know
2.1.3. Psychological development of children with age.	Good to know
2.1.4. Principles of psychological growth & development while managing child patient.	Good to know
3. Dental fear and its management.	Must know
3.1. Factors affecting child's reaction to dental treatment.	Must know
3.2. Know different theories of child psychology	Good to know
4. Behaviour management	Must know
4.1. Definitions.	Must know
4.2. Types of behaviour encountered in the dental clinic.	Good to know
4.3. Non-Pharmacological & pharmacological methods of Behaviour Management.	Good to know
4.4. Able to classify the children based on their behavioural patterns.	Good to know
5. Restorative dentistry	Must know
5.1. Principles of Pediatric Operative Dentistry.	Must know
5.2. Modifications required for cavity preparation in primary and young permanent teeth. – Flipped classroom	Good to know
5.3. Various Isolation techniques.	Must know
5.4. Restorations of decayed primary, young permanent and permanent teeth in children using various restorative materials like Glass Ionomer, Composites & Silver Amalgam. Stainless steel, Polycarbonate & Resin Crowns.	Good to know
6. Classification, modification & types of cavity preparation in children.	Must know
7. Pediatric Endodontics	Good to know
7.1. Principles & Diagnosis.	Good to know
7.2. Classification of Pulpal Pathology in primary, young permanent & permanent teeth.	Good to know
<ul><li>7.3. Management of Pulpally involved primary, young permanent &amp; permanent teeth.</li></ul>	Good to know
7.4. Pulp capping-direct & indirect.	Good to know

7.5. Pulpotomy	Good to know
7.6. Pulpectomy – Flipped Classroom	Good to know
7.7. Apexogenesis	Good to know
7.8. Apexification	Good to know
7.9. Obturation techniques and material used for primary, young permanent and Permanent teeth in children.	Good to know
7.10. Knowledge about different procedures & Materials used in Pediatric Endodontics	Good to know
8. Space Maintainers	Must know
8.1. Definitions.	Must know
8.2. Problems encountered during primary and mixed dentition phases and their Management.	Must know
9. Serial extractions	Must know
9.1. Decision making & Indications of various space maintainers / Regainers.	Must know
10. Traumatic Injuries to the teeth & Supporting structures & their management	Good to know
10.1. Classifications & Importance Squelae& reaction teeth to trauma.	Good to know
10.2. Management of Traumatized teeth.	Good to know
10.3. Classification & Management of different Traumatic Injuries in children.	Good to know
11. Interceptive Orthodontics	Must know
11.1. Identify the cause & Formulate the respective	Must know
I reatment plan for various Dental malocclusions.	
12. Handicapped children & their management	Good to know
12.1. Definition,	
features	Good to know
12.3. Physically handicapping conditions.	Good to know
12.4. Mentally compromising conditions.	Good to know
12.5. Medically compromising conditions.	Good to know
12.6. Genetic disorders	Desirable to know
12.7. Know in brief about different handicapping conditions	Desirable to know
13. Oral habits & their management	Must know
13.1. Definition, Etiology & Classification.	Must know
13.2. Clinical features of digit sucking, tongue thrusting	Must know
mouth breathing and various other secondary habits.	
13.3. Management of oral habits in children.	Good to know
13.4. Learn the different oral Habits & their effects on Oro-	Good to know

facial structures.	
14. Gingival & periodontal diseases in children	Must know
14.1. Normal gingival &periodontium in children.	Must know
14.2. Definition, etiology & Pathogenesis.	Must know
14.3. Prevention & Management of gingival & Periodontal	Good to know
diseases.	
14.4. Knowledge about normal gingival & periodontal	Good to know
Structures & their pathologic conditions	
15. Pediatric Dental Radiology	Must know
15.1. Different types of films & Projections.	Must know
15.2. Modification for pediatric patients & Handicapped	Good to know
children.	
15.3. Knowledgeaboutdifferentx-rayprojections,	Good to know
Modifications & Advances in Radiology, in accordance with	
pediatric dentistry.	
16. Congenital abnormalities in children	Good to know
16.1. Definition, classification, clinicalfeaturesand	Good to know
management.	
16.2. To know about the common congenital abnormalities	Good to know
tound in children that affect Orofacial Structures.	
17. Dental emergencies in children and management.	Must know
17.1. Special consideration in Aspirated & Ingested Dental materials & instrument	Good to know
17.2. Know about the different emergencies that can arise in	Good to know
a dental situation.	
18. Dental materials used in pediatric dentistry	Must know
18.1. Tooth colored Filling materials.	Must know
18.2. Amalgam	Must know
18.3. Recent advances	
18.4. Overall knowledge of composition, manipulation,	Must know
18.5. Applicability of various materials used in pediatric	Must know
Dentistry.	
19. Dental Health education and school dental health programs.	Good to know
19.1. Outline of school dental health program.	Good to know
19.2. Different school dental health programs.	Good to know
19.3. Different school dental Health programs & planning for	Good to know
a school dental health program.	
20. Fluorides	
20.1. Historical Background.	
20.2. Systemic and Topical Tuorides.	
20.3. Mechanism of Action.	
20.4. I oxicity and Management.	Must know
20.5. Knowledge about systemic & topical fluorides.	Must know
21. Forensic Pediatric Dentistry	Good to know

- 21.1. Introduction
- 21.2. Importance of Primary teeth in forensic dentistry

## **b)** CLINICAL WORK:

- 1. Diagrams -
  - 1.1. Habit breaking appliance
  - 1.2. Fixed space maintainer
  - 1.3. Myofunctional appliances
  - 1.4. Orthopaedic appliances
  - 1.5. Interceptive orthodontics
- 2. Discussion of clinical topics
- 3. Case history records and chair side discussion
- 4. Cases
- 5. Seminar

Quota for Final year

1.	Class1	and Class 2	restoration	35
	-			

- 2. Oral Prophylaxis 05
- 3. Fluoride application
- 4. Pit & Fissure Sealant application 05 15
- 5. Extractions
- 6. Clinical History taking 07
- 7. Education and Motivation
- c) RECOMMENDED BOOKS:

Sr. No.	Title	Author	Publisher	Edition	Year
1.	Dentistry for the child and adolescent	Mc Donald	Mosby	10th	2015
2.	Clinical Paedodontics	Finn	W B Saunders Company	4th	2001
3.	Text book of Paedodontics	SobhaTandon	Jaypee	3rd	2018

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4.	Text book o Paediatric Dentistry	f Nikhil Marwah	Jaypee	4th	2018
5.	Paediatric Dentistry Principles an Practice	Muthu S d	Elsevier	2nd	2011
6.	Text book o Paediatric dentistry	f Damle S G	Arya	5th	2017

## RECOMMENDED BOOKS FOR REFERENCE

Sr. No.	Title	Author	Publisher	Edition	Year
1.	Paediatric Dentistry (Infancy through adolescences)	Paul Casamassimo, Henry Fields ,DennisMcTigue, Arthur Nowak	Elsevier	5th	2016
2.	Kennedy's Paediatric operative dentistry	Kennedy & Curzon	Wright	4th	2002
3.	Primary Preventive Dentistry	Norman O. Harris	Pearson Prentice Hall	6th	2004
4.	Behaviour Management	Wright	Mosby	<b>1</b> st	1983
5.	Paediatric Dentistry	Mathewson	Quintenence book	3rd	1995
6.	Endodontics	Ingle	B.C Decker Inc.	6 <sup>th</sup>	2002
7.	Pathways of Pulp	Cohen	Elsevier	9th	2007

8.	Principle practice Paedodontics	and of	Arathi Rao	Jaypee	3rd	2012

d) SCHEME OF EXAMINATION:

### INTERNAL EXAMINATION SCHEME

- I. First internal (Theory/Practical)- 20 Marks
- II. Second Internal (Theory/Practical) 20 Marks III. Third Internal (Theory/Practical) 60 Marks

Theory As per the university rule

Ur	niversity Practicals / Clinica	ls: (distribution of marks)	90 Marks
1.	Spotters 10 * 2 marks		20 marks
2.	Case History, Diagnosis &	Treatment Planning	50 marks
3.	Clinical procedure		10 marks
4.	Journal		10 marks

## PUBLIC HEALTH DENTISTRY

## COURSE OUTCOMES ASSESSED:

Were the students able to:Describe the basis of public health, preventive dentistry, public health problems in India, Nutrition, Environment and their role in health, basics of dental statistics, epidemiological methods, National oral health policy with emphasis on oral health policy.Identify health problems affecting the society, conducting health surveys, conducting health education classes and decide health strategies. Exhibit a positive attitude towards the problems of the society and must take responsibilities in providing health. Communicate the needs of the community efficiently, inform the society of all the recent methodologies in preventing oral disease

# <u>A.</u> COURSE CONTENT AND APPROACH TO THE SUBJECT:

### APPROACH TO THE SUBJECT

TOPIC	APPROACH		
1. INTRODUCTION TO PUBLIC HEALTH DENTISTRY			
1.1 Definition of dentistry	Must know		
1.2 Pioneers of dentistry	Desirable to know		
1.3 History of dentistry	Must know		
1.3.1 Milestones in the field of dentistry	Good to know		
1.3.2 Historical dates	Good to know		
1.3.3 Dentistry in ancient times	Good to know		
1.4. Aim, scope and objectives of dentistry	Must know		
1.4.1 Dentistry in future	Good to know		
2. PUBLIC HEALTH DENTISTRY			
2.1Health and disease	Must know		
2.1.1 Concepts, philosophy, definition and characteristics	Must know		
2.2 Public health	Must know		
2.2.1Definition, concepts and history of public health	Must know		
2.3 General epidemiology	Must know		
2.3.1 Definition, objectives, methods, uses and screening for disease	Must know		
2.3.2 Investigation of an epidemic	Desirable to know		
2.3.3 Quarantine procedures	Good to know		
2.4. Public health administration	Must know		

2.4.1 Priority, establishment, manpower, health management	Must know
2.4.2 infectious disease epidemiology	Desirable to know
2.4.3 Control of epidemics	Good to know
2.5 Health care delivery system	Must know
2.5.1 Centre and state, oral health policy, primary health care, national health programmes, health organizations and agencies	Must know
2.5.2 Health care delivery systems of other countries	Desirable to know
2.6 Behavioral science	Must know
2.6.1 Definition of sociology, anthropology and psychology and their role in health and oral health of community	Must know
2.7 Health economics	Desirable to know
3. ENVIRONMENTAL HEALTH	
3.1 Concepts and principles	Must know
3.2 Role of environment in health, Domains of environment	Must know
3.3 Physical environment	Must know
3.3.1 Role of air, water, radiation ,noise in health and disease; air pollution, water pollution,	Must know
3.3.2 Water purification methods	Desirable to know
3.4 Biological environment	Must know
3.4.1 Arthropods in health and disease	Must know
3.4.2 Vector control	Desirable to know
3.5 Social environment	Must know
3.5.1 Definition and role of social environment in health and disease	Must know
3.6 Waste disposal	Must know
3.6.1 Hospital waste management	Must know
3.6.2 Methods of solid waste disposal	Desirable to know
3.6.3 Excreta disposal, sullage, sewage system	Good to know
3.7 Mass disaster and environmental health	Must know
4.HEALTH EDUCATION	
4.1 Introduction to health education	Must know
4.1.1 Definition	Must know
4.2 Concepts and principles	Must know
4.2.1 Theories and models of health education	Desirable to know
4.3 Planning and evaluation of health education programme	Good to know
4.3.1 Health education methods	Must know
4.3.1 Levels of health education	Must know
4.3.2 Health education aids	Must know
4.3.3 Methods of communication	Must know

4.3.4 Effective use of audio visual aids	Must know
4.4.3 Barriers to communication	Must know
5. ETHICS AND JURISPRUDENCE	
5.1 Professional liabilities	Must know
5.2 Basis for medical ethics	Must know
5.2.1 Hypocratic oath	Desirable to know
5.2.2 Negligence	Must know
5.2.3 Malpractice	Must know
5.4 Principles of ethics(FLIPPED CLASSROOM)	Must know
5.4.1 Ethical rules for dentists prescribed by DCI	Must know
5.4.2 Consents	Must know
5.5 COPRA	Must know
5.5.1 Evidence	Must know
5.6 Contracts	Must know
5.7 Methods of identification in forensic dentistry	Must know
5.7.1 Age, sex identification using forensics	Desirable to know
6. DENTAL PUBLIC HEALTH	
6.1 Introduction to dental public health	Must know
6.1.1 Definition and difference between community and clinical health	Must know
6.2 Epidemiology of dental diseases dental caries, periodontal diseases, malocclusion, dental fluorosis and oral cancer.	Must know
6.2.1 Epidemiological studies related to oral diseases, etiology and risk factors for oral diseases	Must know
6.3 Survey procedures	Must know
6.3.1 Planning, implementation and evaluation, WHO oral health survey methods 1997, indices for dental diseases.	Must know
6.4 Delivery of dental care	Must know
6.4.1 Dental auxiliaries( operating and non- operating), incremental and	Must know
6.5 Comprehensive health care, School dental health	Must know
6.6 Payments of dental care	Must know
6.6.1 Methods of payments, dental insurance, Government plans	Must know
6.7 Preventive dentistry	Must know
6.7.1 Definition, levels, role of individual,community and profession	Must know
6.7.2 Fluorides in dentistry, plaque control programmes	Must know

7 RESEARCH METHODOLOGY

7.1 Introduction	Must know
7.1.1 Definition and applications of research methodology	Must know
7.2 Types of research	Must know
7.2.1 Classification, differences, merits and demerits of research types	Must know
7.3 Designing a research protocol	Must know
7.3.1 Steps and considerations in a research protocol	Must know
7.4 Health information	Must know
7.4.1 Basic knowledge of computers,MS Office and statistical programmes	Must know
8 BIOSTATISTICS	
8.1 Introduction	Must know
8.1.1 Definitions and terminologies	Must know
8.2 Collection of data	Must know
8.2.1 Methods of data collection and their advantages and disadvantages	Must know
8.3 Presentation of data	Must know
8.3.1 Methods of presentation of data and its interpretation	Must know
8.4 Measures of central tendency	Must know
8.4.1 Importance of mean, median,mode and their computation	Must know
8.5 Measures of dispersion	Must know
8.5.1 Standard deviation, variance and its computation	Must know
8.6 Tests of significance	Must know
8.6.1 Parametric and non-parametric tests and their application	Must know
8.6.2 Performing statistical analysis of data	Desirable to know
8.7 Sampling and sampling techniques	Must know
8.7.1 Classification, methods, merits and demerits of each technique	Must know
8.8 Errors and bias	Must know
8.8.1 Definitions, Types of error, common biasesand ways of minimization	Must know
8.9 Calibration	Must know
8.9.1 Methods of calibration	Must know
8.10 Blind trials	Must know
9. Practice management	
9.1 Introduction, Place and locality	Must know
9.1.1 Definitions and terminologies	Must know
9.1.2 Premises & Layout	Must know

9.2Types of practice, advantages and disadvantages of each type of practice	Must know
9.2.1 Selection of equipments	Must know
9.2.2 Rules and regulations governing each practice	Must know
9.2.3 Types of practices in various countries	Desirable to know
9.2.4 recent advances and future trends in clincial practice	Good to know
9.3 Maintenance of records / accounts / audit	Must know
9.4 Requirements for starting a practice	Must know
10. Dentist Act 1948 with amendment	
10.1.1 Objectives, functions, composition, registration and membership of IDA	Must know
10.2 Dental Council of India and State Dental Councils, Composition and responsibilities	Must know
10.2.1 Objectives, functions and composition of centre and state DCI	Must know
10.3 Indian Dental Association, Head Office, State, Local and branches	Must know

# B. PRACTICAL (IV BDS)

Quota:

- Oral health status assessment using WHO oral health survey methods and indices  $_{\odot}$  OHI S
  - $_{\odot}$  Silness and Loe Index for Plaque
  - $\circ$  Loe and Silness Index for Gingiva
  - $\circ$  CPI
  - $\circ$  DMFT and DMFS
  - $_{\odot}$  Dft and dfs
  - Deans Fluorosis Index

- Visit to PHC, water Purification Plant, water Treatment plan, Public Health Lab
- Visit to the Institution of Special Care groups
- Application of Pit and fissure sealants- 2
- 2 Pit and Fissure sealant application on extracted mounted teeth as pre clinical exercise Fluoride Application- 2
- Comprehensives Health Care- 2 cases
- ART- 2
- Case history recording- 2
- Evidence Based Health Education Material

# C. RECOMMENDED BOOKS FOR READING

Sr.	Title	Author	Publisher
No			
1.	Essentials of preventive and	Soben Peter	Arya(Medi)
	community dentistry		Publishing house
2.	Park's textbook of preventive and	K.Park	Banarsidasbharat
	social medicine		publisher
3.	Prevention of Oral Diseases	JJ. Murray	Oxford university
			press
4.	Fluorides in dentistry	Ole Fjerskov	Munksgaard
5.	Dentistry dental practice and	David F striffer	W.B. Saunders
	community	Brian A Burt	company
6.	Principles of Dental public health	Jameas Morse	Harvard university
		Dunning	press (USA)
7.	Dental Public Health- An	Geoffery L Slack	John wright and
	introduction to Community		sons, Bristol
	Dentistry		
8.	Oral health Survey- Basic methods	W.H.O.	W.H.O, Geneva,
			1997
9.	Introduction to Bio-statistics	B.k. Mahajan	Jaypee Publishers
10.	Jong's Community Dental health	George M. Gluck	Mosby. Publishers
		Warren M.	

# **D.** SCHEME OF EXAMINATION

#### INTERNAL EXAMINATION SCHEME

I. First internal (Theory/Practical)- 20 Marks

- II. Second Internal (Theory/Practical) 20 Marks
- III. Third Internal (Theory/Practical) 60 Marks

Theory As per the university rules

UNIVERSITY PRACTICAL EXAM: (DISTRIBUTION OF MARKS)

Will be held for 90 marks.

- 1. Case History with treatment needs indicating level of prevention (20 marks)
- 2. Two epidemiological indices (30 marks including chair side viva)
- 3. Health education material preparation and delivery (20)
- 4. Spotter Identification (20)

## SECTION VI ETHICS IN DENTISTRY

ETHICS (20 hrs. of instruction)

Introduction:

There is a definite shift now from the traditional patient and doctor relationship and delivery of dental care. With advance in science and technology and the increasing needs of the patient, their families, and community, there is a concern for the health of the community as a whole. There is a shift to greater accountability to the society. Dental specialists like the other health professionals are confronted with many ethical problems. It is therefore absolutely necessary for each and every one in health care delivery to prepare themselves to deal with these problems. To accomplish this and develop human values the Council desires that all the trainees undergo ethical sensitisation by lectures or discussion on ethical issues, discussion of cases with an important ethical component. Course content:

Introduction to ethics -

- What is ethics?
- What are values and norms?
- How to form a value system in one's personal and professional life?
- Hippocratic oath.
- Declaration of Helsinki, WHO declaration of Geneva, International code of ethics.
- DCI codes of ethics.

Ethics of the individual -

The right person as a person Right to be respected Truth and confidentiality Autonomy of decision Doctor Patient relationship

Profession Ethics -

Code of conduct Contract and confidentiality Charging of fees, fee splitting Prescription of drugs Over- investigating the patient Malpractice and negligence

#### Research Ethics -

Animal and experimental research/ humanness Human experimentation Human volunteer research- informed consent Drug trials Ethical workshop of cases Gathering all scientific factors Gathering all value factors Identifying the areas of value- conflict, setting of priorities Working our criteria towards decisions

Recommended: Medical Ethics, Francis C.M, I Ed.1993, Jaypee Brothers, New Delhi p.189

## SECTION VIII CURRICULUM OF DENTAL INTERNSHIP PROGRAM

- The duration of Internship shall be of one year.
- All parts of internship shall be done in the dental college duty recognized/approved by the Dental Council of India for the purpose of imparting education and training to dental graduates in the country.
- The internship shall be compulsory and rotating as per the regulation prescribed for the purpose.
- The degree BDS shall be granted after completion of internship.
- The applicants seeking NOC for doing their one year paid rotating internship programme from one recognised dental college to another recognised dental college, are hereby advised to apply online to DCI. The NOC of the DCI, in reference to the details submitted by the applicant on the portal of the DCI, will be sent to the concerned applicant at his/her email ID instantly as well as to the parent dental college and the transferee dental college of the applicant. (Council Letter No.DE-1 MiscIII/2017/16511 dated 04<sup>th</sup> January 2018).

#### Organization of content:

The Curriculum during the 4 year of BDS training is subject based with more emphasis on learning practical skill. During one year internship the emphasis will be on competency based and community oriented training. The practical skills to be mastered by the interns along with the minimum performance level are given under the course content of different departments of Dental Education. The supervisors should see that proper facilities are provided in all departments and attached institutions for their performance. Specification of teaching activities:

Didactic lectures are delivered during the four years training in BDS. These shall be voided during the internship program. Emphasis shall be on chair-side teaching small group teaching and discussions tutorials, seminars, ward posting, laboratory posting, field visits and self learning.

Use of Resource materials:

Overhand projectors, slide projectors, film projectors charts diagrams, photographs, posters, specimens, models and other audiovisual aids shall be provide in all the

photographs, posters, specimens, models and other audiovisual aids shall be provide in all the dental colleges and attached institutions and field area. If possible, television, video and tapes showing procedures and techniques to be mastered by the interns should be provided. Determinantsof Curriculum for internship for interns:

The curricular contents of internship training shall be based on.

- I. Dental health needs of the society.
- II. Financial material and manpower resources available for the purpose.
- III. Nation dental Health Policy.
- V. Existing Dental as also the primary health care concept for the delivery of health services.

- VI. Task analysis of what graduates in dentistry in various practice settings, private and government's service actually perform.
- VII. Epidemiological studies conducted to find out prevalence of different dental health problem taking into consideration the magnitude of dental problem. Seventy of dental problems and social disruption caused by these problems.

### Objectives:

- A. To facilitate reinforcement of learning and acquisition of addition knowledge.
  - a. Reinforcement of knowledge.
    - b. Technique& resources available to the individual and the community, Social and cultural setting.
    - c. Training in a phased manner from a shared to full responsibility.
- B. To facilitate the achievement of basic skills attaining competence Vs maintaining competence in
  - i) History Taking
  - ii) Clinical Examination
  - iii) Performance and interpretation of essential data.
  - iv) Data analysis and inference
  - v) Communication skills aimed at imparting hope and optimism in the patient
  - vi) Attributes for developing working relationship in clinical setting and community team work.
- C. To facilitate attribute of sound attitudes and habits
  - i) Emphasis on individual and human being and not on disease symptoms
  - ii) Provision of comprehensive care rather than fragmentary treatment
  - iii) Continuing Dental Education and Learning of accepting the responsibility
- D. To facilitate understanding of professional and ethical principles
  - i) Right and dignity of patients
  - ii) Consultation with other professionals and referral to seniors/institutions
  - iii) Obligations to peers colleagues patient families and community
  - iv) Provision of free professional services in an emergency situation
- E. To initiate individual and group action, leading to disease prevention and dental health promotion at the level of individual families and the community

### Content (Subject matter)

The Compulsory rotating paid Dental Internship shall include training in Oral Medicine & Radiology, Oral & Maxillofacial Surgery, Prosthodontics, Pediodontics, Conservative Dentistry Pedodonics Oral Pathology & Microbiology, Othodontics and Community Dentistry.

### General Guidelines:

- 1. It shall be task oriented training, Theinterns should participate in various institutions and field programmers and be given due responsibility to perform the activities in all the department of the dental College and associated Institutions.
- 2. To Facilitate achievement of basic skills and attitude the following facilities should be provide to all dental graduals:
  - I. History taking, examination, diagnosis, charting and recording treatment plan of cases.
  - II. Presentation of cases in a group of seminar.
  - III. Care and sterilization of instruments used.
  - IV. Performance and interpretation of essential laboratory tests and other relevant investigations.
  - V. Data analysis and inference.
  - VI. Proper use of antibiotics, anti-inflammatory and other drugs, as well as other therapeuticmodalities.
  - VII. Education of patents, their relatives and community on all aspects of dental health care while working in the institution as also the field.
  - VIII. Communication aimed at inspiring hope, confidence and optimism.
  - IX. Legal rights of patients and obligations of dental graduate under forensic jurisprudence.
  - *X.* Compulsory training on BLS 2. training on Adobe Photoshop and Corel Draw
  - XI. Conducting lectures, seminars, course for interns as capacity building trainning

programmes on compulsory training on Basic Life Support, Courses on Soft

skills,

Communication, Biomedical waste, dental photography, practice

management.

A. Oral Medicine & Radiology:

- 1. Standardized examination of patients 25 Cases
- 2. Exposure to clinical, pathological laboratory procedures

	and biopsies.	5 Cases
3.	Effective training in taking of Radiographs.	2Full mouth
	(Intra-Oral) I.O.(Extra Oral) E.O	1
	Cephalogram	1
4.	Effective management of cases in wards	2 Cases

5. Pre clinical exercise for intern 5 radiographic tracing of impacted 3rd molars on OPG and/or IOPAs

### B. Oral and Maxillofacial Surgery:

a. The Interns during their posting in oral surgery shall perform the following procedures:

1.	Extractions		50	
2.	Surgical extractions		2	
3.	Impactions		2	
4.	Simple intra Maxillary Fixation	1		
5.	Cyst enucleations			1
6.	Incision and drainage		2	
7.	Alveoloplasties, Biopsies & Frenetomies, etc			3
Q	Assisting/observing major surgeries under genera	l anada	thosia	2

8. Assisting/ observing major surgeries under general anaesthesia 2

b. The interns shall perform the following on cancer patients:

- 1. Maintain file work
- 2. Do extractions for radiotherapy cases.
- 3. Perform biopsies.
- 4. Project.
- 5. Observe varied cases of oral cancers.
- 6. Evidence based case presentation

Peer group teaching in clinics for interns,

- 7. This will enable students to manage emergency situation more competently.
  - c. The Interns shall have 15 days posting in emergency services of a dental general hospital with extended responsibilities in emergency dental care in the wards. During the period they shall attend to all emergencies under the direct supervision of surgeon during any operation:
  - 1. Emergencies

(i) Toothache, (ii) Trigeminal neuralgia, (iii) Bleeding from mouth due to trauma, post extraction, bleeding disorder or hemophilia, (iv) airway obstruction due to fracture mandible and maxilla, dislocation of mandible, syncope or vasovagal attacks, ludwig's angina tooth fracture post intermaxillary fixation after general Anaesthesla.

2. Work in I.C.U. with particular reference to resuscitation procedures.

3. Conduct tutorials on medico-legal aspects including reporting on actual cases coming to casualty. They should have visits to law courts.

4. One Evidence based peer group discussion topic to be presented

#### 3. Prosthodontics:

The Dental graduates during their internship posting in Prosthodontics shall make:

5 5		
1. Complete Denture (upper & lower)		2
2. Removable Partial Denture		4
3. Fixed Partial Denture		1
4. Planned cast partial Denture		1

- 5. Miscellaneous eg: reline/over Denture/ repaints of Maxillofacial prosthesis 1
- 6. Learning Use of Face bow and semi adjustable articulators.
- 7. Crowns
- 8. Introduction of Implants
- 9. Project

#### 4. Periodontics:

Α.	The Dental	graduates shall	perform the	following procedures
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- Prophylaxis 15 Cases 1.
- 2. Flap Operation 2 Cases
  - Root Planning 3.

Gingivectomy

Curettage 4.

- 1 Case

1 Case

1 Case

Perio-Endo Case 1 Case 6.

Β. During their one week posting in the community health centers, the interns shall educate the public in prevention of Periodontal diseases.

#### 5. Conservative Dentistry:

5.

To facilitate reinforcement of learning and achievement of basic skills, the interns shall perform the following procedures independently or under the guidance of supervisors:

- 1. Restoration of extensively mutilated tooth 5 Cases 2. Inlav and only Preparations 1 Cases
- 3. Use of tooth colored restorative materials
- 4. Treatment of discolored vital and non-vital teeth
  - 280

- 4 Cases
- 1 Cases

5. Management of dento-alveolar fracture	1 Cases
6. Management of pulpless, single-rooted teeth without periapical lesion	4Cases
7. Management of acute dento alveolar infection	2 Cases
8. Management of pulpless, single-rooted teeth with periapical lesion	1Cases
9. Non-surgical management of traumatized teeth during formative period	d.

