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# Curriculum for Under-graduate Dental (BDS) Education in Bangladesh- Updated 2016

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*Approved by*  
**Bangladesh Medical & Dental Council (BM&DC)**

203, Shaheed Sayed Nazrul Islam Sarani (86, Bijoy Nagar)

Dhaka-1000

[www.bmdc.org.bd](http://www.bmdc.org.bd)

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**December-2016**

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## PREFACE

Medical science is constantly advancing with the advancement of science and technology. Global changes are happening in medical education in accordance and conformity of these advancements and changes. With the application of these knowledge and skills of medical and dental science, future doctors should satisfy their patients with the changing needs of the community. Much changes are happening in teaching methods and teaching sites or learning environment. It is now an established fact that best learning is achieved through utilizing the learning environment in factual situation. A doctor can better learn from his own patients. Slogan of today is now the unity of education and practice. The undergraduate curriculum for future doctor is expected to be so designed that it should focus more on real life situation and of learning i.e. more community oriented as well as more community based. To serve this purpose community campus partnership is very much appropriate and essential.

The undergraduate dental curriculum was reviewed & updated in 2007 by Centre for Medical Education (CME) through with an aim to produce community oriented dental surgeon who will be able to provide essential primary dental health care to the community. The need to develop a community- oriented and competency-based dental curriculum was felt by all concerned. For that series of workshops with dental specialists, experts from every discipline and medical educationists took place to review & update the dental curriculum, which would reflect institutional, departmental objectives as well as subject wise learning objectives. The curriculum should have contents relevant to the dental & common health problems of the country and assessment method should be scientific, reliable and valid and also questions should be objectively set and designed. The teaching methods should also be scientific and more biased for effective small group teaching. As a whole the other components of the curriculum such as, course contents, strategy for teaching, materials or media used and the assessment system within the available timeframe were to be identified scientifically to provide the dental graduates with proper knowledge, skills and attitude. Thus the Undergraduate dental Curriculum 2007 was developed and implemented.

Now after eight years with the combined efforts of the Directorate General of Health Services (DGHS), Centre for Medical Education (CME) and Bangladesh Medical & Dental Council (BM&DC), MOH&FW and different Dean offices reviewed and updated the Undergraduate Dental Curriculum 2007 with the inclusion of national goal, objectives, competencies. The updated BDS Curriculum 2016 is ready to be implemented from session 2017-2018. This enormous task has been efficiently completed with the most sincere and heartiest effort of the teachers of both public and private dental colleges and also delegates of concerned authorities and faculty members of CME. The activities in regards to technical support, compilation and editing were done by Centre for Medical Education (CME) as per it's terms of reference.

**Prof. Mohammad Shahidullah**

President

Bangladesh Medical & Dental Council (BM&DC)

## PREAMBLE

The quality of health care is under scrutiny all over the world because of increasing public expectation of their health care services. Therefore a positive change is needed in the role of dental surgeons. The role of teachers and students in teaching learning with positive changes in dental education, its strategy and process also needs to be reviewed and developed.

This BDS curriculum 2016 has been reviewed & updated and scientifically designed, which is responsive to the needs of the learners and of the community. The present curriculum, its assessment method is expected to effectively judge competencies acquired that are required to meet the oral health need of our people. It is gratifying to note that all concerned in the promotion of dental education in the country have involved themselves in the planning and formulation of this need-based and competency based curriculum which has been initiated under the auspices of the Centre for Medical Education (CME).

Though curriculum is not the sole determinant of the outcome, yet, it is very important as it guides the faculty in preparing their instruction and tells the students what knowledge, skills and attitude they are to develop through the teaching learning process. The ultimate indicators of assessing curriculum in dental education is the quality of oral & dental health services provided by its graduates with required competencies.

In conclusion, I would like to mention that the curriculum planning process is continuous, dynamic and never-ending. If it is to serve best, the needs of the individual students, educational institutions and the community to whom we are ultimately accountable, must be assessed.

I congratulate all who were involved in reviewing, redesigning, updating and developing the BDS curriculum, particularly the Centre for Medical Education. They contributed to complete this activity a commendable job and deserve special appreciation.