# 6. Pedodontics and Preventive Dentistry:

During their posting in Pedodontics and dental home the dental gradates shall perform:

1. Topical Application of fluorides including varnish	5 Cases
2. Restorative procedures of carious deciduous teeth in children.	10 Cases
3. Pulpotomy	2 Cases
4. Pulpectomy	1 Cases
5. Fabrication and insertion of space maintainers	1 Cases
6. Oral habits breaking appliances	1 Cases
7. Project	

8. Camps

## 7. Oral Pathologyand Microbiology:

The interns shall perform the following: 1. History-recording and clinical examination		5 Cases		
2. Blood, Urine and Sputum examination		5 Cases		
3. Exfoliative Cytology and smears study, age determination		2 Cases		
4. Biopsy-Laboratory Procedure & resorting				
5. forensic odontology exercise		Case		
6.Two days biodesigning will be added during the period of routine department posting				
7.project/camp				

## 8. Orthodontics:

A. The interns shall observe the following procedures during their posting in orthodontics:

- 1. Detailed diagnostic procedures for 5 patients
- Laboratory techniques including wire-bending for removable appliances, soldering and processing of myo-functional appliances.
- 3. Treatment of plan options and decisions
- 4. Making of bands, bonding procedures and wire insertions.
- 5. Use of extra oral anchorage and observation of force values.
- 6. Retainers.
- 7. Observe handing of Patients with oral habits causing malocclusions

The Interns shall do the following laboratory work:

1. Wire bending for removable appliances and space maintainers including welding and heat treatment procedure 5 Cases 2 Cases

5 Cases

- 2. Soldering exercises, banding & bonding procedures
- 3.Cold-cure and heat-cure acrylisation of simple Orthodontics appliances
- 4. Prpration of one model/chart

## **9.** Public Health Dentistry:

1. The interns shall conduct health education sessions for individuals and group on oral health public health nutrition, behavioral sciences, environmental health, preventive dentistry and epidemiology.

2. They shall conduct a short term epidemiological survey in the community or in the, alternate participate in the planning and methodology including RHS

3. They shall arrange effective demonstrations of:

A) Preventive and interceptive producers for prevalent dental diseases.

B) Mouth-rising and other oral hygiene demonstrations	5Cases
C)Toothbrushing techniques	5Cases
4. Conduction of oral health education programmers at	
A) School setting	2
B) Community setting	2
C)Adult Education Programmers	2
5. Preparation of Heath Education Materials	5

6. Exposure to team concept and National health Care systems:

a) Observation of functioning of heath infrastructure.

b) Observation of functioning of heath care team including multipurpose workers male and female, health education and other workers.

c) Observation of at least one national Health Programme

d) Observation of interlinkages of delivery of oral health care with Primary Health Care. Mobile Dental clinics, as and when available, should be provided for this teachings.

### Elective Posting

The interns shall be posted for 15 days in any of dental departments of their choice mentioned in the foregoing.

**Continuing Dental Education:** The Interns shall from time to time attend various CDE programs, conferences inside and outside the campus.

The Institution shall compulsorily conduct Lecture series on topics like ethics and jurisprudence, Sterilization, infection control, waste management, CPR and Basic Life support, and courses on soft skills, communication, dental photography and Practice management etc. Attendance in these lectures conducted in the institution is compulsory for internship completion.

#### Evaluation

1. Formative Evaluation:

Day to day assessment of the interns during their internship posting should be done. The objective is that all the items must acquire necessary minimum skill required for carrying out day to day professional work competently. This can be achieved by maintaining records and performance data book by all interns. This will not only provide demonstrable evidence of the processes of training but more importantly of the interns own acquisition of competencies as rotated to performance. It shall form a part of formative evaluation and shall also constitute component of final grading of interns.

2. Summative Evaluation:

It shall be based on the observation of the supervisors of different departments and the records and performance data / log book maintained by the interns. Grading shall be done accordingly. **Rural Service** 

In the rural services, the student will have to participate in -

- 1. Community Health Monitoring programs and services which include Preventive, Diagnostic and corrective procedures
- 2. To create educational awareness about dental hygiene and diseases.
- 3. Conduction of Oral Health Education Program at-
  - (a) School Setting-5(b) Community Setting-5(c) Adult Education Program-5
  - (c) Adult Education Program -5
- 4. Compulsory setup of satellite clinics in remote areas 1
- 5. Lectures to create awareness and education in public forums about the harmful effects of tobacco consumption and the predisposition to oral cancer- Two Lectures per student.

### **Period of Postings**

1.	Oral Medicine & Radiology	-	1 month
2.	Oral and Maxillofacial Surgery	-	1 1/2 months
3.	Prosthodontics	-	1 1/2 months
4.	Periodontics	-	1 month
5.	Conservative Dentistry	-	1 month
6.	Pedodontics	-	1 month
7.	Oral Pathology & Microbiology	-	15 days
8.	Orthodontics	-	1 month
9.	Community Dentistry /Rural Services	-	3 months
10	Elective	-	15 days
### B. PHARM. SEMESTER – VIII (BPH) SUBJECT: BIOSTATISTICS AND RESEARCH METHODOLOGY -THEORY (BP801T)

<b>Teaching Scheme (Hours/Week)</b>			Credits	Examination Scheme					
Lect	Tut	Prac	Total		Ext	Sess.	СМ	Prac	Total
3	1	-	4	4	75	15	10	-	100

# A. COURSE OVERVIEW

**Scope:** To understand the applications of Biostatics in Pharmacy. This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non-Parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analysing the statistical data using Excel.

Objectives: Upon completion of the course the student shall be able to

- Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)
- Know the various statistical techniques to solve statistical problems
- Appreciate statistical techniques in solving the problems.

NO	TOPIC	L (Hrs)	COs
[1]	Introduction: Statistics, Biostatistics, Frequency distribution	10	CO1
	Measures of central tendency: Mean, Median, Mode- Pharmaceutical		CO2
	examples Measures of dispersion: Dispersion, Range, standard deviation,		
	Pharmaceutical problems		
	<b>Correlation:</b> Definition, Karl Pearson's coefficient of correlation, Multiple		
	correlation - Pharmaceuticals examples		
[2]	<b>Regression:</b> Curve fitting by the method of least squares, fitting the lines	10	CO1
	y=a + bx and $x$		CO2
	= a + by, Multiple regression, standard error of regression– Pharmaceutical		
	Examples		
	Probability: Definition of probability, Binomial distribution, Normal		
	distribution, Poisson's distribution, properties - problems		
	Sample, Population, large sample, small sample, Null hypothesis,		
	alternative hypothesis, sampling, essence of sampling, types of sampling,		
	Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical		
	examples		
	<b>Parametric test:</b> t-test (Sample, Pooled or Unpaired and Paired), ANOVA,		
	(One way and Two way), Least Significance difference		
[3]	Non-Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test,	10	CO2
	Kruskal-Wallis test, Friedman Test.		CO3
	Introduction to Research: Need for research, Need for design of		CO4
	Experiments, Experiential Design Technique, plagiarism		
	Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot,		
	Counter Plot graph		
	<b>Designing the methodology:</b> Sample size determination and Power of a		
	study, Report writing and presentation of data, Protocol, Cohorts studies,		
	Observational studies, Experimental studies, Designing clinical trial,		
	various phases.		

[4]	Blocking and confounding system for Two-level factorials	08	CO2
	Regression modeling: Hypothesis testing in Simple and Multiple		CO3
	regression models.		CO5
	Introduction to Practical components of Industrial and Clinical Trials		
	Problems: Statistical Analysis Using Excel, SPSS, MINITAB®, DESIGN		
	OF EXPERIMENTS, R - Online Statistical Software's to Industrial and		
	Clinical trial approach		
[5]	Design and Analysis of experiments:	07	CO4
	Factorial Design: Definition, 22, 23design. Advantage of factorial design		CO5
	Response Surface methodology: Central composite design, Historical		
	design, Optimization Techniques		

- 1. Bolton, Stanford. Pharmaceutical statistics: Practical and clinical applications; 2<sup>nd</sup> Ed; Marcel Dekker Inc: New York, 1997
- 2. Panneerselvam, R. Design and Analysis of Experiments; PHI: India, 2012

# **D. REFERENCE BOOKS**

- 1. Gupta, SC. Fundamentals of Statistics;7<sup>th</sup> Ed; Himalaya Publishing House: India, 2018
- 2. Montgomery, DC. Design and Analysis of Experiments;10<sup>th</sup> Ed (student edition); John Wiley & Sons, 2019

### **E. COURSE OUTCOMES**

CO	Skill	Statement
Number		
<b>CO1</b>	Understand and	To understand statistical techniques and apply to solve statistical
	Apply	problem
CO2	Remember,	To understand various hypothesis testing techniques and application
	Understand and	to pharmaceutical experiments.
	Apply	
<b>CO3</b>	Understand	To learn research methodology for pharmaceutical experiments
<b>CO4</b>	Understand and	To understand optimization and design of experiments (DoE) for
	Remember	pharmaceutical experiments.
<b>CO5</b>	Understand and	To know operation and application of different statistical software for
	Apply	statistical optimization of experiments.

# F. COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>	PO11	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	-	3	3	-	-	2	-	1	-	3	3	3	2	3	2
CO2	3	-	3	3	-	-	2	-	1	-	3	3	3	2	1	2
<b>CO3</b>	3	-	3	3	-	-	3	-	3	-	3	3	3	2	3	2
<b>CO4</b>	3	-	3	3	-	-	2	-	2	-	3	3	3	2	2	2
<b>CO5</b>	3	-	3	3	-	-	1	-	3	-	3	3	3	2	1	2
Avg	3	-	3	3	-	-	2		2	-	3	3	3	2	2	2

### **SUBJECT : Communication Skills**

Teac	hing Schen	ne (Hours/V	Week)	Credits		Examinati	on Scheme	
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac
-	-	2	2	1	-	-	-	25

# A. COURSE OVERVIEW

The course is intended to familiarize students with the basics of English language and help them to learn to identify language structures for correct English usage. To enable the students to adopt strategies for effective reading and writing skills. It helps students to carry out day to day communication at the work place by adequate understanding of various types of communication to facilitate efficient interpersonal communication.

# **B. COURSE CONTENT**

NO	ТОРІС	Practical	COs
[1]	Concord, Tenses, Impersonal Passive Voice, Conditional Sentences,	4	CO1
	Conjunctions and Prepositions, Idioms.		
[2]	Nature and Scope, Communication Networks, Supervisor and Em-	6	CO2
	ployee Communication, Organizational Structure, Lack of Trust, Un-		CO3
	ethical Communication.		
	Non-verbal Communication: Significance and Forms, Elements of		
	Non-verbal Communication.		
	Cross-cultural Communication: Concept, Different Communication		
	Styles and Strategies.		
	Technology-enabled Business Communication: Tools, Impact, Effec-		
	tiveness.		
	Case Study.		
[3]	Business Messages: Importance, Types, Approaches, Stages.	8	CO3
	Business Letter Writing: Principles and Components, Kinds of Busi-		CO5
	ness Letters		
	Instructions: Written Instructions, Format, Audience Analysis, Char-		
	acteristics		
	Business Reports: Kinds, Characteristics, Parts, Elements, Steps		
	Proposals: Types, Components, Format, Proposal Layout and Design		
	Resume: Format, Types, Video Resumes, Send Resumes, Online Re-		
	cruitment: Process and Techniques.		
[4]	Interviews: Principles, General Preparations, Follow up, Questions	6	CO4
	Group Discussion: Planning and Preparation, Steps.		CO5

# C. TEXT BOOKS

- 1. Meenakshi Raman and Prakash Singh, *Business Communication;* Oxford University Press
- 2. Meenakshi Raman and Sangeeta Sharma, Technical Communication;

Oxford UniversityPress

### **D. REFERENCE BOOKS**

- 1. Sangeeta Sharma & Vinod Mishra , *Communication Skills for Engineers and Scientists*; PHI
- 2. William Sanborn Pfeiffer and T. V. S. Padmaja, *Technical Communication*; Pearson

# **E. COURSE OUTCOMES**

CO	Skill	Statement
Number		
<b>CO1</b>	Apply	Effective use of tenses and Conditional Sentences for academic
		writing
CO2	Analyze	Identify Various Means of Professional Communication
<b>CO3</b>	Apply	Practice Effective Business Writing and Correspondence
<b>CO4</b>	Apply	Exercise Interviews and Group Discussion Practices
<b>CO5</b>	Apply	Understanding Professional Environment and Being Competent

# F. COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1
<b>CO1</b>	2	2	2	2	3	2	-	-	1	3	-	-	2
<b>CO2</b>	2	2	2	2	3	2	-	-	3	3	2	-	2
<b>CO3</b>	2	2	2	3	2	2	-	-	2	3	2	-	2
<b>CO4</b>	2	2	2	2	2	2	-	-	3	3	2	-	2
<b>CO5</b>	2	2	2	1	1	2	-	-	3	3	2	-	2
Avg	2	2	2	2	2.2	2	-	-	2.4	3	2	-	2

#### DHARMSINH DESAI UNIVERSITY, NADIAD FACULTY OF INFORMATION SCIENCE

#### **Communicative English - I**

Teac	hing sc	heme (H/W)	Exan	n. Sche	me (Ma	ırks)
L	Tu	Pr	Th	Ss	Tw	Total
4	-	-	60	40	-	100

Looking at the diverse backgrounds & abilities of the thresh hold students, this syllabus aims at

(1) Importing the basic communication competency of the learners.

I

- (2) Familiarize them with the basic contents necessary for English communication during their studies.
- (3) Facilitate them in LSRW skills. &
- (4) Enable them to use English language for communicational needs.

So the syllabus is need base & it has a tentativeness, to facilitate the various learners of various competencies:

(I)	Introduction to Basics of Communication.	[1]
(II)	What is Communication? It's various definitions.	[1]
(III)	The salient features / Characteristics of the communication.	[2]
(IV)	Barriers to effective communication.	[2]
(V)	Improving LSRW:	[18]
	Introduction.	
	Verbal and Nonverbal Communication	
	Listening Process	
	GD	
	Forms of Oral Presentation	
(VI)	The Basic Vocabulary	[8]
	(a) How to improve vocabulary?	
	(b) Prefixes / Suffixes (MFU).	
	(c) Synonyms/ Antonyms.	
	(d) One word substitution.	
	(e) Spellings.	
(VII)	Developing Fluency & Pronunciation.	[8]
	IPA	
	Grammar [conjunction, auxiliaries, prepositions, articles, tenses]	
	Language games	

#### Text:/ Source :

The major source of studies for the students is the classroom, which will be very interactive & full of activities related to their syllabus. They must participate actively in their classes. The faculty will be a guide, helper, motivator & facilitator for the learners, but not the traditional teacher. So the learner's evaluation will be based on the class work only. The tests & exams will be based entirely on the class work & the participation of the learners in the classroom activities.

--- Prof. Rajanikant Jain.

Co - ordinator English Communication.

#### DHARMSINH DESAI UNIVERSITY, NADIAD FACULTY OF INFORMATION SCIENCE

#### **BC-207** Communicative English - II

Teac	hing sc	heme (H/W)	Exan	n. Sche	eme (Ma	arks)
L	Tu	Pr	Th	Ss	Tw	Total
4	-	-	60	40	-	100

Looking at the diverse backgrounds & abilities of the thresh hold students, this syllabus aims at

1. Importing the basic communication competency of the learners.

.

2. Familiarize them with the basic contents necessary for English communication during their studies.

- 3. Facilitate them in LSRW skills. &
- 4. Enable them to use English language for communicational needs.

So the syllabus is need base & it has a tentativeness, to facilitate the various learners of various competencies:

I) Oral Communication Hard Skills and Soft Skills Dyadic Communication	[6]
Presentation	
5Cs of Communication	
II) Comprehension and Précis	[6]
III) Essays & Paragraph writing.	[8]
IV) Letter writing	
(i) Personal & Social letters	[3]
(ii) Business letters.	[5]
(iii) Applications.	[3] V)
Developing dialogues	[3]
VI) Group Discussion.	[3]
VII) Self – Presentation.	[3]

#### Text:/ Source :

The major source of studies for the students is the classroom, Which will be very interactive & full of activities related to their syllabus. They must participate actively in their classes. The faculty will be a guide, helper, motivator & facilitator for the learners, but not the traditional teacher. So the learner's evaluation will be based on the class work only. The tests & exams will be based entirely on the class work & the participation of the learners in the classroom activities.

--- Prof. Rajanikant Jain.

Co - ordinator English Communication.

# **B. TECH. SEMESTER – VI (CH) SUBJECT: ENERGY TECHNOLOGY**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme					
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total	
3	0	0	3	3	60	0	0	0	60	

### A. COURSE OVERVIEW

The motivation of the course is students shall understand current practices of fuel usages and future prospectus of new and non-conventional energy resources exploration. Moreover, they shall understand various energy sources including conventional and non-conventional including solar thermal, geothermal, wind, Ocean, biomass, etc. and also demonstrate knowledge of various energy technologies and learn present energy scenario and the need for energy conservation.

NO	TOPIC	L+T	COs
		(hrs)	
[1]	An Introduction to Energy Sources	4	1,2
	energy sources (conventional & non-conventional), renewable energy		
	resources, primary & secondary energy sources, energy chain, energy		
	demand, national energy strategy & plan, energy management, energy		
	audit & conservation		
	Definitions, Units & Measures		
	proximate & ultimate analysis, calorific values, rank of coal, coking &		
	caking, gasification, basis for reporting results of analysis, units &		
	conversion factors		
[2]	Solid Fuels	4	1,2,3
	wood & charcoal, peat, lignite, sub-bituminous & bituminous coals, semi-		
	anthracite and anthracite coals, cannel & boghead coal, origin of coal,		
	composition of coal, analysis & properties of coal, problems		
[3]	Processing of Solid Fuels	4	1,2,7
	coal preparation, washability curve, dry & wet washing methods of coal,		
	washer efficiency, gasification & liquefaction of solid fuels, problems		
[4]	Solar Energy	4	1,3,7
	solar constant, solar radiation & related terms, measurement of solar		
	radiation, solar energy collectors - flat plate collector, air collector,		
	collectors with porous absorbers, concentrating collectors, applications &		
	advantages of various collectors, selective absorber coatings, solar energy		
	storage systems (thermal, electrical, chemical & mechanical), solar pond,		
	applications of solar energy		_
[5]	Wind Energy	2	1,3,7
	basic principles, power in wind, force on blades & turbines, wind energy		
	conversion, site selection, basic components of wind energy conversion		
	systems (WECS), classification of WECS, wind energy collectors,		
1.01	applications of wind energy		
[6]	Energy from Biomass	4	1,3,4,7
	introduction, energy plantation, biomass conversion technologies,		
	photosynthesis, biogas generation, factors affecting biogas generation,		
	classification of biogas plants & their comparisons, types of biogas plants		
	(including those used in India), biogas from plant wastes, community		

	plants & site selection, digester design considerations, design calculations, methods of maintaining & starting biogas plants, properties & utilisation of biogas, thermal gasification of biomass, pyrolysis, alternative liquid fuels		
[7]	<b>Geothermal Energy</b> geothermal resources, hydrothermal resources, liquid dominated systems,	4	1,3,7
	geopressured resources, petrothermal systems, magma resources, energy conservation & comparison with other resources, applications of		
	geothermal energy		
[8]	Energy from Oceans	4	1,5,7
	OTEC, methods (open cycle & close cycle) energy from tides,		
	components of tidal power plants, operation, methods of utilisation of		
	tidal energy, storage, ocean waves, wave energy conversion devices		
[9]	Fuel Cell	4	1,6,7
	introduction, hydrogen – oxygen fuel cell, ion exchange membrane cell,		
	fossil fuel cell, molten carbonate cell, advantages & disadvantages,		
	conversion efficiency, polarisation, type of electrodes, applications of fuel		
	cells		
[10]	Hydrogen & Methanol	4	1,6,7
	properties of Hydrogen, production of hydrogen, thermochemical		
	methods, fossil fuel methods, solar methods, storage & transportation,		
	safety & management		
[11]	Magneto Hydro-Dynamic (MHD) Power Generation	4	1,6,7
	principle, MHD system, open cycle system, closed cycle system, design		
	problems & developments, advantages, materials for MHD generators,		
	magnetic field & super conductivity		
[12]	Nuclear Energy	3	1,6,7
	fission, fusion, fuel for nuclear fission reactor (exploration, mining,		
	milling, concentrating, refining, enrichment, fuel fabrication, fuel use,		
	reprocessing, waste disposal), storage & transportation, fast & slow		
	neutrons, multiplication factors & reactor control, uranium enrichment		
	process, nuclear reactor power plant, fast breeder reactor, boiling water		
	reactor, pressurised heavy & light water reactor		

- 1. Energy Sources 2<sup>nd</sup> Ed. by G. D. Rai, Khanna Publications, New Delhi
- 2. Fuels & combustion by Samir Sarkar, Orient Longmans(1974)

# **D. REFERENCE BOOKS**

- 1. Solar Energy by Sukatame. Tata McGraw Hill, New Delhi
- 2. Energy Technology by Rao & Parulaker

# **E. COURSE OUTCOMES**

CO	Skill	Statement						
Number								
<b>CO1</b>		Understand the types of energy sources, forms of energies basic						
		definition and terminology.						
<b>CO2</b>		Explain the origin of solid fuel coal and its characteristic, analysis and						
	Comprehension	properties of coal and various coal washing process.						
<b>CO3</b>	Comprehension	Classify the non-conventional energy resources like solar energy, WECS						
	Application	and biomass conversion techniques.						
<b>CO4</b>	Application	Design the biogas plant and analyses the factors affecting the biochemical						
	Application	biomass conversions.						
<b>CO5</b>	Analysis	Demonstrate the basic knowledge of renewable energy resources like						
	Application	geothermal energy and OTEC systems for electricity generation.						
<b>CO6</b>	Analysis	Apply the use of chemical energy sources like hydrogen, fuel cell and						
		MHD for satisfy the energy need at various sectors.						
<b>CO7</b>		Analyse the National energy strategies and policies for energy						
		conservation, energy Audit and causes of increase in energy demand.						

# F. COURSE MATRIX

	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	<b>PO11</b>	PO12	PSO1	PSO2	PSO3	PSO4	
<b>CO1</b>	3.0	1.0	1.0	1.0	2.0	3.0	2.0	2.0	2.0	2.0	1.0	3.0	1	2	1	3	
<b>CO2</b>	2.0	2.0	2.0	1.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2	3	2	3	
CO3	3.0	3.0	3.0	2.0	3.0	2.0	2.0	1.0	2.0	2.0	1.0	1.0	3	3	2	2	
<b>CO4</b>	3.0	2.0	1.0	1.0	2.0	3.0	2.0	2.0	3.0	3.0	2.0	3.0	2	2	3	2	
<b>CO5</b>	3.0	2.0	3.0	3.0	3.0	3.0	2.0	2.0	1.0	1.0	1.0	2.0	3	2	2	2	
<b>CO6</b>	2.0	2.0	1.0	1.0	1.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0	2	3	3	2	
<b>CO7</b>	2.0	1.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0	1.0	3.0	1	1	2	3	
Avg	2.6	1.9	2.0	1.7	2.3	2.3	2.0	1.9	2.0	2.1	1.4	2.3	2.0	2.3	2.1	2.4	

**Q:1** What is the need of understanding non-conventional energy resources?

Due to increased population, the use of conventional fuel required increases day by day demanding high energy needs. So the stock of this fuel reduces and it has reached to a level of obsolesce. There is a need of finding alternative energy recourse which will cater the need of energy demand without affecting the environment. So the concept of non-conventional energy is required to taught to the students.

Q:2 Why do we need to teach government strategies, policies and plan regarding energy?

In old day the main aim of the chemical process industries to cater the need of populations in term of providing goods and chemical for survival. In doing so nobody bothered for use of energy and pollution created by industries. Now days, the cost of energy and pollution reduction has become an important issue to be addressed by professional chemical engineers. So to make students aware about the energy policies prepared by government agencies and plan to reduce the cost of energy this topic is introduced in the curriculum.

#### DHARMSINH DESAI UNIVERSITY, NADIAD FACULTY OF INFORMATION SCIENCE

#### **Environment Studies**

Teach	ning sc	heme	Exam. Scheme (Marks)							
$\mathbf{L}$	Tu	Pr	Th	Ss	Pr	Tw	Total			
4	-	-	60	-	-	40	100			

(1)	The Multidisciplinary Nature of Environmental Studies:	[2]
	Definition, scope and importance; Need for public awareness	

#### (2) Natural Resources:

[6]

Renewable and non-renewable resource: Natural resources and associated problems:

- (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
- (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies
- (e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies
- (f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources; equitable use of resources for sustainable lifestyles

#### (3) Ecosystems:

[6]

Concept of an ecosystem; Structure and function of an ecosystem; Producers, consumer and decomposers; Energy flow in the ecosystem; Ecological succession; Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

#### (4) Biodiversity and its conservation:

Introduction Definition: genetic, species and ecosystem diversity; Bio geographical classification of India; Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values; Biodiversity at global, National and local levels; India as a mega-diversity nation; Hot-spots of biodiversity; Threats to biodiversity: habitat loss, poaching of wild life, man wild life eon filets; Endangered and endemic species of India; Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

[6]

#### DHARMSINH DESAI UNIVERSITY, NADIAD FACULTY OF INFORMATION SCIENCE

#### (5) Environmental Pollution:

Definition; Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards

Solid Waste Management: Causes, Effects and Control Measures of Urban and Industrial

Waste

S

Role of an individual in prevention of pollution; Pollution case studies; Disaster management: floods. Earthquake, cyclone and landslides

### (6) Social Issues and the Environment:

[7] From Unsustainable to Sustainable development; urban problems related to energy; Water conservation. Rain water harvesting, watershed management; Resettlement and rehabilitation of people; its problems and concerns; Case studies Environmental ethics: Issues and possible solutions.

Climate change: Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies

Waste land reclamation; Consumerism and waste products; Environment Protection Act; Air (Prevention and Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislation; Public awareness

# (7) Human Population and the Environment:

[6] Population growth, variation among nations; Population explosion Family Welfare Programme; Environment and human health; Human Rights; Value Education; HIV/AIDS; Women and Child Welfare; Role of information Technology in Environmental and human health; Case studies

#### (8) Field

#### work:

Visit to a local area to document environment assets river/forest/grassland/hill/mountain

Visit to a local polluted site– Urban /Rural/Industrial/Agricultural

Study of common plants, insects, birds. Study of simple ecosystems – pond, river, hill, slopes etc.

# **Text Book**

Environmental Studies Erach Bharucha for UGC UGC, New Delhi &BVIEER, Pune

# B. PHARM. SEMESTER – II (BPH) SUBJECT: ENVIRONMENTAL SCIENCES- THEORY (BP206T)

<b>Teaching Scheme (Hours/Week)</b>				Credits	Examination Scheme						
Lect	Tut	Prac	Total		Ext	Sess.	СМ	Prac	Total		
2	-	-	2	3	50	15	10	-	75		

# A. COURSE OVERVIEW

**Scope:** Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

**Objectives:** Upon completion of the course the student shall be able to:

- Create the awareness about environmental problems among learners.
- Impart basic knowledge about the environment and its allied problems.
- Develop an attitude of concern for the environment.
- Motivate learner to participate in environment protection and environment improvement.
- Acquire skills to help the concerned individuals in identifying and solving environmental problems.
- Strive to attain harmony with Nature.

NO	TOPIC	L (Hrs)	COs
[1]	The Multidisciplinary nature of environmental studies Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.	10	CO1 CO3 CO4
[2]	<ul> <li>Ecosystems</li> <li>Concept of an ecosystem.</li> <li>Structure and function of an ecosystem.</li> <li>Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)</li> </ul>	10	CO1 CO2 CO3
[3]	Environmental Pollution: Air pollution; Water pollution; Soil pollution	10	CO1 CO3 CO5

- 1. S.S. Randhava, Environmental Sciences, Vikas and Company Medical Publishers, Pee vee publication, Jalandhar, 2019.
- 2. Prof. M. K. Gupta, Prof. Manish Jaimini, Environmental sciences, Vikas Pandey, published by Nirali Prakashan, Pune, 2018

### **D. REFERENCE BOOKS**

- 1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
- 2. Agarwal, K.C. Environmental Biology, Nidi Publ. Ltd. Bikaner, 2001
- 3. Bharucha Erach, The Biodiversity of India, Mapin Pu blishing Pvt. Ltd., Ahmedabad 380 013, India,
- 4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- 5. Clark R.S., Marine Pollution, Clanderson Press Oxford
- 6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T., Environmental Encyclopedia, Jaico Publ. House, Mumbai, 2001, 1196p
- 7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- 8. Down of Earth, Centre for Science and Environment

### **E. COURSE OUTCOMES**

CO	Skill	Statement
Number		
<b>CO1</b>	Understand and	Discuss environmental problems among learners and create the
	create	awareness and strive to attain harmony with Nature.
<b>CO2</b>	Understand and	Describe concept of Ecosystems and remember structure and
	remember	function of it.
<b>CO3</b>	Create	To create an attitude of concern for the environment protection and
		environment improvement.
<b>CO4</b>	Understand and	Explain Natural Resources of Environment
	remember	
<b>CO5</b>	Understand and	Describe and analyse the environmental pollution.
	analyse	

### F. COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>	PO11	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3	3	1	3	2	1	2	2	3	3	3	2	2	2	2
<b>CO2</b>	2	3	3	1	2	2	1	2	2	3	3	3	2	2	2	2
<b>CO3</b>	2	3	3	2	2	2	1	2	2	3	3	3	3	2	2	2
<b>CO4</b>	2	3	2	2	2	2	2	2	2	3	3	3	3	2	2	2
<b>CO5</b>	2	3	3	2	3	2	2	2	2	3	3	3	3	2	2	2
Avg	2.2	3	2.8	1.6	2.4	2	1.4	2	2	3	3	3	2.6	2	2	2

## **B. TECH. SEMESTER – I (CH/CL/IC/MH) SUBJECT : ENVIRONMENTAL STUDIES**

Teach	<b>Teaching Scheme (Hours/Week)</b>			Credits		Exam	ination So	cheme	
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	_	_	2	0	40	_	P/F	_	40

# A. COURSE OVERVIEW

Motivation: Identify and analyze the current issues related to the environment, increase awareness and induce interest among students to propose ethically appropriate and economically feasible solutions for sustainable developmental activities.

Objective: The objective for this course is to bring awareness about sustainable development is a key to the future of mankind. Evaluate the utilization and over-exploitation of natural resources and advantages of conserving biodiversity. Understanding, comprehending and analyzing solutions to the contemporary environmental issues and problems of pollution, population explosion, solid waste disposal, environmental degradation, economic productivity, global warming, ozone layer depletion and loss of biodiversity. Application of the knowledge about the environment for innovative solutions.

Justification: As the subject is a Mandatory (Non-credit) course included in the Model Curriculum provided by AICTE.

NO	ΤΟΡΙΟ	L+T (hrs)	COs
[1]	The multidisciplinary nature of environmental studies	1	CO1
			CO3
	Definition, scope and importance & Need for public awareness		
[2]	Natural resources	5	CO1
			CO2
	Renewable and non-renewable resource: Natural resources and		CO3
	associated problems		
	• Forest resources: Use and over-exploitation, deforestation, case		
	studies. Timber extraction, mining, dams, and their effects on forests and		
	tribal people		
	• Water resources: Use and over-utilization of surface and ground		
	water, floods, drought, conflicts over water, dams benefit and problems		
	• Mineral resources: Use and exploitation, environmental effects of		
	extracting and using mineral resources, case studies		
	• Food resources: World food problems, changes caused by		
	agriculture and overgrazing, effects of modern agriculture, fertilizer-		
	pesticide problems, water logging, salinity, case studies		
	• Energy resources: Growing energy needs, renewable and non-		
	renewable energy sources, use of alternate energy sources, case studies		
	• Land resources: Land as a resource, land degradation, man induced		
	landslides, soil erosion and desertification		
	• Kole of an individual in conservation of natural resources. Equitable		
	use of resources of sustainable lifestyles		

[3]	Ecosystems	5	CO1
	<ul> <li>Concept of an ecosystem, Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem</li> <li>Ecological succession, Food chains, food webs and ecological pyramids</li> <li>Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)</li> </ul>		CO2
[4]	Biodiversity and its conservation	5	CO1
	<ul> <li>Introduction definition: Genetic, species and ecosystem diversity</li> <li>Bio-geographical classification of India</li> <li>Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels</li> <li>India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India</li> <li>Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity</li> </ul>		02
[5]	Environmental Pollution	5	CO1
			COS
	<ul> <li>Definition, Causes, effects and control measures of:</li> <li>Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards</li> <li>Solid waste management, causes, effects and control measures of urban and industrial wastes</li> <li>Role of an individual in prevention of pollution, Pollution case studies</li> <li>Disaster management: floods, earthquake, cyclone and landslides</li> </ul>		CO4

[7]	Human Population and the Environment	4	CO1
1.1			CO3
	• Population growth, variation among nations, population explosion.		CO5
	Family Welfare Program, environment and human health, human rights.		
	Value education		
	• HIV/AIDS. Women and Child Welfare. Role of Information		
	Technology in Environmental and human health		
	Case studies		
[8]	Field work		CO2
[~]	• Visit to a local area to document environmental assets		CO3
	(river/forest/grassland/hill/mountain)		CO4
	• Visit to a local polluted site - Urban/Rural/Industrial/Agricultural		CO6
	• Study of common plants, insects, birds		
	• Study of simple ecosystems – pond, river, hill, slopes etc.		
	Termwork:	(Pass/	CO1
		Fail)	CO2
	(a) Awareness Activities:	,	CO3
	i) Small group meetings about water management, promotion of recycle		CO4
	use, generation of less waste, avoiding electricity waste ii) Slogan making		CO5
	event iii) Poster making event iv) Cycle rally v) Lectures from experts		CO6
	(b) Actual Activities:		
	i) Plantation ii) Gifting a tree to see its full growth iii) Cleanliness drive iv)		
	Drive for segregation of waste v) To live some big environmentalist for a		
	week or so to understand his work vi) To work in kitchen garden for mess		
	vii) To know about the different varieties of plants viii) Shutting down the		
	fans and ACs of the campus for an hour or so.		

Erach Bharucha Textbook of Environmental Studies; Second Edition, Universities Press: 1. Hyderabad, 2013.

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2. Basak, A. Environmental Studies; Dorling Kindersley: India, 2009.

3. Dhameja, S. K. Environmental studies; S. K. Kataria and Sons: New Delhi, 2007.

4. Rao, C. S. Environmental Pollution Control Engineering; Wiley publishers: New Delhi, 2006.

5. Brunner, R. C. Hazardous Waste Incineration; McGraw Hill: Michigan, 1989.

6. Clark, R. S. Marine Pollution; Clanderson Press Oxford: Bath, 2001. 7. Agarwal, K. C. *Environmental Biology*; Nidi Publ.: Bikaner, 2001.

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9. De, A. K. *Environmental Chemistry;* Wiley Eastern: New Delhi, 2006.

10. Gleick, H. P. Water in crisis, Pacific Institute for Studies in Dev., *Environment & Security*; Stockholm Env. Institute Oxford Univ. Press: New York, 1993.

11. Hawkins, R.E., *Encyclopedia of Indian Natural History*; Bombay Natural History Society: Bombay, 1987.

12. Heywood, V. H.; Waston, R. T. *Global Biodiversity Assessment;* Cambridge Univ. Press: Cambridge, 1995.

13. Mckinney, M.L.; School, R.M. *Environmental Science systems & Solutions*; Web enhanced edition: USA, 1996.

14. Miller, T.G. Jr.; Spoolman, S. E. *Environmental Science*; Cengage learning: Wadsworth, 2014.

15. Rao, M. N.; Datta, A.K. *Waste Water treatment*; Oxford & IBH Publ.: New Delhi, 1987.

16. Townsend, C., Harper, J.; Michael, B. *Essentials of Ecology*; Blackwell: Oxford, 2008.

17. Trivedi, R. K., *Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards*, Vol I and II; B. S. Publications, Hyderabad, 2010.

18. Trivedi, R. K.; Goel, P. K. Introduction to air pollution; ABD Publishers: Jaipur, 2003.

19. Wanger, K. D., *Environmental Management;* W.B. Saunders Co. Philadelphia, USA, 1998.

# **E. COURSE OUTCOMES**

CO	Skill	Statement
Number		
CO1	Comprehension	<b>Recall, understand and interpret</b> the terminologies used in environmental studies correctly
CO2	Evaluate	<b>Relate</b> the importance of natural resources, biodiversity, hotspots and <b>deduce</b> the threats to biodiversity
CO3	Analysis	Analyse the factors causing environmental pollution, formulate the role of an individual in abatement and control of pollution, improve disaster management techniques
CO4	Evaluate	<b>Evaluate</b> the social issues involved in climate change, water conservation, rainwater harvesting, wasteland reclamation, consumerism and waste generation, environmental ethics, environmental laws and requirement of public awareness
<b>CO5</b>	Comprehension	<b>Understand</b> the issues related to population, family welfare programs, human health, value education, and role of IT in environment

CO	Skill	Statement
Number		
CO6	Application	Make use of the field work including visits to local areas to document environmental assets, assess the polluted sites, study species and ecosystems in our surroundings

# F. COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	<b>PO</b> 9	<b>PO10</b>	PO11	PO12	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	1	2	1	1	1	1	3	1	1	3	2	2	2	3	3	2
CO2	1	2	1	1	1	2	3	2	2	2	2	2	2	2	2	2
CO3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
<b>CO4</b>	3	3	3	3	3	3	3	3	2	3	2	3	2	3	3	3
CO5	2	3	3	3	2	3	3	3	3	3	1	2	2	2	2	3
<b>CO6</b>	3	3	3	3	3	3	3	3	3	3	2	3	2	3	3	3
A	0.40	0.07	0.00	0.00	0.40	0.5	0	0.5	0.00	0.00	0	0.5	0.40	0.07	0.07	0.07
Avg	2.16	2.67	2.33	2.33	2.16	2.5	3	2.5	2.33	2.83	2	2.5	2.16	2.67	2.67	2.67

### B. TECH. SEMESTER – II (EC/CE/IT) SUBJECT: ENVIRONMENTAL STUDIES SYLLABUS & SCHEME (W.E.F. 2021)

Te (	aching Hours/	g Schem /Week)	e	Credits			Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	TW.	Pract.	Total	
2			2	0	40				40	

Reference Code MC-II

#### A. Detailed Syllabus:

# [1] The multidisciplinary nature of environmental studies Definition, scope and importance & need for public awareness

#### [2] Natural resources

Renewable and non-renewable resource: Natural resources and associated problems Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams, and their effects on forests and tribal people

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefit and problems

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies

Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification

Role of an individual in conservation of natural resources. Equitable use of resources of sustainable lifestyles

#### [3] Ecosystems

Concept of an ecosystem, Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem

Ecological succession, Food chains, food webs and ecological pyramids

Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

#### [4] Biodiversity and its conservation

Introduction definition: Genetic, species and ecosystem diversity Bio-geographical classification of India

Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels

India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity

# [5] Environmental Pollution

Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear hazards Solid waste management, causes, effects and control measures of urban and industrial wastes

Role of an individual in prevention of pollution, Pollution case studies Disaster management: floods, earthquake, cyclone and landslides

# [6] Social issues and the environment

From unsustainable to sustainable development, Urban problems related to energy Water conservation, rain water harvesting, watershed management Resettlement and rehabilitation of people: its problems and concerns. Case studies Environmental ethics: Issues and possible solutions

Climate change: Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

Case studies

Wasteland reclamation, Consumerism and waste products

Environment Protection Act: Air (Prevention and Control of Pollution) Act, Water (Prevention &Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act Issues involved in enforcement of environmental legislation Public awareness

# [7] Human Population and the Environment

Population growth, variation among nations, population explosion, Family Welfare Program, environment and human health, human rights, Value education HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environmental and human health Case studies

# [8] Field work

Visit to a local area to document environmental assets (river/forest/grassland/hill/mountain) Visit to a local polluted site - Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds Study of simple ecosystems – pond, river, hill, slopes etc.

# B. Text Books:

- Erach Bharucha *Textbook of Environmental Studies*; Second Edition, Universities Press: Hyderabad, 2013.
- Poonia, M. P.; Sharma, S. C. *Environmental studies*; Khanna Publishing House: New Delhi, 2017.
- Rajagopalan, R. Environmental Studies; Oxford University Press: India, 2015.

# C. Reference Books:

- Varandani, N. S. Basics of Environmental studies; Lambert Academic Publishing: Germany, 2013.
- Basak, A. *Environmental Studies*; Dorling Kindersley: India, 2009.
- Dhameja, S. K. Environmental studies; S. K. Kataria and Sons: New Delhi, 2007.
- Rao, C. S. Environmental Pollution Control Engineering; Wiley publishers: New Delhi, 2006.

Department of Information Technology, Dharmsinh Desai University, Nadiad

- Brunner, R. C. *Hazardous Waste Incineration*; McGraw Hill: Michigan, 1989.
- Clark, R. S. *Marine Pollution*; Clanderson Press Oxford: Bath, 2001.
- Trivedy, R. K. Handbook of Environmental Laws, Acts, Guidelines, Compliances & standards; B. S. publications: Hyderabad, 2005.
- Jadhav, H.; Bhosale, V. M. Environmental Protection and Laws; Himalaya Pub. House: Delhi, 1995.
- Agarwal, K. C. *Environmental Biology*; Nidi Publ.: Bikaner, 2001.
- Bharucha, E. *The Biodiversity of India*; Mapin Publishing: Ahmedabad, India, 2002.
- Cunningham, W.P.; Cooper; Gorhani, T. H. E.; Hepworth, M.T., *Environmental Encyclopedia*; Jaico Publ. House: Mumbai, 2001.
- De, A. K. Environmental Chemistry; Wiley Eastern: New Delhi, 2006.
- Gleick, H. P. Water in crisis, Pacific Institute for Studies in Dev., *Environment & Security*; Stockholm Env. Institute Oxford Univ. Press: New York, 1993.
- Hawkins, R.E., *Encyclopedia of Indian Natural History*; Bombay Natural History Society: Bombay, 1987.
- Heywood, V. H.; Waston, R. T. *Global Biodiversity Assessment;* Cambridge Univ. Press: Cambridge, 1995.
- Mckinney, M.L.; School, R.M. *Environmental Science systems & Solutions*; Web enhanced edition: USA, 1996.
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- Odum, E.P. *Fundamentals of Ecology*; W.B. Saunders: USA, 1971.
- Rao, M. N.; Datta, A.K. Waste Water treatment; Oxford & IBH Publ.: New Delhi, 1987.
- Sharma, B. K., Environmental Chemistry; Goel Publ. House: Meerut, 2001.
- Townsend, C., Harper, J.; Michael, B. Essentials of Ecology; Blackwell: Oxford, 2008.
- Trivedi, R. K., *Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards*, Vol I and II; B. S. Publications, Hyderabad, 2010.
- Trivedi, R. K.; Goel, P. K. Introduction to air pollution; ABD Publishers: Jaipur, 2003.
- Wanger, K. D., *Environmental Management;* W.B. Saunders Co. Philadelphia, USA, 1998.

# **B. TECH. SEMESTER – V (CH) SUBJECT : ENVIRONEMTAL ENGINEERING**

<b>Teaching Scheme (Hours/Week)</b>			Credits		Exam	ination So	cheme		
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	0	0	100

### A. COURSE OVERVIEW

Environmental engineering deals with the application of engineering principles to the control, modification and adaption of the physical, chemical and biological factors of the environment in the interest of human's health, comfort and social wellbeing. The student will identify and troubleshoot for environmental pollution problems.

NO	TOPIC	L+T	COs
		(hrs)	
[1]	<b>Introduction to Environmental Pollution:</b> Introduction to environment,	4	CO1
	Biosphere, Hydrological and nutrient Cycles, Types of pollution and		
	Pollutant		
[2]	Air Pollution:	22	CO2
	Sources and Effects:		
	Air pollution – Definition and concentrations, classification and		
	properties of air pollutants, criteria air pollutants, Photochemical smog,		
	emission sources for air pollutants, Air pollution laws and standards in		
	India, behaviour and fate of various air pollutants in atmosphere, Effects		
	of air pollution on health, impact on vegetation and materials.		
	Meteorological aspects of air pollutant dispersion		
	Meteorology – definition and parameters, Temperature lapse rate,		
	Inversion and atmospheric stability, Plume behaviour, Dispersion of air		
	pollutants – The Gaussian plume model		
	Air pollution sampling and measurement		
	Ambient air sampling and stack sampling, Collection of gaseous		
	air pollutants and Particulate pollutants, Analysis of air pollutants		
	Air pollution control methods and Equipments		
	Control methods, Principle and design of particulate matter control		
	devices- gravitational settling chambers, cyclone separators, bag house		
	filters, electrostatic precipitators, wet and dry scrubbers.		
	Control of specific gaseous pollutants		
	Control of specific gaseous pollutants– Modification of operating		
	conditions, modification of design conditions, effluent gas treatment		
	methods.		~~ <b>^</b>
[3]	Waste water engineering:	30	CO3
	Origin of waste water and waste water flow rates		CO4
	Introduction to waste pollution, Reasons for waste water treatment,		
	Introduction to treatment operations, process and concepts, Components		
	of waste water flow rates, Waste water sources and flow rates, Variation		
	in wastewater flow, Analysis of waste water flow rate data, Reduction of		
	waste water flows.		
	Waste water characteristics		
	Physical, Chemical and Biological characteristics of wastewater		
	Waste water treatment		

Objective and classification of waste water treatment, Major		
factors for selection of system, Design parameters for waste water		
treatment, Reactor used in waste water treatment		
Physical unit operation and their design		
Objective and Application of Physical unit operations in waste		
water treatment, Various unit operations – Screening, Grit chambers, Flow		
equalization, Flocculation, Flotation., Sedimentation, Design of various		
units- Screening, Flow equalization, Flotation, Sedimentation.		
Chemical Unit processes		
Objective and Application of Chemical unit processes in waste		
water treatment, Various chemical unit processes - Chemical		
Precipitation, Disinfection		
Biological Unit processes		
Objective of Biological unit processes in waste water treatment,		
Important definition, Classification of biological unit processes, Bacterial		
growth and Kinetics of Bacterial growth, Suspended growth treatment		
process - Activated sludge process- Modification, Design, Aerated		
lagoons, Aerobic attached growth treatment processes – trickling filters &		
its design, rotating biological contractors, Introduction to anaerobic		
suspended growth treatment processes attached growth treatment process,		
sludge treatment & disposal, Introduction to advanced waste water		
treatment.		
[4]         Solid waste management	4	CO5

- 1. Metcalf and Eddy, *Wastewater Engineering, Treatment and Reuse*,15th ed.; Tata McGraw Hill, New Delhi, 2003.
- 2. C.S.Rao., *Environmental Pollution Control Engineering*, 3rd ed., New Age International Publishers, Delhi, 2018.

# **D. REFERENCE BOOKS**

- 1. Scott, F. H. *Elements of Chemical Reaction Engineering;* 5th ed.; Prentice Hall India (p) Ltd.: New Delhi, 2016.
- 2. Smith, J. M. *Chemical Engineering Kinetics*; 3rd ed.; McGraw Hill Incorporation: New York, 2000.
- 3. Peavy, H.S., Rowe, D.R., Tchobanoglous, G. *Environmental Engineering*, Indian editon, Tata McGraw Hills,
- 4. Martin Crawford, Air pollution control theory, Tata McGraw-Hill.
- 5. G.L.Karia and R.A.Christian, *Wastewater treatment Concepts and Design approach*, 2nd ed.; East Economy Edition

# **E. COURSE OUTCOMES**

CO	Skill	Statement
Number		
<b>CO1</b>		Understand the sources, effects and control measure of different
		types of pollution.(Air, Water, Land etc.)
<b>CO2</b>		Analyse general air pollution problems, meteorological aspects,
		control and measure of particulate pollutants and gaseous pollutants.
<b>CO3</b>	Evoluoto	Apply the basic knowledge on water pollutants and waste water
	Comprehension	characteristics and build expertise in analysis and testing of water
	Application	samples.
<b>CO4</b>	Synthesis	Evaluate the significance of various unit operations and unit
	Analysis	processes involved in waste water treatment, Create design of
	Anarysis	specific treatment methods for effluents of various chemical process
		industries
<b>CO5</b>		Understand about solid waste, remember problems associated with
		solid waste disposal, evaluating various methods for solid waste
		treatment.

# F. COURSE MATRIX

	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	<b>PO11</b>	PO12	PSO1	PSO2	PSO3	PSO4	•
<b>CO1</b>	2	2	1	2	2	2	3	1	2	1	1	2	1	1	1	1	
CO2	3	3	2	2	2	2	2	2	2	2	2	2	2	1	1	1	
CO3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	
<b>CO4</b>	3	2	3	2	2	2	2	2	2	2	2	2	1	2	2	1	
<b>CO5</b>	2	1	2	1	1	1	2	2	2	2	2	2	1	1	1	2	
Avg	2.6	2	2	2.8	2.8	2.8	2.2	2.8	2	2.8	2.8	2	2.4	2.4	2.1	2.1	

#### **Questions:**

Que: 1 Classify air pollutant based on source type and also give its examples?

Ans: 1

Air pollutants can be classified based on their emission by natural process or due to anthropogenic activities. So based on source they are of two types:

Natural pollutants: windblown dust, volcanic ash and gases Anthropogenic pollutants: pollutant generated from combustion, petroleum refining process, food processing etc.

Concept: What is pollutant and its classification?

Que: 2 Differentiate attached growth and suspended growth system of biological treatment of wastewater?

Ans: 2 Biological treatment performance is depend upon developing a suitable mixed culture of microorganisms in the treatment unit. When microorganism are maintained in suspension the process is suspended growth and when the microorganism in the reactor remain attached to some fixed medium then it is attached growth .

Concept: different method of waste water treatment, role of microorganism

# MBA SEMESTER – III SUBJECT: ETHICS, VALUES AND STRESS MANAGEMENT

Teachi	ing Schem	ne (Hours/	Week)	Credits		Exam	ination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total		
4.5	0	0	4.5	4	50%	20%	30%	-	100%		

# A. COURSE OVERVIEW

- To introduce the students with the fundamentals of Business Ethics and to make them aware of ethical practices of the business world.
- To teach them the reasons for stress and how to cope with it in the workplace.
- To help students realize the link between business ethics and strategic management.

NO	TOPIC	L+T	COs
		(hrs)	
[1]	Ethics in Business: Business Ethics and Its issues, Moral Development	4	CO1
	and Moral Reasoning, Arguments for and against Business Ethics, Moral		
	responsibility and Blame.		
	Cases: Business Ethics in Saudi Culture, WorldCom's Whistle-blower,		
	Was National Semiconductor Morally Responsible? Gun Manufacturers		
	and Responsibility.		
	Take Home Cases: Slavery in the Chocolate Industry, Enron's Fall		
[2]	Ethical Principles in Business: Utilitarianism: Weighing Social Costs and	4	CO1
	Benefits, Rights and Duties, Justice and Fairness, The Ethics of Care,		
	Integrating Utility, Rights, Justice and Caring, An alternative to Moral		
	Principles: Virtue Ethics, Morality in International Context.		
	Cases: Working for Eli Lilly & Company, Conflict Diamonds, Exxon		
	Mobil, Amerada Hess, and Marathon Oil in Equatorial Guinea.		
	<u>Take Home Cases:</u> Publius, Unocal in Burma		
[3]	The Business System: Government, Markets, and International Trade:	4	CO1
	Free Markets and Rights: John Locke, Free Markets and Utility: Adam		
	Smith, Free Trade and Utility: David Ricardo, Marx and Justice:		
	Criticizing Markets and Free Trade, Conclusion: The Mixed Economy, the		
	New Property, and the End of Marxism.		
	<u>Cases:</u> Napster's, Grokster's, and StreamCast's Rovolution, Brian's		
	Franchis,		
	Take Home Cases: GlaxoSmithKline, Bristol-Myers Squibb, and AIDS in		
	Africa, Accolade versus Sega		
[4]	Ethics in Marketplace: Introduction, Perfect Competition, Monopoly	4	CO2
	Competition, Oligopolistic Competition, Oligopolies and Public Policy,		
	Cases: Drug Company Monopolies and Profits, Fixing the Computer		
	Memory Market, Oracle and PeopleSoft, Take Home Cases: Playing		
	Monopoly: Microsoft, Archer Daniels Midland and the Friendly		
	Competitors		

		4	~ ~ •
[5]	Ethics and Environment: The dimensions of pollution and Resource	4	CO3
	Depletion, The Ethics of Pollution Control, The Ethics of Conserving		
	Depletable Resources.		
	Cases: The Aroma of Tacoma, The Auto Companies in China, Exporting		
	Poison Take Home Cases: The Ok Tedi Copper Mine, Gas or Grouse?		
[6]	The Ethics of Consumer Production and Marketing: Markets and	4	CO2
	Consumer Protection. The Contract View of Business Firm's Duties to		
	Consumers. The Due Care Theory. The Social Costs View of the		
	Manufacturer's Duties Advertising Ethics Consumer Privacy Cases: The		
	Tobacco Companies and Product Safety Advertising Death? New Balance		
	and the "Made in USA" Label Take Home Cases: Poster Diskinger and		
	Needle Stielte The Ford/Firestone Debaele		
(7)			000
[7]	The Ethics of Job Discrimination:	4	CO2
	Job Discrimination and Its Nature, Discrimination: Its Extent,		
	Discrimination: Utility, Rights, and Justice, Affirmative Action, <u>Cases:</u>		
	Johnson Controls' Fatal Protection Policy, Wall Street: It's Man's World,		
	Peter Oiler and Winn-Dixie Stores, <u>Take Home Cases:</u> Shoulder Kroger		
	Pay for What Ralphs' Employer Did Then? Wal-Mart's Women		
[8]	The Individual in the Organization: The Rational Organization, The	4	CO2
	Employee's Obligations to the Firm, The Firm's Duties to the Employee,		
	The Political Organization, Employee Rights, Organizational Politics, The		
	Caring Organization, Cases: Delivering Pizza, Employment at Will at		
	Howmet Corporation? Swingline Moves, Take Home Cases: Gap's Labor		
	Problems. Who Should Pay?		
[9]	1 What is Stress? Stress and Burnout Stimulus-Oriented Approach	4	CO4
121	Response-Oriented Approach The Psychodynamic Approach Stress	•	001
	Tolerance Limit Burnout Ancient Indian Concents Positive Role of		
	Stress Stress Potential and the Creative Personality Stress Potential of the		
	Creative Process Stress Potential for Creative Managers		
[10]	Organizational Pala Strass: The Concent of Pala Strass, Pala Space Pala	1	COS
	Organizational Role Stress. The Concept of Role-Stress, Role Space, Role	4	$CO_{3}$
	Sei, Measurement of Role Stress, Role Space Conflicts, Role Set		004
	Connicts, Correlates of Role Stress, Personal Correlates of Role Stress,		
	Role Stress and Background Factors, Stress and Productivity,		
[11]	Organizational Correlates of Role Stress		a a f
	Coping Styles or Strategies: Coping Strategies: Concept, Coping	4	CO5
	Management, Coping Profiles of Some Groups		
[12]	<u>Moderators of Stress:</u> Personality Variables, needs as Moderator, Locus of	2	CO5
	Control as Moderator, Type-A as Moderator, Mental Health as Moderator,		
	Coping Strategies as Moderator and all other variables as moderators		
[13]	Countering Stress: What an Organization Can do, Theory of Job	4	CO5
	Characteristics Model, Managing Organizational Stress using the Job		
	Characteristic Approach, Issues in Implementing the Job Characteristic		
	Model, A New Strategy using the Job Characteristics Approach to Manage		
	Organizational Stress, Concept of Role Efficacy as a Reducer of Stress,		
	What Individuals can do, Stress: Its perception and consequences,		
	Awareness of being in a stressful state, What happens during a stressful		
	situation, Proneness to Experience stress and its identification. Coping		
	Mechanisms in Indian Managers. Coping Strategies for Role Stresses		
	Ways to Manage Stress Effectively Managing the stress through non		
	drugs methods (all). The Spiritual Dimension of Stress		
	and a memous (an), the spinuar Dimension of Suess		

(It is necessary that at least 85% of course content is covered in prescribed textbooks. The format should be as per APA referencing format)

1. Velasquez, M. G. (2006). Business ethics: Concepts & cases. Pearson Educación.

# **D. REFERENCE BOOKS**

(The format should be as per APA referencing format)

# **E. COURSE OUTCOMES**

(Minimum 5 Cos are required)

CO Number	Skill	Statement
C01	Evaluate	Increase awareness about real life corporate scandals and ethical reasons behind that at individual, group and system level
CO2	Comprehension	Identify the frameworks that can help deal with real life ethical dilemmas
CO3	Application	Increase the awareness about human rights, environmental ethics, values, gender etc. discrimination
<b>CO4</b>	Synthesis	Create a scientific foundation of stress management
C05	Analysis	Create awareness about how to deal with the stress experience, including the inputs from the Indian scriptures.

# F. COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	<b>PO10</b>	PO11	PO12	PSO1	PSO2	PSO3	PSO4	
<b>CO1</b>	2	2	3	1	3	2	2	2	2	3	2	3	2	2	3	3	
<b>CO2</b>	1	3	2	2	2	3	3	3	3	2	3	2	3	3	2	2	
CO3	2	2	3	3	3	2	2	2	1	2	2	1	2	2	2	2	
<b>CO4</b>	3	1	1	3	1	2	3	2	2	2	2	2	1	2	2	3	
<b>CO5</b>	2	3	2	2	2	3	2	2	2	2	2	3	3	3	2	2	
Avg	2	2.2	2.2	2.2	2.2	2.4	2.4	2.2	2	2.2	2.2	2.2	2.2	2.4	2.2	2.4	2.225

2.4.1 Priority, establishment, manpower, health management	Must know
2.4.2 infectious disease epidemiology	Desirable to know
2.4.3 Control of epidemics	Good to know
2.5 Health care delivery system	Must know
2.5.1 Centre and state, oral health policy, primary health care, national health programmes, health organizations and agencies	Must know
2.5.2 Health care delivery systems of other countries	Desirable to know
2.6 Behavioral science	Must know
2.6.1 Definition of sociology, anthropology and psychology and their role in health and oral health of community	Must know
2.7 Health economics	Desirable to know
3. ENVIRONMENTAL HEALTH	
3.1 Concepts and principles	Must know
3.2 Role of environment in health, Domains of environment	Must know
3.3 Physical environment	Must know
3.3.1 Role of air, water, radiation ,noise in health and disease; air pollution, water pollution,	Must know
3.3.2 Water purification methods	Desirable to know
3.4 Biological environment	Must know
3.4.1 Arthropods in health and disease	Must know
3.4.2 Vector control	Desirable to know
3.5 Social environment	Must know
3.5.1 Definition and role of social environment in health and disease	Must know
3.6 Waste disposal	Must know
3.6.1 Hospital waste management	Must know
3.6.2 Methods of solid waste disposal	Desirable to know
3.6.3 Excreta disposal, sullage, sewage system	Good to know
3.7 Mass disaster and environmental health	Must know
4.HEALTH EDUCATION	54 26
4.1 Introduction to health education	Must know
4.1.1 Definition	Must know
4.2 Concepts and principles	Must know
4.2.1 Theories and models of health education	Desirable to know
4.3 Planning and evaluation of health education programme	Good to know
4.3.1 Health education methods	Must know
4.3.1 Levels of health education	Must know
4.3.2 Health education aids	Must know
4.3.3 Methods of communication	Must know

18.1 classification and clinical features	Must know
18.2 maxillary procedures	Good to know
18.3 Mandibular procedures	Good to know
19 cleft lip and palate	
19.1 aetiology and classification	Must know
19.2 cleft lip repair	Good to know
19.3 palatoplasty	Good to know
20 Neurological disorders	
20.1 Trigeminal neuralgia	Must know
20.2 Facial nerve paralysis	Must know
20.3 Nerve injuries	Good to know
21 Tumours of oral cavity	
21.1 Benign odontogenic and non-odontogenic	Must know
tumours	
21.2 Biopsy	Must know
21.3 oral cancer	Must know
22. Oral implantology	Must know
23.Medical jurisprudence and medicolegal considerations	Good to know
24. Biomedical Waste management	Must to know

Formal and structured evidence-based education is integrated in theory which incorporates at least one or two evidences related to the lecture being taken.