**Professor Dr. Abul Kalam Azad**

Director General, DGHS

Govt. of the Peoples Republic of Bangladesh

## BACKGROUND AND RATIONALE

Curriculum planning, scheming and updating is not a stationary process, rather a nonstop course of action done on a regular basis through a scheme. More than nine years have over and done since the Centre for Medical Education (CME), planned and developed the “BDS Curriculum for Under-graduate dental education for Bangladesh in 2007”

Centre for Medical Education (CME) in association with BM&DC, Deans Offices, DGHS, MOH&FW under took the whole process. Review workshops were held through active participation of different dental professional groups, faculty members. Accordingly, first, second, third and final professional group meetings were held with support from PSE, DGHS. Later on, in order to give a final shape with recommendation it was sent to BM&DC for further action. A taskforce group examined the revised undergraduate dental curriculum.

The revised undergraduate dental curriculum is expected to be implemented with the newly admitted students of 2017–2018 session. Performance of these; students as graduates will articulate about the achievement of this “Curriculum for Under-graduate Dental Education in Bangladesh – Updated 2016” as need-based, community oriented & competency based.

I hope this curriculum will continue to serve as guiding principle for the students and faculty members. It is readily understood that in order to further improve, update this Curriculum for Under-graduate Dental Education in Bangladesh–Updated 2016 needs constant review, revision and updating.

Last but not least, I would like to extend my deep gratefulness to all faculty members of Centre for Medical Education and others who shared their expertise and insights and worked hard to generate this precious document.

**Prof. Dr. Md. Abdur Rashid**

Director

Medical Education & Health Manpower Development

DGHS, Mohakhali, Dhaka 1212

## ACKNOWLEDGEMENT

Factors contributing to an effective dental education system are quality of students, quality of teaching staff, and their effective delivery of need based scientific curriculum. Although the best students are admitted in the dental colleges every year yet the dental graduates are not always of the desired quality for providing oral & dental health services to the community. The answer then should be sought in other factors of which the most important is the curriculum. A curriculum is generally regarded as a programme of instruction for an educational institution and its plan takes the form of a descriptive outline of courses, their arrangement and sequence, the time assigned to them, the contents to be covered in them, the instructional methods to be employed and finally evaluation.

The enormous task of reviewing and updating of the BDS curriculum was assigned to Centre for Medical Education (CME). The curriculum was reviewed and updated with a scientific approach of Delphi Technique in national workshops. The participants of these workshops were almost all the Professors of the concerned departments/subjects, principals of all the dental colleges, medical educationists, faculty members of CME and a good number of resource personnels including the President & members of the Bangladesh Medical & Dental Council and Deans of the Faculty of Medicine of Dhaka/Chittagong/Rajshahi/Shah Jalal Universities and concerned persons from DGHS and MOH&FW. The other supplementary approach was to make it evidence based through need assessments. The overwhelming response of all categories of teachers for reviewing & updating of this curriculum is indeed praiseworthy. They have worked hard to identify and discard the superfluous elements from the course contents and added new elements to make teaching-learning process more relevant, meaningful and up-to-date. Congratulations to them, they have done a commendable job. Efforts given by the principals, members of academic council, teachers, students and intern doctor providing their valuable opinions during the need assessment at the beginning of reviewing and updating of this BDS curriculum are duly acknowledged. As director, CME I express my gratitude to all the members of National Core Committee(NCC) for their all cordial co-operation, guidance all the ways since beginning up to the completion of reviewing and updating of BDS curriculum. I acknowledge the technical and financial support from PSE, DGHS.

The composition of the planners of this curriculum is unique. The authorities responsible for approving, implementing and functioning of this curriculum have worked together and involved themselves in its reviewing & updating. It is only natural that they left no stone unturned to get a need based and competency based applicable curriculum. I would like to acknowledge Professor Dr. Md. Humayun Kabir Talukder, Professor (Curriculum Development & Evaluation), Centre for Medical Education (CME) for his efforts in co-ordinating this activity without which it would be difficult to complete this work. I am grateful to all others who actively participated in this great job, specially the faculty and staffs of Centre for Medical Education who worked very hard and efficiently to develop this BDS Curriculum 2016 which is mainly discipline based community oriented with the reflection of competency based, integrated & community based in nature.

**Professor Dr. AFM Saiful Islam**  
Director  
Centre for Medical Education  
Mohakhali, Dhaka – 1212

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## National Goal and Objectives of Course

### National Goal:

To produce competent, compassionate, reflective and dedicated health care professionals who:

- consider the care and safety of their patients as first concern
- establish and maintain good relationship with patients, their attendants and colleagues
- are honest, trustworthy and act with integrity
- are capable of dealing with common dental diseases and dental health problems of the country and are willing to serve the community particularly the rural community;
- but at the same time acquire firm basis for future training, service and research at both national and international level.
- are committed to keep their knowledge and skill up-to-date through 'Continuous Professional Development' all through their professional life.