#### B. PRACTICAL/ CLINICAL :

#### i. VARIOUS THEORY TOPICS WILL BE DISCUSSED

ii. CLINICALS: During the clinical postings the students are required to appear for daily discussions on various pre-decided topics for which they are asked to systematically search and find best available evidences and produce during discussions either in electronic form or print form

3 <sup>rd</sup> year	Minimum of 05patients extraction under local anaesthesia
4 <sup>th</sup> year	Minimum of 10 patients extraction under local anaesthesia with various nerve block techniques

17.4. Identification of cadavers by Dental Appliances, Restorations and Tissue remnants	Good to know
17.5. Role of Dentist in Forensic Science	Good to know
<ol> <li>Benign Tumors of the Oral Cavity - Definition of tumor, han and terratoma with examples. Classification of odontogenic benign tumors, C/F, investigations, D/D &amp; treatment</li> </ol>	nartomas, choriostoma and non-odontogeni
18.1 Pyogenic Granuloma	Must to Know
18.2 Hemangioma and Angiomatous Syndromes	Must to Know
18.3 Lymphangioma	Desirable to Know
18.4 Giant Cell Granuloma (Peripheral and Central)	Must to Know
18.5 Fibrous Dysplasia of Bone	Good to Know
18.6 Albright's Syndrome	Good to Know
19. Environmental Science including Biomedical Waste Manag	ement
19.1. Introduction	Good to Know
19.2. What is Bio- Medical Waste	Good to Know
19.3. Risk from Bio- Medical Waste	Good to Know
19.4. Environmental Hazard	Good to Know
19.5. Occupational Hazard	Good to Know
19.6. Public Health Hazard	Good to Know
19.7. Legal Provision	Good to Know
19.8. Treatment and Disposal Methodology	Good to Know

# 2. APPROACH TO THE SUBJECT OF DIFFERENTIAL DIAGNOSIS

TOPIC	DISTRIBUTION
Soft tissue lesions	20
1.1. White lesions of oral mucosa	Must to Know
1.2. Solitary oral ulcers and fissures	Must to Know
1.3. Peripheral oral exophytic lesions	Good to Know
1.4. Pits, fistulas and draining lesions	Good to Know
1.5. Intraoral brownish, bluish or black conditions	Good to Know
1.6. Solitary red lesions	Good to Know
1.7. Generalized red conditions and multiple ulcerations	Good to Know
1.8. Red conditions of the tongue	Good to Know
1.9. Yellow conditions of the oral mucosa	Good to Know
Bony lesions	
2.1. Radiolucencies of Jaws	
2.1.1. Anatomic radiolucencies	Must to Know
2.1.2. Periapical radiolucencies	Must to Know

4.3.4 Effective use of audio visual aids	Must know
4.4.3 Barriers to communication	Must know
5. ETHICS AND JURISPRUDENCE	
5.1 Professional liabilities	Must know
5.2 Basis for medical ethics	Must know
5.2.1 Hypocratic oath	Desirable to know
5.2.2 Negligence	Must know
5.2.3 Malpractice	Must know
5.4 Principles of ethics(FLIPPED CLASSROOM)	Must know
5.4.1 Ethical rules for dentists prescribed by DCI	Must know
5.4.2 Consents	Must know
5.5 COPRA	Must know
5.5.1 Evidence	Must know
5.6 Contracts	Must know
5.7 Methods of identification in forensic dentistry	Must know
5.7.1 Age, sex identification using forensics	Desirable to know
6. DENTAL PUBLIC HEALTH	
6.1 Introduction to dental public health	Must know
6.1.1 Definition and difference between community and clinical health	Must know
6.2 Epidemiology of dental diseases dental caries, periodontal diseases, malocclusion, dental fluorosis and oral cancer.	Must know
6.2.1 Epidemiological studies related to oral diseases, etiology and risk factors for oral diseases	Must know
6.3 Survey procedures	Must know
6.3.1 Planning, implementation and evaluation, WHO oral health survey methods 1997, indices for dental diseases.	Must know
6.4 Delivery of dental care	Must know
6.4.1 Dental auxiliaries( operating and non- operating), incremental and	Must know
6.5 Comprehensive health care, School dental health	Must know
6.6 Payments of dental care	Must know
6.6.1 Methods of payments, dental insurance, Government plans	Must know
6.7 Preventive dentistry	Must know
6.7.1 Definition, levels, role of individual,community and profession	Must know
6.7.2 Fluorides in dentistry, plaque control programmes	Must know

7 RESEARCH METHODOLOGY

# Dharmsinh Desai University Nadiad

#### **BBA – Hotel Management**

#### Sixth Semester

### Course: Housekeeping - V Code: HM602

#### **Rationale:**

- ✤ To make students knowledgeable about all advance theories of Housekeeping.
- To introduce the Housekeeping systems with the latest developments in the field of Hospitality Industry which hold relevance to the future managers?

Teac	ching Scheme			Examinatio	on Scheme	
L	Т	Р	Sessional	End Term	Practical	Total
3		2	40	60	50	150

(L: Lecture, T: Tutorial, P: Practical)

#### **Course Duration:**

The course duration is of 50 sessions of 60 minutes each

S.No	Course Contents
1	Ecotels
	A. Ecotel Certification
	B. Choosing an ecofriendly site
	C. Hotel design and Construction
	D. Energy Conservation
	E. Water conservation
	F. Waste management
	G. Environment friendly housekeeping

#### **Practical:**

- 1. Flower Arrangement
- 2. Horticulture
- 3. Supervision

### Suggested Learning Resources

- 1. Hotel Housekeeping Operations and Management G. Raghubalan, Smritee Raghubalan Oxford Publication.
- 2. Textbook of Housekeeping Management and Operations Sudhir Andrews McGraw Hill Publication.
- 3. Training Manual of Housekeeping Sudhir Andrews McGraw Hill

# DIPLOMA CEHMICAL SEMESTER – III SUBJECT: INDUSTRIAL SAFETY & ENVIRONMENTAL ENGINEERING (DK - 319)

Teaching Scheme (Hours/Week)					Exam	ination Se	cheme	
L	Т	Р	Total	Ext	S	TW	Р	Total
3	1	3	7	60	40	25	50	175

### A. COURSE OVERVIEW

The course is introducing general concept and their controls of safety, environment, and pollution. Students will learn to safety objects, role of chemical engineers, chemical hazards, mechanical hazards, electrical hazards, fire hazards and their controls and prevention methods and some pollution like water pollution, noise pollution, miscellaneous pollution, and solid waste disposal methods,

### **B. COURSE CONTENT**

NO	TOPIC	COs
[1]	General introduction & concepts of safety: - Safety of organization industrial	CO1
	plant lay out of safety, safety measures concept & importance of safety in	CO4
	chemical industries.	
[2]	Chemical & fire Hazards & their control: - Definition, source, &	CO1
	classification of hazards like chemical, fire, different methods for controlling	CO4
	chemical & fire hazards, objective & importance of fire prevention, fire	
[2]	Other bayards & accurational disasses: Concept of machanical electrical	<u>CO1</u>
[3]	& noise bazards with their precaution & notified dangerous occupational	CO1
	diseases with their cause and their prevention	0.04
[4]	<b>Personal Protective Devices:</b> - Protective devices for head, ears, eves, face,	CO2
L - J	respiratory system, hand, feet etc.	
[5]	Introduction to pollution: - Introduction to environmental pollution, sources	CO1
	of pollutants, effects of pollution on human health, vegetation, animal life &	CO5
	effect on environment. & Miscellaneous Pollution: Sources types of effect of	<b>CO6</b>
	noise pollution, radiation etc.	
[6]	Air Pollution: - Sources & Types of air pollutant, classification, properties of	CO1
	air pollutant, effect of air pollution, Air pollution control methods like	CO5
	gravitational settling, Diffusion, Electrostatic precipitation, Centrifugal	
	gravity settler cyclone separator fabric filter electrostatic precipitator wet	
	scrubber etc	
[7]	Water pollution: - Introduction, characterization of water, BOD, COD, VM,	<b>CO1</b>
	SM, classification of sources. Water pollution, sewage treatment processes like	CO5
	primary, secondary of final treatment, Brief idea about CETP of design criteria	<b>CO6</b>
	for Industrial effluent treatment plant.	
[8]	Solid waste of disposal methods: - Sources of classification, Methods of	CO1
	disposal like dumping, sanitary land filling, incineration, composting etc.	CO5
		CO6

### C. TEXT BOOKS

1. S. Rao, Environmental Pollution control engineering, 2nd edition, New age International (P) Ltd.,Hyderabad, January, 2006.

DEPARTMENT OF CHEMICAL ENGINEERING, DDU, NADIAD

### **D. REFERENCE BOOKS**

1. Danieal A. Crowel & Joseph. F, 2nd edition, Prentice hall PT, New Jersey, 2002.

# E. COURSE OUTCOMES

СО	Skill	Statement
Number		
<b>CO1</b>	Remembering	The general introductions and concept of safety.
<b>CO2</b>	Analysing	To choose appropriate protective devise for any given conditions.
<b>CO3</b>	Applying	To apply hazard & pollution analysis techniques for risk assessment.
<b>CO4</b>	Understanding	To understand fire hazards, objective, source and importance of
		safety and their objects.
<b>CO5</b>	Remembering	Types of Pollutions And Sources
<b>CO6</b>	Understanding	To Understand Control methods, and disposal management.

### F. COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	3	2	2	2	2	3	3	3	2	3	3	3	3	3
<b>CO2</b>	3	3	3	3	3	3	3	3	3	3	3	3	3	3
<b>CO3</b>	3	3	2	3	3	3	3	3	3	3	3	3	3	3
<b>CO4</b>	3	3	3	3	3	3	3	3	3	3	3	3	3	3
<b>CO5</b>	3	2	2	2	2	3	3	3	2	3	3	3	3	3
<b>CO6</b>	3	3	3	3	2	3	3	3	2	3	3	3	3	3
Avg	3	2.6	2.5	2.6	2.5	3	3	3	2.5	3	3	3	3	3

## M. TECH. SEMESTER – II (CH) SUBJECT : INTRODUCTION TO ENVIONMENTAL ENGINEERING

Teaching Scheme (Hours/Week)				Credits		Exam	ination Sc	cheme	
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
4	0	0	4	4	60	40	0	0	100

### A. COURSE OVERVIEW

Environmental engineering deals with the application of engineering principles to the control, modification and adaption of the physical, chemical and biological factors of the environment in the interest of human's health, comfort and social wellbeing. The student will identify and troubleshoot for environmental pollution problems.

NO	TOPIC	L+T	COs
		(hrs)	
[1]	Introduction to Environmental Pollution: Introduction to environment,	4	CO1
	Biosphere, Hydrological and nutrient Cycles, Types of pollution and		
	Pollutant		
[2]	Air Pollution:	22	CO2
	Sources and Effects:		
	Air pollution – Definition and concentrations, classification and		
	properties of air pollutants, criteria air pollutants, Photochemical smog,		
	emission sources for air pollutants, Air pollution laws and standards in		
	India, behaviour and fate of various air pollutants in atmosphere, Effects		
	of air pollution on health, impact on vegetation and materials.		
	Meteorological aspects of air pollutant dispersion		
	Meteorology – definition and parameters, Temperature lapse rate,		
	Inversion and atmospheric stability, Plume behaviour, Dispersion of air		
	pollutants – The Gaussian plume model		
	Air pollution sampling and measurement		
	Ambient air sampling and stack sampling, Collection of gaseous		
	air pollutants and Particulate pollutants, Analysis of air pollutants		
	Air pollution control methods and Equipments		
	Control methods, Principle and design of particulate matter control		
	devices- gravitational settling chambers, cyclone separators, bag house		
	filters, electrostatic precipitators, wet and dry scrubbers.		
	Control of specific gaseous pollutants		
	Control of specific gaseous pollutants– Modification of operating		
	conditions, modification of design conditions, effluent gas treatment		
[2]	methods.	20	<u> </u>
[3]	waste water engineering:	30	$CO_3$
	Introduction to waste nollution. Descens for waste water treatment		C04
	Introduction to treatment operations, process and concents, Components		
	of waste water flow rates. Waste water sources and flow rates. Variation		
	in waste water flow Analysis of waste water flow rate data Reduction of		
	waste water flows		
	Waste water characteristics		
	Physical Chemical and Biological characteristics of wastewater		
	Waste water treatment		

Objective and classification of waste water treatment, Major		
factors for selection of system, Design parameters for waste water		
treatment, Reactor used in waste water treatment		
Physical unit operation and their design		
Objective and Application of Physical unit operations in waste		
water treatment, Various unit operations – Screening, Grit chambers, Flow		
equalization, Flocculation, Flotation., Sedimentation, Design of various		
units- Screening, Flow equalization, Flotation, Sedimentation.		
Chemical Unit processes		
Objective and Application of Chemical unit processes in waste		
water treatment, Various chemical unit processes - Chemical		
Precipitation, Disinfection		
Biological Unit processes		
Objective of Biological unit processes in waste water treatment,		
Important definition, Classification of biological unit processes, Bacterial		
growth and Kinetics of Bacterial growth, Suspended growth treatment		
process - Activated sludge process- Modification, Design, Aerated		
lagoons, Aerobic attached growth treatment processes – trickling filters &		
its design, rotating biological contractors, Introduction to anaerobic		
suspended growth treatment processes attached growth treatment process,		
sludge treatment & disposal, Introduction to advanced waste water		
treatment.		
[4]         Solid waste management	4	CO5

- 1. Metcalf and Eddy, *Wastewater Engineering, Treatment and Reuse*,15th ed.; Tata McGraw Hill, New Delhi, 2003.
- 2. C.S.Rao., *Environmental Pollution Control Engineering*, 3rd ed., New Age International Publishers, Delhi, 2018.

# **D. REFERENCE BOOKS**

- 1. Scott, F. H. *Elements of Chemical Reaction Engineering;* 5th ed.; Prentice Hall India (p) Ltd.: New Delhi, 2016.
- 2. Smith, J. M. *Chemical Engineering Kinetics*; 3rd ed.; McGraw Hill Incorporation: New York, 2000.
- 3. Peavy, H.S., Rowe, D.R., Tchobanoglous, G. *Environmental Engineering*, Indian editon, Tata McGraw Hills,
- 4. Martin Crawford, Air pollution control theory, Tata McGraw-Hill.
- 5. G.L.Karia and R.A.Christian, *Wastewater treatment Concepts and Design approach*, 2nd ed.; East Economy Edition
#### E. COURSE OUTCOMES

CO	Skill	Statement
Number		
<b>CO1</b>		Understand the sources, effects and control measure of different
		types of pollution.(Air, Water, Land etc.)
CO2		Analyse general air pollution problems, meteorological aspects,
		control and measure of particulate pollutants and gaseous pollutants.
<b>CO3</b>	Evoluoto	Apply the basic knowledge on water pollutants and waste water
	Comprehension	characteristics and build expertise in analysis and testing of water
		samples.
<b>CO4</b>	Synthesis	Evaluate the significance of various unit operations and unit
	Analysis	processes involved in waste water treatment, Create design of
	Anarysis	specific treatment methods for effluents of various chemical process
		industries
<b>CO5</b>		Understand about solid waste, remember problems associated with
		solid waste disposal, evaluating various methods for solid waste
		treatment.

#### F. COURSE MATRIX

	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>	PO11	<b>PO12</b>	PSO1	PSO2	PSO3	PSO4	•
<b>CO1</b>	2	2	1	2	2	2	3	1	2	1	1	2	1	1	1	1	
<b>CO2</b>	3	3	2	2	2	2	2	2	2	2	2	2	2	1	1	1	
<b>CO3</b>	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	1	
<b>CO4</b>	3	2	3	2	2	2	2	2	2	2	2	2	1	2	2	1	
<b>CO5</b>	2	1	2	1	1	1	2	2	2	2	2	2	1	1	1	2	
Avg	2.6	2	2	2.8	2.8	2.8	2.2	2.8	2	2.8	2.8	2	2.4	2.4	2.1	2.1	

#### DHARMSINH DESAI UNIVERSITY, NADIAD FACULTY OF INFORMATION SCIENCE

#### BCA - 316 Yoga

m. Sche	me (Ma	rks)		
Ss	Pr	Tw	Total	
-	50	-	100	
	n. Sche Ss -	n. Scheme (Ma Ss Pr - 50	Ss Pr Tw - 50 -	Ss Pr Tw Total - 50 - 100

#### Part-1TraininginYogicAsanas, PranavamsandMudras:

- 1. Kapalbhati, Anulom Vilom Pranayam, Omkar Pranayam, Shavasan, Suryanamskar, Body Rotations.
- 2. Asanas for Meditation.
  - Padmasan, Swastikasan, Sidhdhasan, Bhadrasan, Vajrasan, Sukhasan, Savasan
- 3. Asanas to be performed in standing position
  - Triconasan, Pervatasan, Utlatukasan, Hastapadasan.
- 4. Asanas to be performed while lying in supine position.
  - Servangasan, Halasan, Savasan, Kosthavishramasan, Matshendrasan, Suptavajrasan.
- 5. Asanas to be performed lying in prone position.
  - Uttanapadasan, Uttanadhadasan, Sarpasan, Bhujasan, Salabhasan, Dhanurasan, Makarasan.
- 6. Asanas to be performed in sitting position.
  - Pavanmuktasan, Hastapadasan, Vajrasan, Ardhamatshyendrasan, Shishuasan, Saptamudrasan, Gomukhasan.
- 7. Yoga Mudras (seven Types)
- 8. Pranayams (seven Types)

#### Part-2RaiyogaMeditation-TheoryandPractice:

- 1. The True Concept of Yoga
- 2. Science of Consciousness & Dynamics of Mind
- 3. Concept of God & True Secularism
- 4. Principles of Spiritual Science
- 5. Practical Meditation

#### Part-3Moral, Ethical and Spiritual dimensions indevelopment of innerpersonality:

- 1. Holistic Health
- 2. Stress Management and Relaxation Techniques Addiction, Cure and Remedies to get rid of them

#### **SUBJECT: MANAGEMENT INFORMATION SYSTEMS**

Teaching Scheme (Hours/Week)			Credits		Exam	ination Se	cheme		
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
4	-	-	4	4	60	40	-	-	100

#### A. COURSE OVERVIEW

The course is intended to describe the role of information systems in business management. It covers the fundamentals of decision support systems and Enterprise Systems including E-commerce for business and explain the ethical and societal issues related to information systems.

#### **B. COURSE CONTENT**

NO	ТОРІС	L+T (hrs)	COs
[1]	Organizations and Information Systems, Impact of Information Systems on Organizations and Business Firms, Using Information Systems to Achieve Competitive Advantage Management Information System in a Digital Firm: Concept, Definition, Role of MIS, Impact of MIS, MIS and User, MIS as a Control System, MIS A Support to the Management, Management Effectiveness and MIS, Organization as System.	10	CO1
[2]	Introduction, Infrastructure Components, Contemporary Hardware Platform Trends, Management Issues, Dealing with Platform and Infrastructure Change, Management and Governance, Making Wise Infrastructure Investments Development of Long Range Plans of the MIS, Ascertaining the Class of Information, Determining the Information Requirement, Development and Implementation of MIS, Management of the Information Quality in the MIS, Organisation for Development of MIS, MIS: Development Process Model	9	CO1 CO2
[3]	Applications in Manufacturing Sector: Personnel Management, Financial Management, Production Management, Raw Materials Management, Marketing Management, Corporate Overview Applications in Service Sector: Introduction, Creating a Distinctive Service, Service Concept, Service Process Cycle and Analysis, Customer Service Design, Service Management System, MIS Applications in Service Industry.	10	CO1 CO3
[4]	Concept of Decision Support Systems (DSS), DSS Models, Group Decision Support Systems, AI System, Knowledge based Expert System, DSS Application in E-enterprise, MIS and the Benefits of DSS.	10	CO1
[5]	Enterprise Systems, Enterprise Software and Business Value, Supply Chain Management Systems and its Applications, Global Supply Chains and Internet, Business Value of Supply Chain Management Systems E-Commerce: E-Commerce and the Internet, E-Commerce: Business and Technology, The Mobile Digital Platform and Mobile E-Commerce, Building an E-Commerce Web Site.	10	CO1 CO5
[6]	Understanding Ethical and Social Issues Related to Systems, Ethics in an Information Society, The Moral Dimensions Of Information Systems.	5	CO4
[7]	Case Studies Relevant to the Topics.	6	CO1 CO2

		CO3
		CO4
		CO5

#### C. TEXT BOOKS

- 1. Waman S. Jawadekar, *Management Information Systems Texts and Cases;* 5th ed.; TataMcGrawHill Education Pvt. Ltd.
- 2. Kenneth C Laudon and Jane P Laudon, *Management Information System*; 12th ed.; PHI,New Delhi.

#### **D. REFERENCE BOOKS**

- 1. S. Sadagopan, Management Information Systems; PHI, New Delhi
- 2. Sanjay Mahapatra, Cases in Management Information Systems; PHI, New Delhi
- 3. Uma G. Gupta, *Management Information Systems*; Galgotia Publications

#### **E. COURSE OUTCOMES**

CO	Skill	Statement				
Number						
<b>CO1</b>	Understand	Interpret the Role and Applications of Information Systems in				
		Business Management.				
CO2	Understand	Express Relationships Between Information Systems, Organization,				
		Management and Strategy.				
CO3	Understand	Explain the importance of information quality and the development				
		process of MIS.				
<b>CO4</b>	Understand	Summarize ethical aspects of the information system in professional				
		practices and social issues.				
<b>CO5</b>	Evaluate	Evaluate the applicability of relevant IT infrastructure in				
		management of various business processes.				

#### F.COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10	<b>PO11</b>	PO12	PSO1
<b>CO1</b>	2	3	2	-	-	2	2	2	-	2	-	-	2
<b>CO2</b>	2	2	2	-	-	2	2	1	-	2	-	-	2
<b>CO3</b>	2	1	2	-	-	2	2	3	-	2	-	-	2
<b>CO4</b>	1	2	2	-	-	3	2	1	-	2	-	-	2
<b>CO5</b>	3	2	2	-	-	1	2	3	-	2	-	-	2
Avg	2	2	2	-	-	2	2	2	-	2	-	-	2



Attitude, Ethics and Communication (AETCOM) Competencies for the Indian Medical Graduate

2018



# Medical Council of India Pocket-14, Sector-8, Dwarka, New Delhi 110 077



### <u>FOREWORD</u>

Medical education has its deep rooted relevance with reference to creation of trained health manpower in the country capable of shouldering the onus and responsibility ensuring an effective health care delivery system. It is the prime concern upper most in the minds of all concerned as to whether the said dispensation is mitigated adequately or otherwise? Attainment on this count in my opinion is a 'minimum must' and therefore all 'initiatives' with concrete cause are warranted towards realistic and meaningful actualization of the same.

The crystallization of objectives ensuring corresponding curriculum with appropriate teaching learning strategies, tools, techniques and technology and commensurate mode of assessment are the parts of the core model for providing quality based undergraduate medical education.

It gives me great satisfaction that the 'competency based curriculum' that has been proposed by the Medical Council of India would definitely serve a larger cause in the domain of 'quality centricity'.

The "Conative domain" which hitherto was not appropriately incorporated and structured in the curriculum has been specifically dispensed of by providing a definitive model for the same titled AETCOM "Attitude, Ethics and Communication Model".

Structuring them into competencies, placing them appropriately in the curriculum design ensuring its incorporation through desired teaching and learning would definitely ensure enrichment of the learner with desired communicative and

altruistic skills with proper orientation pertaining to ethics, professionalism, leadership skills and also the attribute that shall inculcate in him/her the essence of lifelong learning.

This definitely would go a long way in creating an 'Indian Medical Graduate' to realistically turn out to be an 'International Medical Graduate' capable of catering to the cause and requirement of health care delivery across the boundaries all over the Globe.

I record my appreciation for Dr. Ved Prakash Mishra, Chairman, Academic Committee and his team for venturing into the said much desired exercise and giving it the required shape out of committed painstaking labour. I am sure that this is going to change the 'shape' and 'face' of undergraduate medical education to make it timely relevant, purposive, need based, consequential and impactful.

(Dr. Jayshree Mehta)



Dr. Vedprakash Mishra Chairman Academic Committee Medical Council of India

Date: 15.09.2017

### FOREWORD

Health Professions and practice is a complex interplay of Knowledge, Clinical Skills & Acumen, Communication, Attitude, Inter- Professional behavior and is largely dependent on strong Ethical values. India, as one of the major stakeholders towards contribution of world's health care, offers a major share of health professionals across the globe. Hence; more so than ever; it needs a curriculum which is better aligned with Health professional attributes that are locally relevant and globally adaptive. This realization; though has struck every health professional of our country; the efforts to effectively deal with the issue was sparsely articulated in its entirety. Teaching and learning of medical ethics, behavioral science, communication skills, and managerial skills have not received due attention in the existing medical curriculum. The proposed AETCOM module is a manifestation of this realization that endeavors to strike a balance between the five identified roles of an 'Indian Medical Graduate (IMG)' viz; Clinician, Leader & Member of health care team, Communicator, Life- long learner and Professional; right from the 1st professional year of training.

The entire concept of AETCOM module lies on the fundamental principle that changing a person's attitude can change his or her behavior. The Cognitive components of attitudes are more fundamental and constant over time and more closely connected to basic values. Behavioural attitudes are manifestations of underlying cognitive and affective attitudes. Ethical dimensions play a crucial role in behavioral evolution and the basic building block of good communication is the feeling that every human being is unique and of value.

There are many new key areas recommended in the AETCOM module that are identified for implementation across the entire duration of the course. It is hoped that the successful implementation of the AETCOM modules will be forerunner of the transition to competency based undergraduate medical education program envisaged by the Medical Council of India. This booklet and other electronic resources provide background concept, session guidelines and other resources for these sessions that will be useful for all faculty involved in conducting these sessions. These are conceptual frameworks only and Institutions and faculty are at liberty to make modifications while implementing the same at their own settings.

It is genuinely expected that this module plays a vital role in providing a coherent picture of how Attitude, Communication and Bioethics can be integrated within medical curriculum and also inspire medical teachers to make it more meaningful and consequential. The effort is surely a new vista to Medical education making it more comprehensive and relevant to health needs of the society.

(Dr. Vedprakash Mishra) Chancellor, Krishna Institute of Medical Sciences (Deemed University), Karad Chairman, National Medical Education Board, IMA Headquarters, New Delhi Pro-Chancellor, Datta Meghe Institute of Medical Sciences (Deemed University), Nagpur Honorary Director, Centre for Health Sciences Education Policy and Planning, DMIMS(DU), Nagpur

DR. (MRS.) REENA NAYYAR SECRETARY I/C



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iktely & 14] | DVJ & 8] }kjck Q4 & 1 uA fnYyk&110 077 **MEDICAL COUNCIL OF INDIA** Pocket- 14, Sector- 8, Dwarka Phase - 1 New Delhi-110077 njkk\*k : 25365075 Phone :25365075 Phone :25365075 QDI : 0091-11-25367014 Fax : 0091-11-25367014 E-mail : secy-mci@nic.in Website : www.mciindia.org

#### FOREWORD

Medical education today has recognized the need to teach and evaluate professionalism as a formal concept due to increasing concerns about physicians' conflict of interest with patients and relatives and possible loss of licensure. The need of the hour is to train medical professionals in this important area of clinical practice but is often ignored. The diagnostic capability of a doctor is greatly enhanced if the doctor is able to effectively communicate with the patient and his/her relatives decreasing frustration of the doctor and patient or relatives. It has been aptly stated that "Medicine is an art whose magic and creative ability have long been recognized as residing in the interpersonal aspects of patient-physician relationship" (Hall, Roter & Rand, 1981).

Having recognized the pivotal role of effective interpersonal communication between doctor and patient in clinical training and practice, the Medical Council of India has embarked on an ambitious and robust Faculty Development Programme in which medical college teachers are trained to acquire theoretical and practical skills in teaching. The Council has also revised and remodeled the Graduate Medical Education Regulations, 1997 with emphasis on curricular reforms. Teaching curricula in various disciplines would be based on a competency based format with emphasis on domains of attitude, ethics and communication, as envisaged in the AETCOM (Attitude, Ethics and Communication) module.

The AETCOM (Attitude, Ethics and Communication) module was prepared by the Academic Cell of the Council under the inspiring leadership of Dr. Ved Prakash Mishra, Chairman, Academic Committee and ably supported by Dr. M. Rajalakshmi, Academic Cell and the members of the Reconciliation Board headed by Dr. Avinash Supe to guide medical institutions and faculty to acquire the much needed competencies in the attitude, ethics and communication domains. I am extremely grateful to all of them for their painstaking efforts in giving shape to such a well structured document and congratulate them for the same. I am sure effective implementation of the revised Graduate Medical Education Regulations would go a long way in improving the standards of medical education in the country.

Dr. Reena Nayyar



# Attitude, Ethics & Communication (AETCOM) competencies

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#### PREFACE

The Medical Council of India has prepared revised Graduate Medical Education Regulations 2017 and competency based UG curricula, accompanied by guidance for its implementation. In response to this, every medical college needs to develop the capacity to adapt to the requirements of the new guidelines. Earlier experience with implementation of curricular changes suggests that a carefully managed, sustainable approach is necessary to ensure that every college has access to these new skills and knowledge. Faculty development has been seen to play a key role in the implementation and sustenance of any curricular reforms.

The Medical Council of India has decided to implement Attitude, Ethics and Communication module (AETCOM) in all medical schools across the country over the next two years. It is against this backdrop that the AETCOM module is prepared along with facilitators guide. This activity has been supported wholeheartedly by the President of Medical Council of India, Dr. Jayshree Mehta and under the inspiring guidance of Dr. Ved Prakash Mishra, Chairman, Academic Committee and whole hearted support of Dr. Reena Nayyar, Secretary-in-charge, Medical Council of India. There are many new key areas recommended in the AETCOM module that were identified for implementation across the entire duration of the course. It is hoped that the successful implementation of the AETCOM module would be the forerunner of the transition to competency based undergraduate medical education program envisaged by the Medical Council of India.

This booklet and other electronic resources provide background concept, session guidelines and other resources for these sessions. These will be useful for all faculty involved in conducting these sessions. These are conceptual frameworks only and institutions and faculty are at liberty to make modifications while implementing the same at their own settings.

It is proposed that the existing network of MCI Nodal and Regional Centers and Medical Education Units of all medical colleges will be the torchbearers of this transformational change. We hope that such a change will significantly impact the quality of community health and patient care in our country.

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#### Attitude, Ethics and Communication (AETCOM) Competencies

# for the Indian Medical Graduate Preamble/Concept

The overall goal of undergraduate medical education program as envisaged in the revised Graduate Medical Education Regulations - 2017 is to create an "Indian Medical Graduate" (IMG) possessing requisite knowledge, skills, attitudes, values and responsiveness, so that she or he may function appropriately and effectively as a physician of first contact of the community while being globally relevant. In order to fulfill this goal, the IMG must be able to function appropriately, ethically and effectively in her/his roles as clinician, leader and member of the health care team and system, communicator, lifelong learner and as a professional. In order to effectively fulfill the above mentioned roles, the IMG must obtain a set of competencies at the time of graduation. In order to ensure that training is in alignment with the goals and competencies, Medical Council of India has proposed new teaching learning approaches including a structured longitudinal programme on attitude, ethics and communication.

Role modelling and mentoring associated with classical approach to professional apprenticeship has long been a powerful tool. This approach alone is no longer sufficient for the development of a medical professional. The domains of attitude and communications with emphasis on ethics therefore need to be taught directly and explicitly throughout the undergraduate curriculum. The two major aspects of teaching professionalism include explicit teaching of cognitive base and stage appropriate opportunities for experiential learning and reflection throughout the curriculum.

AETCOM module has been prepared as a guide to facilitate institutions and faculty in implementing a longitudinal program that will help students acquire necessary competence in the attitudinal, ethical and communication domains. It offers framework of competencies that students must achieve. It also offers approaches to teaching learning methods. However, it is a suggested format and institutions can develop their own approaches to impart these competencies.

### How to use this document

This document is a guide to facilitate institutions and faculty in implementing a longitudinal program that will help students acquire necessary competence in the attitude, ethics and communication domains. The purpose of this program is to allow the graduate to function in roles envisaged in the revised Graduate Medical Education Regulations, 2017 (GMR 2017). The revised GMR 2017 document creates roles for the graduate that goes beyond the traditional knowledge and skill components. In particular, it adds four roles – leader and member of the health care team, communicator, life-long learner and professional - which call for learning and skills not addressed by the traditional syllabi.

The document is divided into the following:

- Section I: contains an extract of the goals, roles and universal competencies as envisaged in the GMR 2017 document. This is the base document upon which all learning in the undergraduate years must be based and lists the final competencies that all students must achieve.
- 2. Section II: contains suggested teaching modules for each professional year including resources cases and methods to teach.
- 3. Section III: contains a list of additional non-core competencies that form a desirable set of learning.
- 4. **Section IV**: is a competency log that contains a list of skills that may be acquired prior to graduation. These skills are best imparted in a simulated setting (usually involving standardized patients). They are also best done progressing in complexity over time. For example, a skill on communicating treatment options may be acquired at different levels of complexities spread over phases before finally being certified.
- 5. Section V: contains formative elements that are observable by tutors/mentors/guides and marked over time with appropriate feedback in a non-punitive fashion.
- 6. **Appendix 1**: consists of the entire set of competencies as approved by the Academic Committee of the Medical Council of India.
- 7. **Appendix 2**: provides a modified communication skill rating tool adapted from the Kalamazoo consensus.

#### **Definitions**

1. Goal: A projected state of affairs that a person or system plans to achieve.

In other words: Where do you want to go? or What do you want to become?

**2. Competency:** The habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served.

In other words: What should you have? or What should have changed?

**3. Objective:** Statement of what a learner should be able to do at the end of a specific learning experience.

In other words: What the Indian Medical Graduate should know, do, or behave.

Knowledge	Skill	Attitude/communicate
Enumerate	Identify	Counsel
List	Demonstrate	Inform
Describe	Perform under supervision	Demonstrate understanding of
Discuss	Perform independently	
Differentiate	Document	
Define	Present	
Classify	Record	
Choose	Interpret	
Elicit		
Report		

#### Action Verbs used in this document

#### Note:

- 1. Specified essential competencies only will be required to be performed independently at the end of the final year MBBS.
- 2. The word 'perform' or 'do' is used ONLY if the task has to be done on patients or in laboratory practicals in the pre/para- clinical phases.
- 3. Most tasks that require performance during undergraduate years will be performed under supervision.
- 4. If a certification to perform independently has been done, then the number of times the task has to be performed under supervision will be indicated in the last column.

Lecture	Any instructional large group method including traditional lecture and interactive lecture
Small group discussion	Any instructional method involving small groups of students in an appropriate learning context
DOAP (Demonstration- Observation - Assistance - Performance)	A practical session that allows the student to observe a demonstration, assist the performer, perform in a simulated environment, perform under supervision or perform independently
Skill assessment	A session that assesses the skill of the student including those in the practical laboratory, skills lab, skills station that uses mannequins/ paper case/simulated patients/real patients as the context demands
Core	A competency that is necessary in order to complete the requirements of the subject (traditional must know)
Non-Core	A competency that is optional in order to complete the requirements of the subject (traditional nice (good) to know/ desirable to know)
National Guidelines	Health programs as relevant to the competency that are part of the National Health Program

#### Explanation of terms used in this document

### **Domains of learning**

К	Knowledge
S	Skill
А	Attitude
С	Communication

К	Knows	A knowledge attribute - Usually enumerates or describes
KH	Knows how	A higher level of knowledge - is able to discuss or analyse
S	Shows	A skill attribute: is able to identify or demonstrate the steps
SH	Shows how	A skill attribute: is able to interpret/ demonstrate a complex procedure requiring thought, knowledge and behavior
Р	Performs	Mastery for the level of competence - When done
	(under	independently under supervision a pre-specified number of
	supervision or	times - certification or capacity to perform independently
	independently)	results

#### Levels of competency

#### Note:

In the table of competency - the highest level of competency acquired is specified and implies that the lower levels have been acquired already. Therefore, when a student is able to SH - Show how - an informed consent is obtained - it is presumed that the preceding steps - the knowledge, the analytical skills, the skill of communicating have all been obtained.

It may also be noted that attainment of the highest level of competency may be obtained through steps spread over several subjects or phases and not necessarily in the subject or the phase in which the competency has been identified.

#### **Teaching Learning Methods recommended**

#### **Guidelines for Case Discussion**

A hybrid problem-oriented approach is one of the most effective ways for students to explore the various facets of "real life issues" that will confront them in their careers. In addition to problem solving skills, case discussions promote collaborative learning, team work, reflection and self-directed learning. The cases presented in this booklet represent competencies that lend themselves best to this form of learning.

The figure on the following page explains the suggested format of the hybrid problem-based learning method:

- 1. Two or more learning sessions are recommended for each session with ample time for self-directed learning and other learning activities between each session.
- 2. A case is introduced into a small group and the facilitator facilitates a small group discussion where,
  - a. initial reactions of the group to the case is obtained
  - b. the underlying ethical, legal and societal principles of the case are elicited
  - c. learning objectives for the case are developed
  - d. learning tasks are assigned for members of the learning groups
  - e. learning resources are identified
    - The suggested location for such a session is a small group discussion area which requires a small table with seating for 8 - 10 students
    - o Suggested duration for such a session is 1 hour
    - A board with chalk or marker is also required
- 3. Learning occurs in between sessions by the learners through following:
  - o Self-directed learning by study of identified learning resources
  - o Self-directed learning through study of online learning resources
  - o Identification of legal, ethical and social precedents for the given settings
  - Obtaining opinion from seniors in the profession on their impressions on the setting
- 4. Reinforcement of the fundamental concepts underlying the case can be done through a large group learning session (lecture or equivalent) in between the small group sessions.

5. In the second session, the small group discussion is focussed on closure of the case (or the part of the case) for which learning objectives were identified for in the first session. The facilitators may guide the discussion based on the ethical, legal, societal and communication aspects of the case. The group discusses the case, based on the learning done in between the session and provides suggestions and alternatives on the approach for doctors to follow. It must be reiterated that there may not be one correct way to resolve a case. The approach will be to allow students to reflect, make a choice and defend their choice, based on their values and learning.



The Hybrid PBL model suggested for ATCOM Cases

#### **Student narrative**

The student narrative is a learning method that focuses on the following skills:

- a. Elicit, observe and record data.
- b. Reflect on the data at a higher level of thinking and derive opinions and conclusions.
- c. Communicate the observations and conclusions in a written and verbal form and expand on and defend the conclusions with colleagues and teachers.
- d. Form new experiences and conclusions based on this discussion.

# **Section I**

# Extract from the Graduate Medical Education Regulations, 2017

- 1. The undergraduate medical education program is designed with a **goal** to create an "Indian Medical Graduate" (IMG) possessing requisite knowledge, skills, attitudes, values and responsiveness, so that he or she may function appropriately and effectively *as a doctor of first contact of the community* while being globally relevant.
- 2. In order to fulfill this goal, the IMG must be able to function in the following **ROLES** appropriately and effectively:
  - **2.1. Clinician** who understands and provides preventive, promotive, curative, palliative and holistic care with compassion.
  - **2.2. Leader and member of the health care team and system** with capabilities to collect, analyze, synthesize and communicate health data appropriately.
  - 2.3. Communicator with patients, families, colleagues and community.
  - **2.4. Lifelong learner** committed to continuous improvement of skills and knowledge.
  - **2.5. Professional**, who is committed to excellence, is ethical, responsive and accountable to patients, community and profession.

### Global Attitude, Ethics and Communication Competencies addressed in the roles of an Indian Medical Graduate

**3. Competencies:** Competency based learning would include designing and implementing medical education curriculum that focuses on the desired and observable ability in real life situations. In order to effectively fulfill the roles as listed in item 2 above, the Indian Medical Graduate would have obtained the following set of competencies at the time of graduation:

# 3.1. Clinician, who understands and provides preventive, promotive, curative, palliative and holistic care with compassion

- 3.1.1. Demonstrate knowledge of normal human structure, function and development from a molecular, cellular, biologic, clinical, behavioral and social perspective.
- 3.1.2. Demonstrate knowledge of abnormal human structure, function and development from a molecular, cellular, biological, clinical, behavioural and social perspective.
- 3.1.3. Demonstrate knowledge of medico-legal, societal, ethical and humanitarian

principles that influence health care.

- 3.1.4. Demonstrate knowledge of national and regional health care policies including the National Health Mission (NHM), frameworks, economics and systems that influence health promotion, health care delivery, disease prevention, effectiveness, responsiveness, quality and patient safety.
- 3.1.5. Demonstrate ability to elicit and record from the patient, and other relevant sources including relatives and caregivers, a history that is complete and relevant to disease identification, disease prevention and health promotion.
- 3.1.6. Demonstrate ability to elicit and record from the patient, and other relevant sources including relatives and caregivers, a history that is contextual to gender, age, vulnerability, social and economic status, patient preferences, beliefs and values.
- 3.1.7. Demonstrate ability to perform a physical examination that is complete and relevant to disease identification, disease prevention and health promotion.
- 3.1.8. Demonstrate ability to perform a physical examination that is contextual to gender, social and economic status, patient preferences and values.
- 3.1.9. Demonstrate effective clinical problem solving, judgment and ability to interpret and integrate available data in order to address patient problems, generate differential diagnoses and develop individualized management plans that include preventive, promotive and therapeutic goals.
- 3.1.10. Maintain accurate, clear and appropriate records of the patient in conformation with legal and administrative frameworks.
- 3.1.11. Demonstrate ability to choose the appropriate diagnostic tests and interpret these tests based on scientific validity, cost effectiveness and clinical context.
- 3.1.12. Demonstrate ability to prescribe and safely administer appropriate therapies including nutritional interventions, pharmacotherapy and interventions based on the principles of rational drug therapy, scientific validity, evidence and cost that conform to established national and regional health programs and policies for the following:
  - a. Disease prevention,
  - b. Health promotion and cure,
  - c. Pain and distress alleviation, and
  - d. Rehabilitation and palliation.

- 3.1.13 Demonstrate ability to provide a continuum of care at the primary and/or secondary level that addresses chronicity, mental and physical disability.
- 3.1.14 Demonstrate ability to appropriately identify and refer patients who may require specialized or advanced tertiary care.
- 3.1.15 Demonstrate familiarity with basic, clinical and translational research as it applies to the care of the patient.

#### 3.2. Leader and member of the health care team and system

- 3.2.1 Work effectively and appropriately with colleagues in an inter-professional health care team respecting diversity of roles, responsibilities and competencies of other professionals.
- 3.2.2 Recognize and function effectively, responsibly and appropriately as a health care team leader in primary and secondary health care settings.
- 3.2.3 Educate and motivate other members of the team and work in a collaborative and collegial fashion that will help maximize the health care delivery potential of the team.
- 3.2.4 Access and utilize components of the health care system and health delivery in a manner that is appropriate, cost effective, fair and in compliance with the national health care priorities and policies, as well as be able to collect, analyze and utilize health data.
- 3.2.5 Participate appropriately and effectively in measures that will advance quality of health care and patient safety within the health care system
- 3.2.6 Recognise and advocate health promotion, disease prevention and health care quality improvement through prevention and early recognition: in a) life style diseases, and b) cancer in collaboration with other members of the health care team.

#### 3.3. Communicator with patients, families, colleagues and community

- 3.3.1 Demonstrate ability to communicate adequately, sensitively, effectively and respectfully with patients in a language that the patient understands and in a manner that will improve patient satisfaction and health care outcomes.
- 3.3.2 Demonstrate ability to establish professional relationships with patients and families that are positive, understanding, humane, ethical, empathetic, and

trustworthy.

- 3.3.3 Demonstrate ability to communicate with patients in a manner respectful of patient's preferences, values, prior experience, beliefs, confidentiality and privacy.
- 3.3.4 Demonstrate ability to communicate with patients, colleagues and families in a manner that encourages participation and shared decision-making.

#### 3.4. Lifelong learner committed to continuous improvement of skills and knowledge

- 3.4.1 Demonstrate ability to perform an objective self-assessment of knowledge and skills, continue learning, refine existing skills and acquire new skills.
- 3.4.2 Demonstrate ability to apply newly gained knowledge or skills to the care of the patient.
- 3.4.3 Demonstrate ability to introspect and utilize experiences, to enhance personal and professional growth and learning.
- 3.4.4 Demonstrate ability to search (including through electronic means), and critically evaluate the medical literature and apply the information in the care of the patient.
- 3.4.5 Be able to identify and select an appropriate career pathway that is professionally rewarding and personally fulfilling.

# 3.5. Professional who is committed to excellence, is ethical, responsive and accountable to patients, community and the profession

- 3.5.1 Practice selflessness, integrity, responsibility, accountability and respect.
- 3.5.2 Respect and maintain professional boundaries between patients, colleagues and society.
- 3.5.3 Demonstrate ability to recognize and manage ethical and professional conflicts.
- 3.5.4 Abide by prescribed ethical and legal codes of conduct and practice.
- 3.5.5 Demonstrate a commitment to the growth of the medical profession as a whole.

#### Assessment of skills related to Attitude, Ethics and Communication

Assessment is a vital component of competency based education. In addition to making the pass/fail decisions, a very important role of assessment is to provide feedback to the learner and help him/her to improve learning. The assessment in AETCOM nodule has been designed with this purpose. The teachers should use this opportunity to observe the performance and provide feedback based on their observations. In case a student has demonstrated a performance, which is considered below expectation, corrective action including counseling should be initiated. Many of the tools in this module may appear subjective but coupled with the experience of the assessor, they will serve a very useful purpose.

# **Section II**

# Learning modules for Professional year I

Number of modules: 5 Number of hours: 34

## Module 1.1: What does it mean to be a doctor?

#### Background

It is important for new entrants to get a holistic view of their profession, its ups and downs, its responsibilities and its privileges. It is important to start this discussion early in their careers when their minds are still fresh with the thrill of joining medical school. Such a discussion will help them remember the big picture through the program and remind them why they have chosen to be doctors.

#### **Competencies addressed**

The student should be able to:	
1. Enumerate and describe professional qualities and roles of a physician	
2. Describe and discuss the commitment to lifelong learning as an important part of physician growth	
3. Describe and discuss the role of a physician in health care system	KH
4. Identify and discuss physician's role and responsibility to society and the community that she/ he serves	KH

#### **Learning Experience**

Year of study: Professional year 1

**Hours:** 8 (6 hours + 2 hours self-directed learning)

- i. Exploratory session- 1 hour
- ii. Facilitated panel discussion 2 hours
- iii. Self-directed learning 2 hours
- iv. Introductory visit to the hospital 2 hours
- v. Discussion and closure of case 1 hour
- An exploratory session with the students to find out (a) why they chose to become doctors, (b) what do they think are the privileges and the responsibilities of the profession, (c) what do they expect from society and what do they think society expects from them, and (d) what will they have to do and give up in order to meet their own and society's expectations. This is preferably done in a small group discussion.

- 2. A facilitated panel discussion involving doctors who are at different stages of their careers (senior, midlevel, young) during which these doctors share their experiences and also answer questions from the students.
- Self-directed learning where students write a report from reflections based on sessions
  1 & 2 and on other reading materials, TV series, movies etc. that they have chosen from the lay press about doctors' experiences.
- 4. Introductory visit to the hospital / community medical centres
- 5. A closure session with students to share their reflections based on 1, 2, 3 and 4 that includes their plans for the next 5 years in order to fulfill their professional and personal roles as doctors.
- 6. A coat ceremony in the Foundation Course may be considered. A white coat ceremony is held in many institutions, as a symbolic transition of the medical student prior to their first day of exposure to clinical teaching, in order to emphasize the importance of their new role as budding doctors.

#### Assessment

- 1. Formative: not required
- 2. Summative: not required

#### Resources

- 1. Whitcomb ME. What does it mean to be a physician? Acad Med.2007; 82: 917-8.
- 2. Eisenberg C. It is still a privilege to be a doctor? N Engl J Med 1986; 314:1113-1114.
- 3. Ofri D. Neuron overload and the juggling doctor. The Lancet 2010; 376: 1820 21.

### Module 1.2: What does it mean to be a patient?

#### Background

Doctors deal with human suffering throughout their professional careers. A balanced approach to the patient care experience requires an understanding of patients, illnesses, their concepts of suffering, coping mechanisms, the role of the doctor, an exploration of empathy vs equanimity and the difference between healing and curing. An introduction to this fundamental but complex field is important in the first Professional year. An introductory experience will allow students to keep the patient experience in perspective during their learning.

#### **Competencies addressed**

The student should be able to:	Level
1. Enumerate and describe professional qualities and roles of a physician	КН
2. Demonstrate empathy in patient encounters	SH

#### **Learning Experience**

Year of study: Professional year 1

**Hours:** 8 (6 hours + 2 hours self-directed learning)

- i. Exploratory session 2 hours
- ii. Hospital visit 2 hours
- iii. Self-directed learning 2 hours
- iv. Discussion and closure of case 2 hours
- 1. An exploratory session with the students enquiring from them about their views on health, disease and suffering. Discussion could involve their personal ill health or involving someone they know among their families and friends. How did that experience affect them? What do they believe patients feel and go through? How does it affect patient's behaviour, outlook and expectations?
- 2. Students are assigned to patients in the hospital, interview them about their experiences, reactions, emotions, outlook and expectations.
- Self-directed learning where students write a report from reflections based on sessions
  1 & 2 and on other readings, TV series movies etc.
- 4. A closure session with students to share their reflections based on 1, 2 and 3.

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation and presentation (written and oral).
- 2. Summative: SAQ

## Module 1.3: The doctor-patient relationship

#### Background

The doctor-patient relationship is the cornerstone to effective patient care. This session builds on the previous two sessions which address doctors and patients and attempts to explore the fundamental basis of the doctor-patient contract, its rules, boundaries and duties. It provides an introduction to the nature of relationship, importance of communication, honesty, transparency, shared responsibility, equality and vulnerability. This introductory session, though complex, will provide an overview for the student to provide them with a perspective on the doctor-patient relationship throughout their years of study.

#### **Competencies addressed**

The student should be able to:	Level
1. Enumerate and describe professional qualities and roles of a physician	KH
2. Demonstrate empathy in patient encounters	SH

#### **Learning Experience**

Year of study: Professional year 1

Hours: 7 hours (5 hours + 2 hours of self-directed learning)

- i. Large group session- 1 hour
- ii. Self-directed learning 2 hours
- iii. Interactive discussions 2 hours
- iv. Discussion and closure 2 hours
- 1. Anchoring a large group session emphasising the fundamentals of the doctor- patient relationship (1 hour).
- 2. Self-directed/Guided learning by students on the doctor-patient relationship that includes learning from resources, lay press, media and movies (2 hours).
- 3. An interactive discussion in a small group, based on session 1, with illustrative cases. Examples of cases that can be used are provided in the resources section (2 hours) (or) a patient-doctor encounter observation with checklist may be used.
- 4. A closure session with reflection by the students, based on items 1, 2 and 3.

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions. A written critique of the situations discussed in item 2 may be used for formative assessment.
- 2. **Summative:** Short questions for example a) rights of patients, b) responsibilities of patients, c) duties of doctors, and d) boundaries of the doctor-patient relationship.

#### Resources

1. http://www.cpso.on.ca/policies-publications/the-practice-guide-medicalprofessionalism-and-col/principles-of-practice-and-duties-of-physicians

#### **Case for discussion 1:**

A 53 year old man is seen by a cardiologist for chest pain lasting for a few minutes on accustomed exercise for the past 3 weeks. After a detailed history and physical examination, the doctor orders an ECG which was normal. He further orders an exercise stress test which showed reversible ischemia. The doctor orders an angiogram. At the time, the patient requests that he would like to have a second opinion. The cardiologist explains that he has done everything correctly and that the patient indeed requires an angiogram. The patient tells him that he cannot make a decision unless he talks to his family doctor of 20 years. The cardiologist is offended and tells the patient that he does not wish to see the patient any longer.

#### **Points for discussion:**

- 1. Trust in the doctor-patient relationship.
- 2. Rights of a patient, Duties of a doctor.
- 3. Does the request for a second opinion provide sufficient grounds to terminate the doctor-patient relationship?

#### **Case for discussion 2:**

A young doctor has been taking care of an 86 year old woman for the past 2 years. She had a fall 2 years ago and has been mostly bed ridden. She lives alone with just a care taker and her children are abroad. She requires preventive care mostly and the doctor makes house visits once a week. The doctor spends time talking to her during each
visit and makes her feel comfortable. One day during such a visit, the patient expresses the view that her children have been ungrateful to her and that she intends to call her lawyer today and divide her assets between the doctor and the caretaker after her death. What should the doctor do?

#### **Points for discussion:**

- 1. Boundaries in the doctor-patient relationship.
- 2. Trust and vulnerability in doctor-patient relationship.

#### **Resources:**

- 1. AMA Code of Medical Ethics: <u>https://www.ama-assn.org/delivering</u> care/amacode-medical-ethics (for case 1)
- 2. <u>https://www.dovepress.com/getfile.php fileID=1351</u> (for case 2)

## Module 1.4: The foundations of communication - 1

#### Background

Communication is a fundamental prerequisite in the medical profession and bedside clinical skills is crucial in ensuring professional success for doctors. This module provides students with an introduction to doctor-patient communication. The Kalamazoo consensus statement<sup>1</sup> provides a working model of teaching communication skills and may be used to impart communication skills. The five 'A's elements of behaviour change model may also be used. Effective listening, verbal and nonverbal communication and creating respect in patient encounters would be the skills that would be introduced.

#### **Competency addressed**

The student should be able to:	Level
Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non-judgmental and empathetic manner	SH

#### **Learning Experience**

Year of study: Professional Year 1

**Hours:** 7 hours (5 hours + 2 hours self-directed learning)

- i. Large group session- 2 hours
- ii. Self-directed learning 2 hours
- iii. Small group discussions 2 hours
- iv. Discussion and closure 1 hour

#### **Contents:**

This module includes 3 interdependent learning sessions:

- 1. Introductory large group sessions on the principles of communication.
- 2. Self-directed/Guided learning by students on the importance and techniques of effective communication.
- 3. Small group sessions on improving communication. These sessions can include either videos or role play highlighting common mistakes in patient doctor communication and allowing students to identify these mistakes and discussing on how to correct them. Situations that can be used include: a) a noisy ambience with a distracted doctor

who is multitasking, b) lack of eye contact, c) doctor who keeps on interrupting patients and not listening, d) doctor who talks down to patients etc.

4. Closure session with reflection by students in a small group based on sessions 1, 2 and 3 and with emphasis on learning done and future directions.

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions. A written critique of the situations discussed in item 3 may be used for formative assessment.
- 2. Summative: may be deferred for later phases.

#### **Resource:**

1. Makoul G. Essential elements of communication in medical encounters: the Kalamazoo consensus statement. Acad Med. 2001; Apr; 76(4): 390-3.

### Module 1.5: The cadaver as our first teacher

#### Background

Medical students enter college and their first and lasting encounter is with the cadaver. Respect for cadaver as a teacher translates later into respect for human beings as teachers and a lifelong respect for learning. Throughout the world the emphasis on "humanizing" the cadaver with respect as first patient or first teacher has gained momentum.

#### **Competency addressed**

The student should be able to:	Level
Demonstrate respect and follows the correct procedure when handling cadavers and other biologic tissues	SH

#### **Learning Experience**

Year of study: Beginning and end of Professional year 1

Hours: 4 (2+2) hours

- i. Opening session- 2 hours
- ii. Closing session 2 hours

#### **Contents:**

- 1. An initial introductory session (large or small group) should be on the importance of biologic tissues and cadavers in their learning. The discussion should focus on the fact that some of these cadavers were unclaimed but also many of them are an anatomic gift by families; respect for donor families, cadavers and tissues is important and must be respected. The session should include safe and clean handling and disposal of biologic tissues (2 hours).
- 2. A session at the end of phase is a small group or large group discussion with reflective presentations by students on how the cadaver helped them to learn, their experience with dissection etc. These sessions should allow the students to display their creativity and may include prose, poetry, sketches etc. An example of such a project is found in the resources section (2 hours).

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions. The respect and the manner in which students handle biologic tissues throughout the phase may be part of the overall formative assessment of the student.
- 2. Summative: may not be required.

**Resource:** http://medicine.yale.edu/education/donation/reflections/ (An example of the project is found here).

## Learning modules for Professional Year II

Number of modules: 8 Number of hours: 37

## Module 2.1: The foundations of communication - 2

#### Background

Communication is a fundamental prerequisite of the medical profession and beside skills is crucial in ensuring professional success for doctors. This module continues to provide an emphasis on effective communication skills. During professional year II, the emphasis is on active listening and data gathering.

#### **Competency addressed**

The student should be able to:	Level
Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non- judgmental and empathetic manner	SH

#### Learning Experience:

Year of study: Professional year 2

**Hours:** 5 (1 + 2 +1+1)

- i. Introductory small group session 1 hour
- ii. Focused small group session 2 hours
- iii. Skills lab session 1 hour
- iv. Discussion and closure 1 hour

#### **Contents:**

This module includes 2 interdependent learning sessions:

- 1. Introductory small group session on the principles of communication with focus on opening the discussion, listening and gathering data.
- 2. Focused small group session with role play or videos where the students have an opportunity to observe, criticise and discuss common mistakes in opening the discussion, listening and data gathering.
- 3. Skills lab sessions where students can perform tasks on standardised or regular patients with opportunity for self critique, critique by patient and by the facilitator.

#### Assessment

- 1. **Formative:** Participation in session 2 and performance in session 3 may be used as part of formative assessment.
- 2. Summative: may be deferred.

#### **Resources:**

- 1. Makoul G. Essential elements of communication in medical encounters: the Kalamazoo consensus statement. Acad Med. 2001; Apr; 76(4): 390-3.
- 2. Hausberg M. Enhancing medical students' communication skills: development and evaluation of an undergraduate training program. BMC Medical Education 2012; 12:16.

## Module 2.2 The foundations of bioethics

#### Background

An introductory session in a large group that provides an overview of the evolution and the fundamental principles of bioethics including the cardinal pillars of ethics viz., autonomy, beneficence, non-maleficence and justice.

#### **Competencies addressed**

The student should be able to:	Level
1. Describe and discuss the role of non-maleficence as a guiding principle in patient care	КН
2. Describe and discuss the role of autonomy and shared responsibility as a guiding principle in patient care	КН
3. Describe and discuss the role of beneficence of a guiding principle in patient care	КН
4. Describe and discuss the role of a physician in health care system	KH
5. Describe and discuss the role of justice as a guiding principle in patient care	КН

#### Learning Experience

Year of study: Professional year 2

Hours: 2 large group session - 2 hours

#### **Contents:**

This module is a large group learning session that can be made interactive by illustrative examples.

#### Assessment

Summative: Short notes on a) Autonomy b) Beneficence c) Non-maleficence

#### **Resource:**

A review of the four principles of bioethics is found here: <u>http://archive.journalchirohumanities.com/Vol%2014/JChiroprHumanit 2007 v14 34-40.pdf</u>

## Module 2.3: Health care as a right

#### Background

This session is aimed at introducing students to health care systems, their access, equity in access, the impact of socio-economic situations in determining health care access and the role of doctors as key players in the health care system.

#### **Competency addressed**

The student should be able to:	Level
Describe and discuss the role of justice as a guiding principle in patient care	KH

#### **Learning Experience**

**Year of study:** Professional year 2

Hours: 2

i. Participatory student seminar - 2 hours

#### **Contents:**

This module may be done as a participatory student seminar with debates on the more controversial issues to increase a reflective process.

Focus may be on:

- 1. Is health care a right?
- 2. What are the implications of health care as a right?
- 3. What are the social and economic implications of health care as a right?
- 4. What are the missing links? (see resource 2 for a brief overview) and
- 5. What are the implications for doctors?

#### Assessment

Summative: Short note on barriers to implementation of health care as a universal right.

#### Resources

- 1. The Universal Declaration of Human Rights. http://www.un.org/en/documents/udhr/
- 2. Missing links in universal health care. http://www.thehindu.com/ opinion/lead/missing-links-in-universal-health-care/article6618667.ece

## Module 2.4: Working in a health care team

#### Background

This session is aimed at introducing students to health care systems and their functioning. It allows students to "tag along" with members of health care teams, observe their work and gain experience about their perspectives. It is hoped that this experience will help students to understand the need for collaborative work in health care, how each member of the health care team is important and also develop respect.

#### **Competencies addressed**

The student should be able to:	Level
1. Demonstrate ability to work in a team of peers and superiors	SH
2. Demonstrate respect in relationship with patients, fellow team members, superiors and other health care workers	SH

#### **Learning Experience**

Year of study: Professional year 2

**Hours:** 6 hours (4 hours "tag along" + 2 hours discussion)

- i. "Tag along" session in hospital- 2 x 2 hours
- ii. Small group discussion session 2 hours

#### **Contents:**

This module may be done as two interdependent sessions:

- 1. A "tag along" session where students spend time with other health care workers including nurses, technicians and others, observe their work, their interactions, conduct a small interview with them and write a narrative based on this interview.
- 2. A small group discussion which is based on the students' observations, experiences, reflections and inferences and what must be done by them to work as an integral part of the health care team.

#### Assessment

Formative: Student participation in session 2 with assessment of submitted narrative.

## **Module 2.5: Bioethics continued** – Case studies on patient autonomy and decision making

#### Background

The important parts of ethical care of the patient are best learnt in a hybrid problem-based format with additional lectures and other sessions that allow students to learn collaboratively with different learning styles. A guide for case discussion is provided in the resources section of this module and may be used as a guide for other modules. The key element is that students remain in the same group with the same facilitator since groups mature in their learning over time.

#### **Competency addressed**

The student should be able to:	Level
Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to patient autonomy, patient rights and shared responsibility in health care	KH

#### **Learning Experience**

Year of study: Professional year 2

Hours: 6

- i. Introduction and group formation 1 hour
- ii. Case introduction 1 hour
- iii. Self-directed learning 2 hours
- iv. Anchoring lecture 1 hour
- v. Case Resolution 1 hour

#### **Case: The Cover Up**

You evaluate Mrs. Lakshmi Srinivasan who is a 48 year old woman presenting with lymphadenopathy. She had been complaining of mild fever and weight loss for the past 4 -5 months. Examination of the neck shows large rubbery lymph nodes that are present also in the axilla and the groin. There is a palpable spleen. She is accompanied by her caring husband.

Lakshmi undergoes a lymph node biopsy and the pathologist calls you and tells you that she has a lymphoma. That evening Mr. Srinivasan comes in first into your office and leaves the report on your table. As you read the description you realise that the final diagnosis has been altered to Tuberculosis by whitening out the pathologist's report. When you look up he tells you –"Sir, I googled lymphoma - it is almost like a cancer. My wife can't handle that diagnosis. She has always been a worried frightened person. I want you to tell my wife that she had TB. She is waiting outside, doctor. I thought I will call her in after I had a chat about this with you".

#### **Points for discussion:**

- 1. Does the patient have a right to know their diagnosis?
- 2. What should the patient be told about their diagnosis, therapy and prognosis?
- 3. How much should be told to a patient about their illness?
- 4. Are there exceptions to full disclosure? Can family members request withholding of information from patient?

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. **Summative:** Short questions on: 1) Define patient autonomy, 2) Contrast autonomy and paternalism, 3) What are the responsibilities of patients and doctors in shared decision making? 4) What is full and reasonable disclosure?

The suggested location, duration and requirements are as in item 2.

Once the case (or part of the case) is resolved, the next case (or the next part of the case) is introduced.

## Module 2.6: Bioethics continued: Case studies on autonomy and decision making

#### Background

This introduces the student to further issues in autonomy including competence and capacity to make decisions (also see module 2.5).

#### **Competency addressed**

The student should be able to:	Level
Identify, discuss and defend medico-legal, socio-cultural and ethical issues as they pertain to refusal of care including do not resuscitate and withdrawal of life support	КН

#### Learning Experience

Year of study: Professional year 2

#### Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### Case: Life on a machine

You are taking care of 78-year-old Mrs. Mythili who was living all alone in an apartment with only a live-in caretaker, 3 streets away from your clinic. She is a widow and her only son emigrated to the US 32 years ago. He visits her once a year. One year ago, she had a fall with a hip fracture that healed badly. She has hypertension which is reasonably controlled on medications. She continues to come to your clinic once a month. Four months ago, she spent some time talking about her sister who recently died following metastatic breast cancer. "My sister suffered a lot, Doctor - they put a tube down her throat to breathe. Even when her heart stopped they kept thumping her chest - it was awful. If I ever fall sick I don't want to go through all this. Promise me, doctor, that you won't do all of this to me. I have lived all alone since my husband died but I have lived independently - now I don't want to depend on a machine to live". You had reassured her that she would be ok and this was just the recent death of her sister affecting her. On subsequent visits she would still bring up this issue and

state that there was no use of her living as a burden to anyone and that no one should endure what her sister had undergone.

One day you get a call from the Emergency Room of the local hospital stating that Mrs. Mythili has been admitted by the caretaker. She had developed fever and shortness of breath. She was brought hypoxic to the emergency room and they had intubated her. Chest X ray revealed a large pneumonic patch. Laboratory testing revealed hyponatremia.

When you visited her she is somewhat drowsy, intubated and restrained. The nurse tells you that she is sometimes lucid; at other times not even able to recognise her son who was there since this morning. She points out at the ET and makes a pleading gesture to remove it. Her son accosts you in the hallway. He tells you that he got a call while he was traveling in Singapore and took the first flight out to be with his mom. He was very distressed at his mother's health and that he wants "everything" possible done for her. You ask him if she had ever indicated what she wanted to be done if she were to require hospitalization and intubation - he says that he used to speak to her every month on the phone and she was always cheerful and enquiring about her grandchildren but did not talk about her health.

#### **Points for discussion:**

- 1. Extent of patient autonomy.
- 2. Elements in decision making: Competency vs Capacity.
- 3. Surrogacy in decision making.
- 4. Autonomy vs beneficence.
- 5. How much does family wishes count?
- 6. Legal, ethical and social aspects of 'Do not resuscitate'.

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. Summative: Short questions on:
  - a) What determines decision making capacity and competency.
  - b) Who has the right to make decisions for a patient who cannot determine for himself.

#### **Resources:** See Module 2.5

## Module 2.7: Bioethics continued: Case studies on autonomy and decision making

#### Background

This introduces the student to further issues in autonomy including informed consent and refusal (also see module 2.5).

#### **Competency addressed**

The student should be able to:	Level
Identify, discuss and defend, medico-legal, socio-cultural and ethical issues as they pertain to consent for surgical procedures	KH

#### Learning Experience

Year of study: Professional year 2

#### Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### Case: Who is the doctor?

A 54 year old man named Mr. Surendra Patel is admitted for acute chest pain in a medical centre. His father had died of a myocardial infarction at the age of 60. Two years ago, his brother had been admitted to a hospital with a myocardial infarction and had died after complications following an angioplasty. Mr. Patel is a diabetic and is on multiple oral hypoglycemic agents with moderate control. He is a businessman with his own small industry. After initial stabilization, the patient is comfortable and pain-free after analgesics, nitrates and statins. Preliminary blood tests and ECG confirm an acute coronary event. The next morning, the senior cardiologist makes rounds and reviews the patient. "You have unstable angina, Mr. Patel and require an angiogram. You may also require either a stent or coronary bypass after the procedure. The nurse will provide you with the necessary paperwork. Please sign it and I will plan the procedure for 4.35 AM tomorrow morning.". "Doctor sahib", asked Mr. Patel, "I am not comfortable with the idea of an angiogram; my brother died on the table when an angioplasty was being done. Aren't there other tests that

you can do? I am not happy with this option". "Your brother would have had it with someone else, Mr. Patel - I have the best hands in town; nothing will happen when I do it" retorted the cardiologist. "But aren't there any other options to see what I have? Is this the only test? I have read somewhere that you can do a CT angiogram", persisted Mr. Patel. "Are you the doctor or am I the doctor?" retorted the cardiologist angrily. "If you are ready to do as I say, sign the papers and I will see you in the Cath lab tomorrow. Otherwise you are free to get discharged". He stomped out.

#### **Points for discussion:**

- 1. Extent of patient autonomy.
- 2. Informed consent and informed refusal.
- 3. Conflict between autonomy and beneficence.
- 4. What should the patient be told about a procedure?
- 5. What must the informed consent include?

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. **Summative:** Short questions on 1) What is informed consent? 2) What is informed refusal?

#### Resources

See module 2.5

# Module 2.8: What does it mean to be family member of a sick patient?

#### Background

Doctors deal with human suffering throughout their professional careers. A balanced approach to the patient care experience requires an understanding of support systems of patients, priorities coping and emotions of families, the role of the doctor, an exploration of empathy vs equanimity and the difference between healing and curing and support.

#### **Competency addressed**

The student should be able to:	Level
Demonstrate empathy in patient encounters	SH

#### Learning Experience

Year of study: Professional year 2

**Hours:** 6 (includes 2 hours of SDL)

- i. Hospital visit & interviews 2 hours
- ii. Large Group Discussions with patients' relatives 1 hour
- iii. Self-directed Learning 2 hours
- iv. Discussion and closure 1 hour
- 1. Students are assigned to patients in the hospital, interview their family about their illnesses, experience, reactions, emotions, outlook and expectations (or can be done in a controlled environment with standardised patients.
- 2. Family members of patients with different illnesses may be brought to a large group discussion with permission and an interactive discussion (based on the items outlined in option A. Can use standardised patients)
- Self-directed learning where students write a report from reflection based on sessions 1 & 2 and on other readings, TV series, movies etc.
- 4. A closure session with students to share their reflections based on 1, 2 and 3 so that it includes how they intend to incorporate the lessons learnt in patient care.

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions and submission of the written narrative.
- 2. **Summative:** Short questions on the role of doctors in the community and expectations of society form doctors.
  - e.g. 1. What is empathy? What is the role of empathy in the care of patients?

## **Learning modules for Professional Year III**

Number of modules: 5 Number of hours: 25

## Module 3.1: The foundations of communication - 3

#### Background

Communication is a fundamental prerequisite of the medical profession and beside skills is crucial in ensuring professional success for doctors. This module builds on the listening skills developed in professional year II. The Kalamazoo consensus statement provides a working model of teaching communication skills and may be used to impart communication skills. Skills, that will be introduced, should include "dealing with emotion".

#### **Competency addressed**

The student should be able to:	Level
Demonstrate ability to communicate to patients in a patient, respectful, non- threatening, non-judgmental and empathetic manner	SH

#### Learning Experience

Year of study: Professional year 3

**Hours:** 5 (1 + 2 + 2)

- i. Introductory small group session 1 hour
- ii. Focused small group session 2 hours
- iii. Skills Lab session 2 hour

#### **Contents:**

- 1. Introductory small group session on the principles of communication with focus on dealing with emotions.
- 2. Focused small group session with role play or video where students have an opportunity to observe, critique and discuss common mistakes when dealing with emotion.
- 3. Skills lab sessions where students can perform tasks on standardised or regular patients with opportunity for self critique, critique by patient and by facilitator.

#### Assessment

1. **Formative:** Participation in session 2 and performance in session 3 may be used as part of formative assessment.

2. Summative: may be deferred.

#### Resources

- 1. Makoul G. Essential elements of communication in medical encounters: the Kalamazoo consensus statement. Acad Med. 2001; Apr; 76(4): 390-3.
- 2. Hausberg M. Enhancing medical students' communication skills: development and evaluation of an undergraduate training program. BMC Medical Education 2012; 12:16.

### Module 3.2: Case studies in bioethics - Disclosure of medical errors

#### Background

This introduces the student to further issues in autonomy including full disclosure of mistakes (also see module 2.5).

#### **Competency addressed**

The student should be able to:	Level
Demonstrate an understanding of the implications and the appropriate procedure and response to be followed in the event of medical errors	SH

#### **Learning Experience**

Year of study: Professional year - 3

#### Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### **Case: Seeking immunity**

It was a busy clinic day and getting worse. Patients were getting impatient. Time was marching and details were becoming a casualty. Five year old Madhumita comes in with her mother. She has asthma and is under your care. You examine her and adjust your prescriptions and start your good byes. At that time, her mother reminds you that she is due for her booster shots. Oh that, you frown - and tell her to wait for a few minutes and that you will have the nurse load the injection and come to the adjoining room and give the injection. You ask the nurse to load the injection and keep it for you over the intercom.

You continue to see patients. After a couple of patients, the mother knocks indicating that she is getting late. You get up and go to the next room. The nurse is not there but you find a loaded syringe. You quickly administer the injection to the child and get back to seeing patients.

A few minutes later, the nurse calls back saying that she has loaded Madhumita's injections. You drop everything and go into the injection room and confront the nurse "But doctor that was gentamicin I had loaded for Mrs. Asif" she says.

#### **Points for discussion:**

- 1. Medical errors in clinical care.
- 2. The correct approach to disclosure of medical errors.
- 3. Consequence of failure to disclosure of medical errors including medico-legal, social and loss of trust.

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions including role play on disclosure of errors.
- 2. **Summative:** Short questions on 1) What is the ethical standard in dealing with medical errors?

## Module 3.3: The foundations of communication - 4

#### Background

Communication is a fundamental prerequisite of the medical profession and beside skills is crucial in ensuring professional success for doctors. This module continues to provide an emphasis on effective communication skills. The emphasis is on administering informed consent during professional year III.

#### **Competencies addressed**

The student should be able to:	Level
1. Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non-judgmental and empathetic manner	SH
2. Identify, discuss and defend, medico-legal, socio-cultural and ethical issues as they pertain to consent for surgical procedures	KH
3. Administer informed consent and appropriately address patient queries to a patient undergoing a surgical procedure in a simulated environment	SH

#### **Learning Experience**

Year of study: Professional year 3

**Hours:** 5(1+2+2)

- i. Introductory small group session 1 hour
- ii. Focused small group session 2 hours
- iii. Skills Lab session 2 hour

#### **Contents:**

- 1. Introductory small group session on the principles of communication with focus on administering informed consent.
- 2. Focused small group session with role play or video where students have an opportunity to observe, criticise and discuss common mistakes in administering informed consent.
- 3. Skills lab sessions where students can perform tasks on standardised or regular patients with opportunity for self critique, critique by patient and by facilitator.

#### Assessment

- 1. **Formative:** Participation in session 2 and performance in session 3 may be used as part of formative assessment.
- 2. **Summative:** A skill station in which the student may administer informed consent to a standardized patient.

#### Resources

- 1. Makoul G. Essential elements of communication in medical encounters: the Kalamazoo consensus statement. Acad Med. 2001; Apr; 76(4): 390-3.
- 2. Hausberg M. Enhancing medical students' communication skills: development and evaluation of an undergraduate training program. BMC Medical Education 2012; 12:16.

## Module 3.4: Case studies in bioethics - Confidentiality

#### Background

This introduces the student to confidentiality and its limits (also see module 2.5).

#### **Competency addressed**

The student should be able to:	Level
Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to confidentiality in patient care	KH

#### **Learning Experience**

Year of study: Professional year 3

#### Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### Case: Do not tell my wife

Ramratan was in tears. "How is it possible doctor? We are expecting our son soon. He will not have a father". Ramratan had seen you with vague aches, fever, weight loss and cough with expectoration not responsive to antibiotics for the past three months. He had a right mid zone lung shadow on X-ray and the sputum was positive for AFB. On being questioned, he had revealed that he had unprotected sexual intercourse with multiple partners 3 years ago. "But I stopped after I married Danno, doctor - I am faithful to her". An informed consent was obtained and HIV screening test was ordered and it was positive. A confirmatory test was subsequently obtained and it was also positive. The CDC count was < 100. Ramratan had come to discuss the results of his HIV test. After consoling him and writing out prescriptions for TB and HIV, you mention to him that he must bring his wife for testing. "This is important, Ramratan", you add - "especially since she is pregnant."

"Absolutely not, sir!" he explosively retorts. "That is not possible. I will be humiliated. Danno will leave me and go. I will never be able to see my son. I will become an outcast in our community. I can't live without my wife, doctor. I urge you, doctor - don't do this. I forbid you..."

#### **Points for discussion:**

- 1. The primacy of confidentiality in patient care.
- 2. What does confidentiality entail?
- 3. When can confidence be breached with whom and how?
- 4. Confidentiality and diseases that may engender patients and society.

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. **Summative:** Short questions on 1) What are the instances in which confidentiality of patient information may be breached?

## Module 3.5: Case studies in bioethics - Fiduciary duty

#### Background

This module discusses doctor's duty including fiduciary duty (also see module 2.5)

#### **Competencies addressed**

The student should be able to	Level
1. Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues as it pertains to the physician - patient relationship (including fiduciary duty)	КН
2. Identify and discuss physician's role and responsibility to society and the community that she/ he serves	КН

#### Learning Experience

#### Year of study: Professional year 3

#### Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### Case: Is he a human being or a machine?

It was a long day and the surgeon has finished four surgeries. Two of these were complicated surgeries requiring all his experience and skills. But it was gratifying. After that he had seen 40 outpatients. He was the most successful doctor in that small community and had provided service for the past 25 years. He had finished his outpatient, ate his meal and went to bed. The night duty doctor who usually comes around 10 pm to sit in the clinic and answer calls from inpatients had taken the night off - he had entrance exams next day. Praying it would be a quiet night he told his wife - I am very very tired; make sure that I am not disturbed.

He woke up at 1AM with the sounds of commotion downstairs. He could hear signs of arguing - Call the doctor, he must come down. He could hear his wife - "please take her to the nearest government hospital. This is a surgical nursing home and doctor is very tired - I cannot wake him up." He could hear irate patient attendants - "but your board

says open 24 hours for emergency. The town hospital is 15 km. away. I don't know if my daughter will make it. By the time the venom will reach the brain. Call your husband now madam. This is not correct". His wife retorted "He has worked from 4AM this morning - he has gone to sleep very tired asking me not to wake him up. Is he the only doctor in town? Is he a human being or a machine? Why are you being unreasonable?" The surgeon reached out for his clothes...

#### **Points for discussion:**

- 1. Duty of a doctor.
- 2. The concept of fiduciary duty.
- 3. Balancing personal and professional life.
- 4. Where to draw the line!

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. Summative: Short questions on: What is fiduciary duty?

## Learning modules for Professional Year IV

Number of modules: 9 Number of hours: 44

## **Module 4.1: The foundations of communication - 5**

#### Background

Communication is a fundamental prerequisite of the medical profession and beside skills is crucial in ensuring professional success for doctors. This module continues to provide an emphasis on effective communication skills. During professional year phase III part II (year four), the emphasis is on communicating, diagnosis, prognosis and therapy effectively.

#### **Competencies addressed**

The student should be able to:	Level
1. Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non-judgmental and empathetic manner	SH
2. Communicate diagnostic and therapeutic options to patient and family in a simulated environment	SH

#### Learning Experience

Year of study: Professional year 4

**Hours:** 5(1+2+2)

- i. Introductory small group session 1 hour
- ii. Focused small group session 2 hours
- iii. Skills Lab session 2 hour

#### **Contents:**

This module includes 3 inter-dependent learning sessions:

- 1. Introductory small group session on the principles of communication with focus on administering communication, of diagnosis, prognosis and therapy.
- 2. Focused small group session with role play or video where students have an opportunity to observe critique and discuss common mistakes in communicating diagnosis, prognosis and therapy.
- 3. Skills lab sessions where students can perform tasks on standardised or regular patients with opportunity for self critique, critique by patient and by facilitator.

#### Assessment

- 1. **Formative:** Participation in session 2 and performance in session 3 mentioned above may be used as part of formative assessment.
- 2. **Summative:** A skills station in which the student may communicate a diagnosis management plan and prognosis to a patient.

#### Resources

Same as Module 3.1

# Module 4.2: Case studies in medico-legal and ethical situations

#### Background

This module discusses the medico-legal and ethical conflicts in adolescents (also see module 2.5).

#### **Competency addressed**

The student should be able to:	Level
Identify, discuss and defend medico-legal, socioeconomic and ethical issues a it pertains to abortion / Medical Termination of Pregnancy and reproductiv rights	KH

#### **Learning Experience**

Year of study: Professional year 4

Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### **Case: The Child's Child**

You are the family doctor of Mr. Ravikiran for the past 10 years. One evening toward the end of a busy clinic Mr. Ravikiran, his wife and daughter come in. The usual smiles were absent. There was silence for a few minutes and when you asked what is the matter, Mr. Ravikiran points out to his wife and tells her that you tell him.

Reluctantly and with tears bursting in her eyes she tells you that her only daughter Sapna who is 16 years old had amenorrhea for 4 months. She had taken her to the gynecologist, who after examining her ordered an ultrasound scan of the abdomen which showed a 16 week fetus. After much argument and discussion, the family requested the gynecologist to perform a Medical Termination of Pregnancy (MTP). Sapna, however refuses to undergo an MTP - claiming that the child is her expression of love and that she believes that taking away her baby's life will be tantamount to murder. The parents are embarrassed to face society and feel that continuing the pregnancy will harm the daughter. As parents, they feel that they have a right to determine if their daughter should undergo a Medical Termination of Pregnancy or not. The daughter feels that she is old enough. As their family doctor, they would like you to help them through this nightmare.

#### **Points for discussion:**

- 1. Who makes health care decisions for adolescents?
- 2. What are the medical implication of the MTP act?
- 3. Are there provisions for emancipated minors?
- 4. Should adolescents be included in the decision making process?

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. Summative: Short questions on the Medical Termination of Pregnancy Act

# Module 4.3: Case studies in medico-legal and ethical situations

#### Background

This module discusses the medico-legal and ethical conflicts in organ transplantation (also see module 2.5).

**Competency addressed** 

The student should be able to:	Level
Identify and discuss medico-legal, socio-economic and ethical issues as it pertains to organ donation	KH

#### **Learning Experience**

Year of study: Professional year 4

Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### Case: The angry brick kiln owner

68 year old Muthukumar is your patient for the past 8 years. You are his family doctor and he seldom does anything without consulting you first. A self made man with no formal education he is a successful brick kiln owner in the suburbs of the city. He has hypertension and diabetes even before the time he has been under your care. Today he enters your office distraught and angry and unable to speak. You calm him down...

Muthukumar is a known diabetic and hypertensive for the past 23 years and has been on multiple medications in the past. Six years ago, he was diagnosed with chronic renal failure. For the past one year, his renal function has been worsening. The nephrologist that you had recommended had suggested dialysis and he has been on hemodialysis thrice a week for the past 6 months. At the last visit, he was suggested renal transplantation.
Muthukumar continues "I saw that kidney doctor today, Doctor. He said that I can get a new kidney instead of my old one. He told me that I need someone to donate a kidney to me. I told him that I don't need anyone's charity and I can buy one donor. That doctor laughed at me, sir - he told me that I cannot buy any kidney and that one of my relatives must donate it to me - He even said that my younger brother is probably the best person to donate the kidney. How dare he, Sir - my younger brother who is dearer to me than a son. I have so many employees in my factory who will line up to give me a kidney. Why is this doctor talking like this?

#### **Points for discussion:**

- 1. Can a kidney be bought?
- 2. What are the health economic outcomes of selling a kidney?
- 3. What are the medico-legal and ethical implications of the Human Organ Transplantation Act?

#### Assessment

- 1. Formative: The student may be assessed based on their active participation in the sessions.
- 2. Summative: Short questions on the Human Organ Transplantation Act.

# Module 4.4: Case studies in ethics empathy and the doctor-patient relationship

#### Background

This module discusses some nuances in the doctor-patient relationship including - failure of therapy, termination of relationships etc. (also see module 2.5).

#### **Competencies addressed**

The student should be able to:	Level
1. Demonstrate empathy in patient encounters	SH
2. Communicate care options to patient and family with a terminal illness in a simulated environment	SH

#### Learning Experience

Year of study: Professional year 4

Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### **Case: A letter from the grave**

Respected doctor:

I am writing this letter with extreme sadness. As you may know that it has been three months since my wife and your patient Mrs. Alka Chaturvedi has passed away. I am writing this letter not with anger or with spite; I am writing this only with the intent that my wife's death not be in vain and that the lessons that can be learned from the way you took care of her may be valuable to other patients in your care and that they will receive the compassion and care from you that Alka never received.

As you may recall, Alka was diagnosed with breast cancer 5 years ago. We rushed to you knowing your reputation as a talented oncologist and we were not disappointed. Your aggressive approach to the disease made all the difference. Surgery and aggressive chemotherapy, while distressing, helped Alka beat the disease and she lived disease-free for 2 years. We were very happy and were and still are very grateful to you. But fate had ordained that our joy will be short-lived. The disease came back with a vengeance. Even at this time you did not give up hope and took on the disease like a warrior but then there came a time that it was clear that the disease had won. We were devastated.

Alka looked up to you as a doctor to provide her with support but it looked like that you were unable to confront the failure. While you did prescribe pain medications and your office helped us find a home nurse you were reluctant to meet Alka or talk to her. When we called for appointments, your office would tell us to contact our family doctor for pain medications. When we did get to see you would not even look at Alka's eyes. You would distractedly talk to her, refill her pain medications and dismiss us quickly. It was as if we were seeing a different doctor than the one we had seen when all was well. And when Alka was admitted to the hospital where she breathed her last you would not even come and see her. We made so many requests for you to come and visit with her. I even called and told you that it would mean so much for her to see you before she departs but you did not.

Would it have been too much for you to come and hold her hand for a minute or say a kind word? Doctor - I am not as learned as you are but patients come to you and repose their faith in you to help them through their illness. We come to you not with the expectation that a cure is always possible but always with the expectation that you will support us in coping with the disease and the tremendous effects it has on our lives. We don't always expect you to succeed but we always expect you to show us care and compassion. I hate to point to out, doctor, that you abandoned Alka when it was clear that she will not be a trophy that you can parade as a success. You abandoned Alka and us at the time we needed you most. You sir, abandoned us when we were most vulnerable.

I write this to you not to fault your knowledge and skills which are considerable. I bear you no ill will. I am grateful that you gave Alka and our family a few more years of togetherness. I only write to remind you that knowledge and skills are not sufficient for a doctor. Compassion, empathy and non-abandonment are superior virtues. I can only hope that Alka's experience with you will help you take care of your other patients who may not all be successes, as you seem to define it. If only you provided patients empathy, all your patients will be your successes, irrespective of outcome.

#### Sincerely

#### **Points for discussion:**

- 1. The role of a doctor as a healer.
- 2. Failure of treatment and its implications for the doctor-patient relationship.
- 3. Empathy and patient care.
- 4. Can the doctor-patient relationship be terminated?
- 5. Hospice care.

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. **Summative:** Short questions on 1) Empathy 2) Doctor's responsibilities in the doctorpatient relationship 3) Doctor's responsibilities in the care of the terminally ill patient.

# Module 4.5: Case studies in ethics: the doctor-industry relationship

#### Background

This module discusses some nuances in the doctor-industry relationship (also see module 2.5).

#### **Competency addressed**

The student should be able to:	Level
Identify and discuss and defend medico-legal, socio-cultural, professional and ethical issues in physician - industry relationships	KH

#### **Learning Experience**

Year of study: Professional year 4

Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### **Case: The Launch**

It was the end of the morning session in your clinic. You were getting ready to have lunch when you are told that a drug company representative wants to meet you. You let him in and he tells you. "Sir - we are launching a new combination drug next month. We are planning a one hour meeting to introduce you to the product. The meeting will be held in Singapore and we will fly you and your spouse business class. All expenses will be borne by us. You can stay there for 3 days, sir. The meeting will be held in a cruise ship. The meeting will be only for one hour, sir. After that there will be a gala dinner and entertainment, Sir. Also, to compensate you for losing your practice for those three days we will pay you an honorarium of Rs. 25000 for each day that you are there. This is our way of saying thank you for all the support in the past and the support that you are going to provide in making this new molecule a success."

#### **Points for discussion:**

- 1. The influence of pharmaceutical industry on doctor's prescription behavior.
- 2. The limits of doctor industry engagement.

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. **Summative:** Short questions on 1) Can doctors accept gifts from pharmaceutical industry? Explain your choice.

#### Resources

The MCI & AMA Code of Medical Ethics.

# Module 4.6: Case studies in ethics and the doctor - industry relationship

#### Background

This module discusses some nuances in the professional relationships and conflicts there of (also see module 2.5).

#### **Competency addressed**

The student should be able to:	Level
Identify conflicts of interest in patient care and professional relationships and describe the correct response to these conflicts	SH

#### **Learning Experience**

Year of study: Professional year 4

#### Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### **Case: The Offer**

You get a call from the secretary of the promoter of the largest and most successful corporate hospital in the city asking for an appointment for you with him. You are perplexed but make it to the appointment. You enter a large well appointed room. The owner of the hospital gets up from his chair, welcomes you and asks you to sit down.

"Welcome to our hospital, doctor." After a few minutes of empty banter, he says – "My marketing executives tell me that you are the most successful practitioner in this area. As you know, we are a growing organisation; we are eager to partner with you. Doctor, I know that you use the services of another hospital here but we can make it worth your while to consider". You look enquiringly. He continues. "In addition to your professional charges that you can determine, we can provide you with 20% of the hospital's collections from your patient including radiology and laboratory charges. If you send us your outpatients for consultations, laboratory or radiology we will give you back 30% of our collections. We hope that you will consider this, doctor and become part of our extended family."

#### **Points for discussion:**

- 1. Fee splitting and other practices.
- 2. Can doctors become entrepreneurs?
- 3. Can doctors own pharmacies or hold stock in pharmaceutical companies?
- 4. What comprises professional conflict of interest?

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. Summative: Short questions on: 1) Fee splitting and its implications for patient care,

2) Conflicts in professional relationships.

# Module 4.7: Case studies in ethics and patient autonomy

#### Background

This module discusses ethical issues in care of children (also see module 2.5).

#### **Competency addressed**

The student should be able to:	Level
Identify conflicts of interest in patient care and professional relationships and describe the correct response to these conflicts	SH

#### **Learning Experience**

Year of study: Professional year 4

Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### **Case: The "Cruel" Parents**

A six year old boy is brought to the emergency room with a single episode of generalised tonic clonic convulsions. The child is stabilised on IV anti-epileptics and an oral anti-epileptic is started. There are no further episodes during the hospitalisation. The child is scheduled for an EEG and an MRI. Through this time the family had been cooperative with the treatment. The parents appear to be educated and appeared to care for their son deeply. When further investigations are suggested, the parents come back to you and say - "doctor, thank you for helping us at a time of need but we feel that it is against our faith to continue allopathic care. We have decided to go back to our ancestral village and our family shrine where we have scheduled a ritual tomorrow. Our priest has promised us that the child will be disease-free, if we perform the rites required. This convulsion is a result of the curse of our ancestors and if we do the requisite rituals to please them the

child will be cured of the disease. Please do not do anymore tests or treatments. We are stopping the medications tomorrow and will get discharged. Thank you."

#### **Points for discussion:**

- 1. Who has the right to decide for children?
- 2. Can parents refuse treatment even in life threatening situations?
- 3. What if there is a conflict?

#### Assessment

- 1. **Formative:** The student may be assessed based on their active participation in the sessions.
- 2. Summative: Short questions on parental consent.

### Module 4.8: Dealing with death

#### Background

Thanatology is a branch of science that deals with death. Death is an event that any medical student will inevitably face during the course of their professional career. Dealing with death empathetically and at the same time not being overwhelmed by it is an important coping skill for doctors.

#### **Competencies addressed**

The student should be able to:	Level
1. Identify conflicts of interest in patient care and professional relationships and describe the correct response to these conflicts.	SH
2. Demonstrate empathy to patient and family with a terminal illness in a simulated environment.	SH

#### **Learning Experience**

Year of study: Professional year 4

Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### **Case: The Empty Bed**

You are a house surgeon in the night shift of the ICU. A 19 year old girl Sharmila is wheeled into the ICU. She has a complicated history. She had surgery for cyanotic congenital heart disease at age 8. She has a history of severe asthma often requiring admission for steroids. She lives in a home near a construction site and recently the attacks have flared up. She now has frequent admissions for asthma exacerbations. She is now constantly on steroids. In the last month, she has had 3 admissions. But she fights it bravely. She carries her books with her when she comes in and after the attack settles down she sits quietly reading. Despite the struggle you noticed that the staff nurses liked her. She was positive and charming. Today was no different but the attack seemed worse. In the ER, the FEV1 was horrible. They had pumped her with steroids, put her on continuous nebulization, an aminophylline infusion was in place when you received her. The smile was smaller but there. The face was cushingoid with all the steroids and the body looked tired. She was moved to her usual bed number 9. Your shift was getting over at 7 a.m. but you stayed on an hour. She looked better, the smile was back you reassured her and said I'll be back in the evening and left.

That evening you report for duty and as you look through the patients, bed number 9 is empty. "Have you discharged Sharmila?" you asked the nurse. No doctor – she developed a sudden cardiac arrest at 12 noon – we could not revive her.

#### **Points for discussion:**

- 1. How should doctors deal with the emotions of patients and family facing death?
- 2. What does the patient experience when he/she is dying? Can physicians make the process of death comfortable?
- 3. What are the emotions faced by doctors when confronting death in patients? Is death a defeat for the doctor? Should the doctor be emotionally detached from a dying patient?
- 4. What are the cultural aspects of dying?

#### Alternate Case: I have decided to die

You are a physician in a community care practice for over 20 years and caring for various patients. Mr. Bhaskara Rao is a patient in your care for the past 14 years. He is 76 years old and has diabetes for the past 30 years. He had renal failure for the past 10 years and is CKD stage V requiring dialysis for 3 years. While he is following up with the nephrologist he values your position in his family as a family doctor and regularly visits you to check if his treatment is correct and more often to seek reassurance. He has invited you to all his family events – the last being one month ago for his grandson's wedding.

This morning you get a call from him. "Doctor! He says in his usual cheerful voice. Can I meet you tomorrow? I have fulfilled all my responsibilities in life. I am not sad. My children are all settled; my grandson is married; my wife as you know is no more. I have decided to stop my dialysis and say goodbye to this world. I thought I'll talk to you about how to prepare for my death!"

#### Learning Experience

Year of study: Professional year 4

#### Hours: 5

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Anchoring lecture 1 hour
- iv. Discussion and closure of case 1 hour

#### **Points for discussion:**

- 1. Can patients choose to die? Is there a role for doctors in the death of patients? Can doctors assist death?
- 2. How should doctors deal with the emotions of patients and family facing death?
- 3. What does the patient experience when he/she is dying? Can physicians make the process of death comfortable?
- 4. What are the emotions faced by doctors when confronting death in patients? Is death a defeat for the doctor? Should the doctor be emotionally detached from a dying patient?
- 5. What are the cultural aspects of dying?

#### Assessment

- **1. Formative:** Participation in sessions may be used as part of formative assessment. Submitted narrative on the socio cultural aspects of death may be used as assessment.
- 2. **Summative:** Short question on assisted dying.

### Module 4.9: Medical Negligence

#### Background

This introductory session allows students to be familiar with the legal aspects of care including negligence and malpractice and ways to protect themselves from such issues.

#### **Competencies addressed**

The student should be able to:	Level
1. Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues pertaining to medical negligence	KH
2. Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues pertaining to malpractice	KH

#### Learning Experience

Year of study: Professional year 4

Hours: 4

- i. Introduction of case 1 hour
- ii. Self-directed learning 2 hours
- iii. Discussion and closure of case 1 hour

#### **Learning Method**

This is an interactive panel discussion by students with legal experts and senior members of the medical profession. A written summary of learning may be provided by the student based on the learning.

#### Assessment

- 1. Formative: Submitted summary may be used as assessment.
- 2. Summative: Short question on medical negligence

AETCOM competencies for IMG

## **Section III**

Name of student	Roll number	Year of joining		
Specific competency no.				
Competency required to graduate	Universal competency no.			
Administer informed consent to a patient undergoing surgery in a simulated environment (Dreyfus level advanced beginner)				
Competency must be acquired at the end of professional year	IV			
Is the acquisition of this competency a prerequisite to advancement to the next phase	Yes/ No			
Does this competency require performance in a patient	Yes/ No			
Number of times the student must have performed the skill				
	Date Completed	Supervisor		
Certified by Faculty: Name, Date and UID				
Student's descriptive narrative of skill acquired				
Faculty only: If the student has not completed the competency, write down the reasons and remedial measures suggested				

### Competency Acquisition: Suggested Log Book pattern

## **Section IV**

### Formative Elements to be marked by Tutor

(Desirable competencies in attitude, ethics and communication skills that may be included in

whole or part of the formative assessment of the student)

	Competency	PY1	PY2	PY3	PY4
	Indicate as appropriate to the level of training				1
	DME: Does not meet expectations; ME - Meets Expectations; N/	A: Not ap	plicable		
1.	demonstrate ability to work in a team of peers and superiors				
2.	demonstrates respect to patient privacy				
3.	demonstrate ability to maintain confidentiality in patient care				
4.	demonstrate a commitment to continued learning				
5.	demonstrate responsibility and work ethics while working in the health care team				
6.	demonstrate respect in relationship with patients, fellow team members, superiors and other health care workers				
7.	demonstrates ability to maintain required documentation in health care (including correct use of medical records)				
8.	demonstrates personal grooming that is adequate and appropriate for health care responsibilities				
9.	demonstrates adequate knowledge and use of information technology that permits appropriate patient care and continued learning				
10.	demonstrates respect and follows the correct procedure when handling cadavers and other biologic tissues				
11.	demonstrates awareness of limitations and seeks help and consultations appropriately				
12.	demonstrates appropriate respect to colleagues in the profession				
	Feedback provided to student (Y/N)				
	Signed by Mentor/tutor Name: Faculty ID	Initial/ Date	Initial/ Date	Initial/ Date	Initial/ Date

#### Appendix 1

#### List of competencies in Attitude, Ethics and Communication

**Note:** Competencies from 1 - 39 are core competencies. Competencies 40 - 54 are non-core (desirable) competencies that be assessed formatively

No	COMPETENCY		K/KH/
	The student should be able to:		SH/P
1	Enumerate and describe professional qualities and roles of a physician	K	KH
	physician		
2	Describe and discuss the commitment to lifelong learning as an important part of physician growth	K	КН
3	Describe and discuss the role of non-malfeasance as a guiding principle in patient care	K	KH
4	Describe and discuss the role of autonomy and shared responsibility as a guiding principle in patient care	K	КН
5	Describe and discuss the role of beneficence of a guiding principle in patient care	K	KH
6	Describe and discuss the role of a physician in health care system	K	KH
7	Describe and discuss the role of justice as a guiding principle in patient care	K	KH
8	Identify and discuss medico-legal, socioeconomic and ethical issues as it pertains to organ donation	K	КН
9	Identify and discuss and defend medico-legal, socioeconomic and ethical issues as it pertains to abortion / medical termination of pregnancy and reproductive rights	K	КН
10	Identify, discuss and defend medico-legal, socio-cultural economic and ethical issues as it pertains to rights, equity and justice in access to health care	K	KH

No	COMPETENCY	Domain	K/KH/
	The student should be able to:		SH/P
11	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to confidentiality in patient care	K	КН
12	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to patient autonomy, patient rights and shared responsibility in health care	К	KH
13	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to decision making in health care including advanced directives and surrogate decision making	К	КН
14	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to decision making in emergency care including situations where patients do not have the capability or capacity to give consent	K	КН
15	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to research in human subjects	K	КН
16	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as they pertain to health care in children (including parental right to refuse treatment)	K	KH
17	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as they pertain to health care in children including parental rights	K	KH
18	Identify, discuss and defend, medico-legal, socio-cultural and ethical issues as they pertain to consent for surgical procedures	K	KH
19	Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues as it pertains to the physician patient relationship (including fiduciary duty)	K	КН

No	COMPETENCY	Domain	K/KH/
	The student should be able to:		SH/P
20	Identify and discuss physician's role and responsibility to society and the community that she/ he serves	K	КН
21	Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues in physician industry relationships	К	КН
22	Demonstrate ability to work in a team of peers and superiors	S	SH
23	Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non-judgemental and empathetic manner	S	SH
24	Demonstrate respect to patient privacy	S	SH
25	Demonstrate ability to maintain confidentiality in patient care	S	SH
26	Demonstrate a commitment to continued learning	S	SH
27	Demonstrate respect in relationship with patients, fellow team members, superiors and other health care workers	S	SH
28	Demonstrate responsibility and work ethics while working in the health care team	S	SH
29	Demonstrate ability to maintain required documentation in health care (including correct use of medical records)	S	SH
30	Demonstrate personal grooming that is adequate and appropriate for health care responsibilities	S	SH
31	Demonstrate adequate knowledge and use of information technology that permits appropriate patient care and continued learning	S	SH

No	COMPETENCY	Domain	K/KH/
	The student should be able to:		SH/P
32	Demonstrate respect and follows the correct procedure when handling cadavers and other biologic tissues	S	SH
33	Administer informed consent and appropriately address patient queries to a patient undergoing a surgical procedure in a simulated environment	S	SH
34	Communicate diagnostic and therapeutic options to patient and family in a simulated environment	S	SH
35	Communicate care options to patient and family with a terminal illness in a simulated environment	S	SH
36	Demonstrate awareness of limitations and seeks help and consultations appropriately	S	SH
37	Demonstrate appropriate respect to colleagues in the profession	S	SH
38	Demonstrate an understanding of the implications and the appropriate procedure and response to be followed in the event of medical errors	S	SH
39	Identify conflicts of interest in patient care and professional relationships and describes the correct response to these conflicts	S	SH
40	Demonstrate empathy in patient encounters	S	SH
41	Demonstrate ability to balance personal professional priorities	S	SH
42	Demonstrate ability to manage time appropriately	S	SH
43	Demonstrate ability to form and function in appropriate professional networks	S	SH

No	COMPETENCY	Domain	K/KH/
	The student should be able to:		SH/P
44	Demonstrate ability to pursue and seek career advancement	S	SH
45	Demonstrate ability to follow risk management and medical error reduction practices where appropriate	S	SH
46	Demonstrate ability to work in a mentoring relationship with junior colleagues	S	SH
47	Demonstrate commitment to learning and scholarship	S	SH
48	Identify, discuss and defend medico-legal, socio-cultural, economic and ethical issues as they pertain to in vitro fertilisation donor insemination and surrogate motherhood	К	KH
49	Identify, discuss and defend medico-legal, socio-cultural professional and ethical issues pertaining to medical negligence	K	КН
50	Identify, discuss and defend medico-legal, socio-cultural professional and ethical issues pertaining to malpractice	K	КН
51	Identify, discuss and defend medico-legal, socio-cultural professional and ethical issues in dealing with impaired physicians	K	КН
52	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as they pertain to refusal of care including do not resuscitate and withdrawal of life support	K	КН
53	Demonstrate altruism	S	SH
54	Administer informed consent and appropriately address patient queries to a patient being enrolled in a research protocol in a simulated environment	S	SH

## Additional list of desirable competencies in attitude, ethics and communication but listed as non-core

Competency	Domain	Level
Identify, discuss, and defend medico-legal, socio-cultural and ethical issues as they pertain to refusal of care including do not resuscitate and withdrawal of life support	К	KH
Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues in dealing with impaired doctors	K	КН
Demonstrate altruism	S	КН
Administer informed consent and appropriately addresses patient queries to a patient being enrolled in a research protocol in a simulated environment	S	КН
Demonstrate appropriate respect to colleagues in the profession	S	SH
Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues pertaining to medical negligence	К	КН
Identify, discuss and defend medico-legal, socio-cultural, professional and ethical issues pertaining to malpractice	K	КН
Demonstrate ability to balance personal professional priorities	S	SH
Demonstrate ability to manage time appropriately	S	SH
Demonstrate ability to form and function in appropriate professional networks	S	SH
Demonstrate ability to pursue and seek career advancement	S	SH
Demonstrate ability to follow risk management and medical error reduction practices where appropriate	S	SH
Demonstrate ability to work in a mentoring relationship with junior colleagues	S	SH

Competency	Domain	Level
Demonstrate commitment to learning and scholarship	S	SH

#### Appendix 2

Communication skills rating scale adapted from Kalamazoo consensus statement

Rating 1-3 - Poor, 4 -6 Satisfactory, 6 -10 Superior

Criteria	Score
Builds relationship	
Opens the discussion	
Gathers information	
Understands the patient's perspective	
Shares information	
Manages flow	
Overall rating	

#### **B.PHARM. SEMESTER – V (BPH)** SUBJECT: PHARMACEUTICAL JURISPRUDENCE–THEORY (BP505T)

Teachi	ing Schem	e (Hours/	Week)	Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	СМ	Prac	Total
3	1	-	4	4	75	15	10	-	100

#### A. COURSE OVERVIEW

**Scope**: This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.

**Objectives**: Upon completion of the course, the student shall be able to understand:

- The Pharmaceutical legislations and their implications in the development and marketing of Pharmaceuticals.
- Various Indian pharmaceutical Acts and Laws.
- The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.
- The code of ethics during the pharmaceutical practice.

#### **B. COURSE CONTENT**

NO	TOPIC	L (Hrs)	COs
[1]	<b>Drugs and Cosmetics Act, 1940 and its rules 1945:</b> Objectives, Definitions, Legal definitions of schedules to the Act and Rules <b>Import of drugs</b> – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties. <b>Manufacture of drugs</b> – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs – Manufacture of drugs for test exemination and	10	CO3 CO4
	analysis, manufacture of new drug, loan license and repacking license.		
[2]	<ul> <li>Drugs and Cosmetics Act, 1940 and its rules 1945.</li> <li>Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F &amp; DMR (OA)</li> <li>Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties</li> <li>Labeling &amp;Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties.</li> <li>Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors.</li> </ul>	10	CO3 CO4
[3]	<ul> <li>Pharmacy Act –1948: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences andPenalties</li> <li>Medicinal and Toilet Preparation Act –1955: Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent &amp; Proprietary Preparations. Offences and Penalties.</li> </ul>	10	CO3 CO4 CO5

	Narcotic Drugs and Psychotropic substances Act-1985 and Rules:		
	Objectives, Definitions, Authorities and Officers, Constitution and		
	Functions of narcotic & Psychotropic Consultative Committee, National		
	Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation,		
	opium poppy cultivation and production of poppy straw, manufacture, sale		
	and export of opium, Offences and Penalties.		
[4]	Study of Salient Features of Drugs and Magic Remedies Act and its	08	CO3
	rules: Objectives, Definitions, Prohibition of certain advertisements,		CO4
	Classes of Exempted advertisements, Offences and Penalties.		
	Prevention of Cruelty to animals Act-1960: Objectives, Definitions,		
	Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding		
	and Stocking of Animals, Performance of Experiments, Transfer and		
	acquisition of animals for experiment, Records, Power to suspend or revoke		
	registration, Offences and Penalties.		
	National Pharmaceutical Pricing Authority: Drugs Price Control Order		
	(DPCO)- 2013. Objectives, Definitions, Sale prices of bulk drugs, Retail		
	price of formulations, Retail price and ceiling price of scheduled		
	formulations, National List of Essential Medicines (NLEM).		
[5]	Pharmaceutical Legislations – A brief review, Introduction, Study of	07	CO1
	drugs enquiry committee, Health survey and development committee, Hathi		CO2
	committee and Mudaliar committee.		CO3
	Code of Pharmaceutical ethics: Definition, Pharmacist in relation to his		
	job, trade, medical profession and his profession, Pharmacist's oath		
	Medical Termination of Pregnancy Act :		
	Right to Information Act:		
	Introduction to Intellectual Property Rights (IPR):		

#### C. TEXT BOOKS

- 1. Dua, J. and Sharma, S., "Pharmaceutical Jurisprudence", S Vikas and Company, Pee vee publishers, India, 2019.
- 2. Jani, GK., "Pharmaceutical Jurisprudence, Forensic Pharmacy", Atul Prakashan, India, 2019

#### **D. REFERENCE BOOKS**

- 1. Jain, NK., "A text book of Forensic Pharmacy" Second edition-Reprint, Vallabh Prakashan, 2007.
- 2. Mithal, BM., "Text book of Forensic Pharmacy" first edition, Vallabh Prakashan, 1988.
- 3. Suresh, B., A text book of "Forensic Pharmacy" 20<sup>th</sup> edition, Birla publication PVT. LTD., 2019.
- 4. Governmentf India, Ministry of Health and Family Welfare, "Drugs and Cosmetics Act and Rules" 2016.
- 5. Dr. Agrawal, SP. And Dr. Khanna, R., "Pharmaceutical Jurisprudence And Ethics" 5<sup>th</sup> edition, Birla publication PVT. LTD.,2008.

#### **E. COURSE OUTCOMES**

CO	Skill	Statement
Number		
<b>CO1</b>	Understand and	Describe and apply the Pharmaceutical legislations in the
	apply	development and marketing of pharmaceuticals.
CO2	Understand,	Discuss the code of ethics during the pharmaceutical practice.
	Remember and	
	Apply	
<b>CO3</b>	Understand and	Explain basic principle of Indian pharmaceutical Acts and Laws.
	remember	
<b>CO4</b>	Understand and	Describe the concept of the regulatory authorities and agencies
	remember	governing the manufacture and sale of pharmaceuticals.
<b>CO5</b>	Understand,	Explain and apply Pharmacy act.
	Remember and	
	Apply	

#### F. COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>	<b>PO11</b>	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	1	2	-	2	2	3	2	2	-	3	3	2	1	3	1
<b>CO2</b>	3	1	2	-	2	2	3	2	2	-	3	3	2	1	3	1
<b>CO3</b>	3	2	2	-	2	2	3	2	2	-	3	3	2	2	3	1
<b>CO4</b>	3	2	2	-	2	2	3	2	2	-	3	3	2	2	3	1
<b>CO5</b>	3	2	2	-	2	2	3	2	2	-	3	3	2	2	3	1
	-			-	-	-	-			-	-					
Avg	3	1.6	2	-	2	2	3	2	2	-	3	3	2	1.6	3	1

#### B. TECH. SEMESTER – VI (CH) SUBJECT: Chemical Process Safety (PEC102)

Teachi	Teaching Scheme (Hours/Week)Cree					Exam	ination So	cheme	
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	0	0	3	3	60	0	0	0	60

#### A. COURSE OVERVIEW

To inculcate the safety culture among the undergraduate students of chemical engineering. To teach fundamentals of safety in process industries, current safety practices in industry by using various tools. To study industrial case studies and standards approved/recommended by CCPS, NFPA and Directorate of Industrial Safety and Health (DISH).

#### **B. COURSE CONTENT**

NO	TOPIC	L+T	Cos
		(hrs)	
[1]	Introduction to Process Safety	3	CO1
	Define: safety, hazard, risk, accident, incident, likelihood, consequence,		
	loss prevention, domino effect, first aid, incident rate, lost workdays,		
	occupational injury and illness, frequency rate, severity rate, fatality rate		
	and fatal accident rate. Theory of accident causation, nature of accident		
	process.		
[2]	Process Safety Strategies and Case Studies	4	CO1
	Concept of Active, Passive, Inherent and Procedural Strategies.		CO3
	Case Studies: Analysis of mistakes made and lessons to learn from four		
	significant chemical industry disasters: Flixborough (England), Pasadena		
503	(Texas), Seveso (Italy) and Bhopal (India).	4	<b>GO</b> (
[3]	<b>I OXICOlOgical Studies</b>	4	CO4
	Entry routes of toxicants into biological system and appropriate control		
	strategy. Elimination of toxicants from biological system by various ways,		
	target organ, acute and chronic toxicity and its toxicological studies,		
	chemical and physical asphysiates, ILV-IWA, ILV-SIEL and ILV-C,		
E 41	LD 50 and LC 50. Detection of possible nazard through senses.	6	000
[4]	Industrial Hygiene	0	CO2,
	NIOSH ACCIU EDA DSM va DMD Safaty work parmita Dra start up		C04
	niosh, Acoin, ErA, rSivi vs. Rivir. Salety work permits, rie-start up and shut down procedures, amorgonou planning and response, mock drill		
	and shut down procedures, emergency planning and response, mock drin,		
	NEDA diamond Evaluation (quantification matheds) and Control matheds		
	like Dyke and Enclosures, dilute and local ventilation, wat methods, good		
	housekeeping and Personal Protective Equipment (PPE)		
[5]	Fire and Explosion	6	CO1
	Basic definitions like fire, combustion, explosion, fire and flash point, auto-	Ū	C02
	ignition etc., concept of fire triangle, flammability limits (LFL and UFL).		CO3
	Classification of fires, various extinguishing medium and its selection.		205
	mobile and stationary fire-fighting methods. Explosion types like		
	mechanical explosion, detonation and deflagration, deflagration to		
	detonation transition (DtoD transition), confined and unconfined explosion.		
	dust explosions, vapor cloud explosion. BLEVE their causes and		
	prevention, Numerical on fire & explosion.		

[6]	<b>Source Models</b> Concept of source models, flow of liquids and vapours through various geometries, flashing liquids, liquid pool evaporation, Realistic and worst	4	CO1 CO5
[7]	case releases. <b>Chemical Reactivity Hazard</b> Concept of chemical reactive hazard, thermal run away models and parametric sensitivity. Use of calorimeters and its types like DSC, ARC, ARRST, APTAC, VSP2 etc. Characterization of reactive chemical hazard using calorimeters. Strategies to control reactive hazard, case study of T2	4	CO3
[8]	Introduction to Reliefs and Relief Devices Need for relief devices, few terminology like set pressure, max. Allowable working pressure, operating pressure, accumulation, overpressure, backpressure, blow down, max. allowable accumulated pressure etc., Location of reliefs, various relief devices like spring loaded (relief valve, safety valve and safety relief valve), mechanical, buckling pin and rupture dick. Selection criteria and combination criteria, effluent system, knock-out drum, cyclone, condenser, quench tank, scrubber, flare and incinerator. Concept of Basic process control systems (BPCS) and Safety instrumented system (SIS), sensor location criteria and redundancy of system, safety interlocks and alarm systems.	5	CO1 CO2
[9]	Hazard Identification and Hazard Analysis HAZID tools like hazard checklist, job safety assessment, hazard survey (Calculation of Dow and Mond Index). Hazard Operability (HAZOP case study), safety reviews, ALARP and Risk Management (RM). HAZAN using probabilistic methods, revealed and unrevealed failures, common failure modes and reliability calculations. Use of tools like FTA, ETA and LOPA analysis.	6	CO1 CO5, CO6
[10]	<b>Safety Guidelines and Standards</b> Safety in laboratory of academic institute and R&D houses, safety during loading and unloading of chemicals, safety while operating positive pressure and negative pressure systems, safety in tank farm, plant lay outing for safer operations, piping and electrical color code. Brief discussion on coverage of factories act (1948), Boiler act (1923), hazardous waste (management and handling) rules (1989), OISD guidelines and ISO- 14000 (EMS), 18000 (OHSAS) and 31000 (RM).	3	CO4, CO6

#### C. TEXT BOOKS

1. Crawl, D. A.; Louvar, J. F. *Chemical Process Safety (fundamentals with applications)*; 3<sup>rd</sup> Ed.; Prentice Hall International Series, 2011.

#### **D. REFERENCE BOOKS**

- 1. Lees, F. P. *Loss Prevention in the Process Industries* (Hazard Identification, Assessment and Control); 2<sup>nd</sup> Ed.; Butterworth-Heinemann, 1980.
- 2. Kletz, T. Learning from Accidents; 3<sup>rd</sup> Ed.; Gulf Professional Publishing, 2001.
- 3. Stoessel, F. Thermal Safety of Chemical Processes (Risk Assessment and Process Design); Wiley-VCH, 2008.
- 4. Banerjee, S. Industrial Hazards and Plant Safety; 1st Ed.; CRC Press, 2002.

#### **E. COURSE OUTCOMES**

CO	Skill	Statement
Number		
<b>CO1</b>		Understand the fundamentals of chemical process safety and the
		importance of process safety.
CO2		Develop an ability to identify and quantify the potential hazards
		associated with chemical processes.
CO3	Understand	Determining the issues pertaining to occupational safety and ethical
	Development	aspects associated with process safety.
CO4	Analyse	Analyse the major industrial safety related regulations and
	Evaluate	guidelines.
CO5	Awareness	Evaluate the process system through mathematical modelling and
		implementation of the outcomes for the mitigation and prevention of
CO6		Create awareness among students for the research and innovation in
		the field of process safety for sustainable future.

#### F. COURSE MATRIX

	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	3	3	2.5	2.5	2.5	3	3	3	2.5	2.5	2.5	3	2	2	2	2
<b>CO2</b>	3	3	2.5	2.5	2.5	3	3	3	2.5	3	2.5	3	3	3	3	3
<b>CO3</b>	3	2.5	2.5	2.5	2.5	2.5	3	3	2.5	2.5	2.5	3	3	3	3	3
<b>CO4</b>	2.5	2.5	2.5	3	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3	3	3	3	3
<b>CO5</b>	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3	2	2	2	2
<b>CO6</b>	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2	2	2	2
Avg	2.8	2.7	2.5	2.6	2.5	2.7	2.8	2.8	2.5	2.6	2.5	2.9	2.5	2.5	2.5	2.5

• A core elective subject **Chemical Process Safety** (**PEC-102**) is proposed in semester –VI, because it is one of the important industry relevant subject. The safety practices and calculations relevant to modern-day chemical industries are covered in the syllabus. This core elective subject requires basic knowledge of mass and energy balance calculations, basic concepts of thermodynamics and unit operations. Hence this subject is introduced in semester-VI after completion of mentioned fundamental subjects.

#### 1) What sort of calculations are covered in CPS?

**Answer-1:** Small calculations of frequency rate, fatality rate and severity rate are introduced in topic-1. TLV of mixture and ventilation related calculations are covered in topic-4. Fire and explosion related calculations are covered under topic-5. Source model and reactivity hazard related calculations are covered under topic 6 and 7 respectively. Quantification of hazard and risk assessment based calculations are covered under topic 9.

#### 2) How the ethical aspects are covered in CPS?

**Answer-2:** The ethical aspects are addressed under the topic why accidents do occur? In addition to this, ethical aspects are covered under design calculations, operating procedure and LOPA analysis.

#### M. PHARM. SEMESTER – III (MPH) SUBJECT: RESEARCH METHODOLOGY AND BIOSTATISTICS -THEORY (MRM301T)

Teach	ing Schem	e (Hours/	Week)	Credits		Exam	ination So	cheme	
Lect	Tut	Prac	Total		Ext	Sess.	СМ	Prac	Total
4	-	-	4	4	75	15	10	-	100

#### A. COURSE OVERVIEW

**Scope:** To understand the applications of Biostatics in Pharmacy. This subject also deals to understand research methodology process, ethics in medical, clinical and pre-clinical research. **Objectives:** Upon completion of the course the student shall be able to

- Know the various statistical techniques to solve statistical problems
- Appreciate statistical techniques in solving the problems.
- To know and understand medical research and ethical practise in clinical and non-clinical research

#### **B. COURSE CONTENT**

NO	TOPIC	L (Hrs)	COs
[1]	<b>General Research Methodology:</b> Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques.	12	CO1
[2]	<b>Biostatistics:</b> Definition, application, sample size, importance of sample size, factors influencing sample size, dropouts, statistical tests of significance, type of significance tests, parametric tests (students "t" test, ANOVA, Correlation coefficient, regression), non-parametric tests (wilcoxan rank tests, analysis of variance, correlation, chi square test), null hypothesis, P values, degree of freedom, interpretation of P values.	15	CO2
[3]	<b>Medical Research:</b> History, values in medical ethics, autonomy, beneficence, non-maleficence, double effect, conflicts between autonomy and beneficence/non-maleficence, euthanasia, informed consent, confidentiality, criticisms of orthodox medical ethics, importance of communication, control resolution, guidelines, ethics committees, cultural concerns, truth telling, online business practices, conflicts of interest, referral, vendor relationships, treatment of family members, sexual relationships, fatality.	15	CO3
[4]	<b>CPCSEA</b> guidelines for laboratory animal facility: Goals, veterinary care, quarantine, surveillance, diagnosis, treatment and control of disease, personal hygiene, location of animal facilities to laboratories, anaesthesia, euthanasia, physical facilities, environment, animal husbandry, record keeping, SOPs, personnel and training, transport of lab animals.	10	CO4
[5]	<b>Declaration of Helsinki:</b> History, introduction, basic principles for all medical research, and additional principles for medical research combined with medical care.	08	CO3 CO5

#### C. TEXT BOOKS

1. Kothari, C R. Research Methodology: Methods & Techniques. New Delhi, New Age International (P) Ltd., Publishers, Cop, 2004.

#### **D. REFERENCE BOOKS**

- 1. Prabhat Pandey, and Meenu Mishra Pandey. Research Methodology: Tools & Techniques. New Delhi, Bridge Center, 2015.
- 2. De, James E. Basic Statistics and Pharmaceutical Statistical Applications. New York, Marcel Dekker, 1999.
- 3. "GUIDELINES: Committee for the Purpose of Control and Supervision of Experiments on Animals." Cpcsea.nic.in, cpcsea.nic.in/Content/55\_1\_GUIDELINES.aspx.
- 4. Ulf Schmidt, et al. Ethical Research: The Declaration of Helsinki, and the Past, Present and Future of Human Experimentation. New York, Ny, Oxford University Press, 2020.
- 5. World Medical Association. "WMA the World Medical Association-Declaration of Helsinki." Wma.net, WMA The World Medical Association-Declaration of Helsinki, 2014, www.wma.net/what-we-do/medical-ethics/declaration-of-helsinki/.

CO	Skill	Statement
Number		
<b>CO1</b>	Understand and	To understand research methodology and application of study design
	Apply	in clinical research.
CO2	Remember,	To learn and apply various biostatistical techniques in hypothesis
	Understand and	testing of research.
	Apply	
<b>CO3</b>	Understand and	To know process of ethical medical research and protocol designing
	Create	
<b>CO4</b>	Understand and	To understand ethics and regulations use of animals in research.
	Remember	
<b>CO5</b>	Understand and	To know ethics and regulation in clinical research.
	Remember	

#### **E. COURSE OUTCOMES**

#### F. COURSE MATRIX

	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>	PO11	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	3	2	3	3	3	-	3	3	2	-	3	3	1	-	3
<b>CO2</b>	3	1	1	3	-	1	-	-	3	-	3	2	2	-	3
<b>CO3</b>	3	3	2	1	3	3	3	3	3	3	3	2	2	-	3
<b>CO4</b>	3	3	2	1	2	3	3	3	3	3	3	2	2	-	3
<b>CO5</b>	3	1	2	2	3	3	3	3	2	3	3	3	3	-	3
Avg	3	2	2	2	2.2	2	2.4	2.4	2.6	1.8	3	2.4	2	_	3

#### DHARMSINH DESAI UNIVERSITY, NADIAD FACULTY OF INFORMATION SCIENCE

#### **BCA-318 Self Development**

Teaching scheme	Exan	n. Sche	eme (Ma	rks)
L Tu	Th	Ss	TW	Total
2 -	60	40	-	125

#### Total: 20 Hrs

- 1. Introduction to Personality Development:
  - a) The basic traits of a developed personality

1

- b) The Pleasing Personality
- 2. Health, Hygiene & High Spirit :
  - a) Physical fitness
  - b) Positive thinking
- 3. Proper use of Language:
  - a) The Communication Skills
  - b) The effective Speech
- 4. Goal Setting.
  - a) How to set goal?
  - b) Advantages of setting a goal
- 5. Leader ship & Team Spirit:
  - a) Effective Leadership qualities
  - b) How to mobilize the team
- 6. Effective self-presentation & facing interview.
  - a) The interview process & preparing for it
  - b) The presentation skills

Scheme: Each topic will be covered in TWO sessions / Lectures, so 12 topics in 24 sessions.
#### SUBJECT : SOFTWARE DESIGN AND TESTING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme					
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total	
4	-	-	4	4	60	40	25	-	125	

### A. COURSE OVERVIEW

This course provides a way of thinking about real world information system design problems and their solutions using various UML models. It covers various phases of software testing life cycle. The course will enable the learners to use various testing techniques and automated testing tools. It also introduces testing of web-based and object-oriented systems.

### **B. COURSE CONTENT**

NO	ΤΟΡΙΟ	L+T (hrs)	COs
[1]	The Importance of Modeling. Object-Oriented Modeling and Principles, An Overview and Conceptual Model of UML	6	CO1
[2]	Classes, Relationships and Other Common Mechanisms, Types of Diagrams, Class Diagrams, Interfaces: Types and Roles, Object Diagrams	9	CO1 CO2
[3]	Interactions, Use-cases, Use-Case Diagrams, Interaction Diagrams, Activity Diagrams, State-chart Diagrams.	9	CO2
[4]	Patterns and Frameworks, Component Diagrams, Deployment Diagrams, A Detailed Case Study on System Analysis and Design using Unified Approach.	6	CO2
[5]	Introduction and Evolution of s/w Testing, Definition and Goals of Testing, Effective and Exhaustive Testing, Software Testing Life Cycle (STLC), Testing Terminology and Methodology.	3	CO3
[6]	Verification, Verification of Requirements, High-level and Low-Level Design, How to Verify Code? Validation, Validation Activities: Unit Testing, Integration Testing, Function Testing, System Testing, Acceptance Testing, Overview of Regression Testing	6	CO3
[7]	Static Testing: Inspection, Structured Walkthroughs, Technical Reviews Dynamic Testing Black-Box Testing: Boundary Value Analysis, Equivalence-Class Testing, White-box Testing: Need of White-box Testing, Basis Path Testing, Graph and Loop Testing, Data Flow Testing.	8	CO3
[8]	Test Organization, Structure of Testing Group, Test Planning, Detailed Test Design and Test	3	CO4
[9]	Need for Automation, Categorization of Testing Tools, Selection of Testing Tools, Cost Incurred in Testing Tools, Guidelines for Automated Testing, Overview of some Commercial Testing Tools.	4	CO3
[10]	Object-Oriented Testing (OOT) Basics, Comparison: Conventional testing and OOT, Issues in OOT, Issues in testing Inheritance, Various OO Testing Techniques.	3	CO5
[11]	Overview of Web-Based Systems, Web Technology Evolution And Comparison with Traditional Software, Challenges in Testing Web-Based Systems, Web Engineering, Testing Web-Based Systems.	3	CO5

1. Grady Booch, James Rumbaugh, and Ivar Jacobson. *The Unified Modeling Language UserGuide;* Low Price Edition, Pearson Education

2. Naresh Chauhan. *Software Testing Principles and Practices;* Oxford Publication

### **D. REFERENCE BOOKS**

1. Joseph Schumuller. *Teach yourself UML in 24 Hours; 3rd ed.;* Sams Publication.

2. Rax Black, Eric Van Veenendaal and Dorothy Greham. *Foundations of* 

Software TestingISTQB Certification; Cengage Learning.

### **E. COURSE OUTCOMES**

СО	Skill	Statement
Number		
<b>CO1</b>	Understand	Describe Object Oriented Methodology and Unified Modeling
		Language for software design and development
<b>CO2</b>	Apply	Prepare overall design using various UML models and diagrams.
CO3	Apply	Understand software testing life cycle and efficiently use modern
		testing techniques and tools to test software.
<b>CO4</b>	Evaluate	Write and execute test plan, test case and test specification
<b>CO5</b>	Understand	Discuss object-oriented and web-based testing techniques.

### F. COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>	PO11	PO12	PSO1
<b>CO1</b>	2	-	1	1	-	1	1	2	1	-	-	-	-
<b>CO2</b>	3	3	3	3	-	3	3	2	3	-	-	-	-
<b>CO3</b>	2	3	3	2	-	3	2	2	2	-	-	-	-
<b>CO4</b>	3	3	3	3	-	3	3	2	3	-	-	-	-
<b>CO5</b>	1	1	-	1	-	1	1	2	1	-	-	-	-
Avg	2.2	2	2	2	-	2	2	2	2	-	-	-	-

### DHARMSINH DESAI UNIVERSITY, NADIAD FACULTY OF INFORMATION SCIENCE

### BC-313 System Analysis And Design

Те	Feaching scheme (H/W)		F	Exam.	Schei	ne (Mai	rks)		
L	Tu	Prac	ſ	ĥ	Ss	Tw	Viva	Total	
4	-	2	6	0	40	25	25	150	
1.	Infor - Data - type - Why	<b>mationandmanage</b> a, Information, syste s of information y CBIS ? (computer	ment m - definition an based informatio	d exai n syst	mples, tem),				[4]
	- man	agement structure			, .				
	- Qua	sifications or variet	ies of CBIS - TPS	S. MIS	S. DSS	S. OAS			
2.	Infor - Wha - Wha - Wha - Cha cen - Eler - Syst i. ii. iii. - The - Attr - tool Engli - The	mationsystemanaly at is system analysis at is system design ? at is system analysis racteristics of system tral objective. nents of system analy tem approaches : System developm Structured Analys Prototyping, When role of system analy ibutes of system analy ibutes of system analy s used by system analy sh) waterfall model (Cl	vsis. and design? n - organization, lysis - output, inp nent Life cycle (S is (The Paris moon n and why prototy rsts, alyst, alyst.(data diction lassic life cycle of	intera ut, fil DLC) del) yping nary, o r linea	ction, es, pro When ? decisio ur sequ	interdep ocesses n and W on trees, uential m	endence hy ? decision nodel)	e, integration, n tables, structured	[6]
•	- Boe	hm's Spiral model	( <b>(1</b> ) )						[0]
3.	- Con - Stra - Met Dete	mationgathering(F) nmunication with pe tegy to gather inforr hods of searching in erminations of DFDs	actinging) cople nation, information formation - Inter s, New system	on sou viewii	urces ( ng, Qı	inside a testionna	nd outsi aires, Sy	de of org. ) /stem observations,	[3]
4.	<u>Requ</u>	irementsspecificati	ons.						[2]
	- Data - majo - four - Why	a dictionary, or symbols, rules, v data dictionary?							
5.	Feasi - Diff - Cos - Payl	bilitvAnalysis. Ferent types of Feasil t-benefit Analysis (I back method, Examp	bility, Present value of I ples.	benefi	ts),				[4]

### DHARMSINH DESAI UNIVERSITY, NADIAD FACULTY OF INFORMATION SCIENCE

6.	Dataflowdiagrams. - What is DFDs ? , - Context diagram, - Symbols used to construct DFDs, - Rules to construct DFDs, - Leveling of DFDs, - Logical DFDs, - Physical DFDs, Examples	[3]
7.	<ul> <li>ProcessSpecifications.</li> <li>Tools used in structured analysis <ol> <li>Structured English (types of structured used, examples)</li> <li>Decision tables (types of decision tables, examples)</li> <li>Decision Trees (Examples)</li> </ol> </li> </ul>	[5]
8.	Control.auditandsecurityofinformationsystems - Controls in information system, - Audit of information systems, - Security of information (computer virus)	[2]
9.	<ul> <li>Svstemimplementation.</li> <li>Coding and unit test</li> <li>Employing programmers to write code,</li> <li>Using code Generator</li> <li>Testing : ensuring the quality,</li> <li>data takeon and conversion,</li> <li>User training,</li> <li>Going live</li> <li>The maintenance cycle.</li> </ul>	[2]
10. Pra Sys De	<ul> <li>ObjectOrientedDesign.         <ul> <li>Introduction</li> <li>Introduction to UML</li> <li>Relationship, Aggregation, Composites, Interfaces, Realization</li> <li>Components of UML                 <ul></ul></li></ul></li></ul>	[9] ·ams
Te Re	<ul> <li>xt-Books:         <ol> <li>Analysis And Design of Information Systems. By V Rajaraman.</li> <li>Sams Teach Yourself UML in 24 Hours By Joseph Schmuller</li> </ol> </li> <li>ference Books:         <ol> <li>Analysis and Design of Information Systems By James A. Senn</li> <li>Systems Analysis And Design</li> </ol> </li> </ul>	

#### SUBJECT : SYSTEM ANALYSIS DESIGN AND MANAGEMENT

<b>Teaching Scheme (Hours/Week)</b>				Credits		Exam	ination So	cheme	
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
4	-	-	4	4	60	40	25	-	125

### A. COURSE OVERVIEW

The course covers various stages of information system development life cycle. It also emphasizes on analytical techniques to develop analysis and design solutions for business problems and user requirements. It enables the learners to understand essential concepts of Project Management and cost estimation.

### **B. COURSE CONTENT**

NO	ΤΟΡΙΟ	L+T (hrs)	COs
[1]	Overview of Information System, Information Technology, Information System Components, Business Process Modeling – Business Informa- tion System, Characteristics of Information System, Types of Business Information System -Organizational Structure, Systems Development Techniques and Tools, Role of System Analyst.	5	CO1
[2]	Technical, Operational and Financial Feasibility, Request Approval, Project Selection Requirement and Methods, Steering Committee, In- formation System Group, Scope, Boundary and Objective of the Project Undertaken.	7	CO2
[3]	Structured English, Decision Tables, Methods of Performing Cost Bene- fit Analysis, System Logical and Physical Design, Selection of Hard- ware and Software, Criteria to Evaluate Hardware and Software.	5	CO5
[4]	Data Flow Analysis, Developing Logical Model Of the System Using Data Flow Diagram, Data Dictionary, HIPO Chart, Visual Table of Content, System Flow Chart, Data Structure Diagram.	8	CO5
[5]	System, Design, Operational, User, Time Chart, Budget Chart.	3	CO5
[6]	Planning, Equipment Installation, Program Developments, Design and Documentation of Software, Program and System Testing, Errors, File Conversions, User Training, Performance Evaluation of the System, Quality Assurance, Post-Implementation Review.	6	CO6
[7]	Project, Project Management, Relationships among Portfolio, Program, Project and Organizational Management, Relationship Between Project, Operations and Organizational Strategy, Business Value, Role and Re- sponsibilities Of Project Manager.	8	CO4 CO7
[8]	Organizational Influences on Project Management, Project Stakeholders and Governance, Project Team, Project Life Cycle.	4	CO4 CO7
[9]	Common Project Management Process Interactions, Project Manage- ment Process Groups, Initiating, Planning, Executing, Monitoring and Controlling, Closing Process Group, Project Information, Role of the Knowledge Areas.	7	CO7
[10]	Process Metrics, Project metrics, Halstead's Software Science, Function Point(FP), Cyclomatic Complexity Measures; Software Project Estima- tion Models- Empirical, Putnam, COCOMO Estimating Size with Story	7	CO3

Points, Velocity, Estimating Time: Ideal Days for Estimated Size, Tech-	
niques for Estimation: Estimates Shared, Estimation Scale, Derive Es-	
timation, Planning Poker.	

### C. TEXT BOOKS

- 1. Henry Lucas, Analysis, Design and Implementation of an Information System; McGraw Hill
- 2. James Senn, Analysis and Design of an Information System ; McGraw Hill
- 3. Uma Gupta, *Management Information Systems, A Managerial Perspective*; Galgotia Pub-lications Pvt Ltd
- 4. A Guide to the Project Management Body of Knowledge (PMBOK<sup>®</sup> Guide); 5th ed.

### **D. REFERENCE BOOKS**

- 1. H. Lucas, Information System Concept for Management; McGraw Hill
- 2. Cleland and King, System Analysis and Project Management; McGraw Hill

### **E. COURSE OUTCOMES**

CO	Skill	Statement
Number		
<b>CO1</b>	Understand	Explain the importance of structured approach of system analysis and design in software development.
<b>CO2</b>	Apply	Perform feasibility study for evaluating the scope of the given system.
CO3	Evaluate	Practice software estimation for software project planning.
<b>CO4</b>	Understand	Understand the significance and practice to comply with ethics in system development.
CO5	Understand	Explain the structured approach of analysis and development.
<b>CO6</b>	Analyse	Prepare software analysis and design deliverables for specified re- quirements individually and in team.
<b>C</b> 07	Understand	Associate Project management principles and processes for lifelong software development practice.

### F.COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	<b>PO10</b>	PO11	PO12	PSO1
<b>CO1</b>	2	2	-	-	-	-	2	1	1	-	-	-	-
<b>CO2</b>	2	2	2	-	-	2	2	3	3	-	3	-	-
<b>CO3</b>	2	2	3	-	-	3	2	3	3	-	3	-	-
<b>CO4</b>	1	2	2	-	-	3	2	1	1	-	2	-	-
<b>CO5</b>	3	3	2	-	-	2	2	1	2	-	3	-	-
<b>CO6</b>	3	2	3	-	-	2	2	3	3	-	3	-	-
<b>CO7</b>	2	1	2	-	-	2	2	2	1	-	-	-	-
Avg	2.1	2	2	-	-	2	2	2	2	-	2	-	-

### B. TECH. SEMESTER – IV SUBJECT: UNIVERSAL HUMAN VALUES

Т	eaching S	cheme (Ho	ours/weel	x)	Examination Scheme				
Lect	Tut	Prac	Total	Credits	s Ext Sess. TW				Total
3	0	0	3	3	60	0	0	0	60

Reference Code HSMC-02

### **DETAILED SYLLABUS:**

# 1 COURSE INTRODUCTION - NEED, BASIC GUIDELINES, CONTENT AND PROCESS FOR VALUE EDUCATION

Purpose and motivation for the course, recapitulation from Universal Human Values-I, self-Exploration-what is it?-Its content and process; 'Natural Acceptance' and experiential validation-as the process for self-exploration, continuous happiness and prosperity-A look at basic human aspirations, right understanding, relationship and physical facility-the basic requirements for fulfillment of aspirations of every human being with their correct priority, understanding happiness and prosperity correctly-a critical appraisal of the current scenario, method to fulfill the above human aspirations: understanding and living in harmony at various levels

### 2 UNDERSTANDING HARMONY IN THE HUMAN BEING - HARMONY IN MYSELF

Understanding human being as a co-existence of the sentient 'I' and the material 'Body', understanding the needs of Self ('I') and 'Body'- happiness and physical facility, understanding the body as an instrument of 'I' (I being the doer, seer and enjoyer), understanding the characteristics and activities of 'I' and harmony in 'I', understanding the harmony of I with the body: sanyam and health; correct appraisal of physical needs, meaning of prosperity in detail, programs to ensure sanyam and health

## **3 UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY- HARMONY IN HUMAN- HUMAN RELATIONSHIP**

Understanding values in human-human relationship; meaning of justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; trust and respect as the foundational values of relationship, understanding the meaning of trust; difference between intention and competence, understanding the meaning of respect, difference between respect and differentiation; the other salient values in relationship, understanding the harmony in the society (society being an extension of family): resolution, prosperity, fearlessness (trust) and co-existence as comprehensive human goals, visualizing a universal harmonious order in society- undivided society, universal order- from family to world family

## **4 UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE - WHOLE EXISTENCE AS COEXISTENCE**

Understanding the harmony in the nature, interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in

nature, understanding existence as co-existence of mutually interacting units in all pervasive space, holistic perception of harmony at all levels of existence, include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

### **5** IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS

Natural acceptance of human values, definitiveness of ethical human conduct, basis for humanistic education, humanistic constitution and humanistic universal order, competence in professional ethics: a. ability to utilize the professional competence for augmenting universal human order b. ability to identify the scope and characteristics of people friendly and eco-friendly production systems c. ability to identify and develop appropriate technologies and management patterns for above production systems, case studies of typical holistic technologies, management models and production systems, strategy for transition from the present state to universal human order: a. at the level of individual: as socially and ecologically responsible engineers, technologists and managers b. at the level of society: as mutually enriching institutions and organizations

### **TEXT / REFERENCE BOOK**

- 1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books
- 2. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan
- 3. Human Values, A.N. Tripathi, New Age Intl. Publishers

### **B. TECH. SEMESTER – IV (IT)**

### SUBJECT: UNIVERSAL HUMAN VALUES - II

Teaching Scheme (Hours/Week)				Credits	Examination Scheme						
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total		
3	-	-	3	3	60	-	-	-	60		

Reference Code HSMC-

### A. COURSE OBJECTIVES

### The objectives of teaching this course are:

- To help the students appreciate the essential complementarity between 'VALUES' and SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement toward value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior, and mutually enriching interaction with Nature.

### **B. DETAILED SYLLABUS**

### **Unit Topic(s)**

### [1] COURSE INTRODUCTION

Need, Basic Guidelines, Content, and Process for Value Education Self Exploration– what is it? - it's content and process; 'Natural Acceptance' and Experiential Validationas the mechanism for self exploration, Continuous Happiness, and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels

### [2] UNDERSTANDING HARMONY IN THE HUMAN BEING

Harmony in Myself! Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha, Understanding the Body as an instrument of 'I' (I being the doer, seer, and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal

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### [07]

Hrs.

**[07]** 

of Physical needs, the meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya

### [3] UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY

[07]

Harmony in Human-Human Relationship Understanding Harmony in the family – the basic unit of human interaction, Understanding values in human to human relationship; the meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship, Understanding the meaning of Vishwas; Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in a relationship, Understanding the harmony in the society (society being an extension of the family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals, Visualizing a universal harmonious order in societyUndivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family.

### [4] UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE [07]

Whole existence as Coexistence: Understanding the harmony in the Nature, Interconnectedness, and mutual fulfillment among the four orders of nature recyclability and self-regulation in nature, Understanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence.

### [5] IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF [08] HARMONY IN PROFESSIONAL ETHICS

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics, Case studies of typical holistic technologies, management models and production systems, Strategy for the transition from the present state to Universal Human Order.

### C. RECOMMENDED TEXT / REFERENCE BOOKS

- 1. R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2
- 2. A Nagaraj, JeevanVidya: Ek Parichaya, Jeevan Vidya Prakashan, Amarkantak, 1999.
- 3. A.N. Tripathi, Human Values, New Age Intl. Publishers, New Delhi, 2004.
- 4. Mohandas Karamchand Gandhi, The Story of My Experiments with Truth
- 5. E. F Schumacher, Small is Beautiful
- 6. Cecile Andrews, Slow is Beautiful
- 7. J C Kumarappa, Economy of Permanence
- 8. PanditSunderlal, Bharat Mein Angreji Raj

### D. COURSE OUTCOMES

CO#	CO Statement	Skill
CO1	Be able to remember and use concepts of human values in day to day life.	Remember
CO2	Be able to understand the difference between values and skills, happiness and excitement, feeling of prosperity and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, ethical and unethical practices etc.	Understand
CO3	Be able to apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.	Apply
CO4	Be able to analyze the value of harmonious relationship based on trust and respect in their life and profession	Analyze
CO5	Be able to examine the role of a human being in ensuring harmony in self, family, society and entire nature / existence.	Evaluate
CO6	Be able to identify a strategy to actualize a harmonious environment at their workplace or institute and evaluate the significance of value inputs in formal education and and start applying them in their life and profession	Create

### E. COURSE MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	0	0	0	0	0	3	0	0	2	0	0	0	0	2	0
CO2	0	0	0	0	0	0	2	1	3	0	0	0	0	2	0
CO3	0	0	0	0	0	0	2	3	3	0	0	0	0	2	0
CO4	0	0	0	0	0	0	3	3	1	0	0	0	0	2	0
CO5	0	0	0	0	0	3	2	3	1	0	0	0	0	2	0
CO6	0	0	0	0	0	0	0	3	2	0	0	0	0	2	0
Avg.	0	0	0	0	0	1	1.5	2.17	2	0	0	0	0	2	0

1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High)

Department of Information Technology, Dharmsinh Desai University

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