### General Objective of BDS Course:

The purpose of the dental educational program is to provide the opportunity for the learner to gain scientific knowledge and clinical skills needed in the practice of the profession, to instill the highest standards of professional conduct as a way of life and to promote a dedication to continuous, life-long professional study and improvement.

### Specific Objectives of BDS Course :

The dental graduate should possess:

- a. A thorough understanding of the biological sciences to enable the integration and correlation of these basic sciences with clinical dental practice.
- b. Competence in diagnosis of oral and dental diseases including and understanding of the relationship between general and oral diseases.
- c. Skills to provide the preventive and curative services commonly required in dental practice.
- d. The ability to organise and administer a dental practice efficiently.
- e. Ability to appraise and apply research findings and new technology.
- f. A commitment towards continuing education.
- g. A sense of professional, ethical and social responsibility.

## Basic Information about BDS Course

1. **Name of the course:** Bachelor of Dental Surgery (BDS)
2. Basic qualifications & prerequisite for entrance in BDS Course:
  - (i) HSC or equivalent with Science.(Biology, Physics, Chemistry)
  - (ii) Candidate has to secure required grade point in the SSC and HSC examinations.
3. **Students selection procedure for BDS course:** According to decision by the proper competent authority as per merit.
4. Medium of Instruction: English
5. **Duration:** BDS course comprises of 5 Years, followed by logbook based rotatory internship for one year
6. Course structure and duration

The BDS course is divided into four phases .

Phase	Duration	Subjects	
1st phase	1½ year	Sub 1 : Anatomy & Dental Anatomy Sub 2 : Physiology, Biochemistry & Science of Dental Materials	First Professional BDS
2nd phase	1 year	Sub 3 : General & Dental Pharmacology Sub4 : Pathology & Microbiology	Second Professional BDS
3rd phase	1 year	Sub 5 : Medicine Sub 6 : Surgery Sub 7 : Periodontology & Oral Pathology	Third Professional BDS
4th phase	1½ year	Sub 8 : Oral & Maxillofacial Surgery Sub 9 : Conservative Dentistry & Endodontics Sub 10: Prosthodontics Sub 11: Orthodontics & Dentofacial Orthopedics Sub 12: Pedodontics & Dental Public Health	Final/4th Professional BDS

**NB:** All academic activities including professional examination of each phase must be completed within the specified time of the phase.

## 7. Phase wise distribution of teaching-learning hours:

### 1st Phase

Subject	Lecture (in hours)	Tutorial (in hours)	Practical (in hours)	Others/ Demonst ration/ Dissection + card Exam (in hours)	Integrated teaching (in hours) (Common)	Formative Exam		Summative exam		Total hours
						Prepar atory leave	Exam time	Prepar atory leave	Exam time	
Sub 1-Paper I: Anatomy	80 hrs	24hrs	24 hrs	148+20 =168 hrs	10 hrs	20 days	42 days	30 days	30 days	296
Sub 1-Paper II: Dental Anatomy	99	146	27	18						290
Sub 2-Paper I: Physiology & Biochemistry	132	124	60	-						316
Sub 2-Paper II: Science of Dental Materials	110	40	70	69						289
Total										1191
Behavioral science, communication skill and medical ethics will be taught through four lecturers (4 hours) within 1st phase under supervision of Dental Public Health department										4
Grand Total										1195
(Time for integrated teaching, examination preparatory leave and for formative & summative assessment is common for all subjects of the phase )										

### 2nd Phase

Subject	Lecture (in hours)	Tutorial (in hours)	Practical/ Demonstr ation (in hours)	Integrated teaching (in hours)	Formative Exam		Summative exam		Total hours
					Preparato ry leave	Exam time	Preparato ry leave	Exam time	
General & Dental Pharmacolo gy	100	70	40	10 hrs	10 days	20 days	10 days	25 days	210
Pathology & Microbiolog y	116	102	22						240
Total									450
(Time for integrated teaching, examination preparatory leave and for formative & summative assessment is common for all subjects of the phase )									

3rd Phase											
Subject	Lecture (in hours)	Tutorial (in hours)	Practical (in hours)	Clinical (in hours)	Others/ Demonstr ation/ Dissection (in hours)	Integrated teaching (in hours)	Formative Exam		Summative exam		Total hours
							Prepara tory leave	Exam time	Prepara tory leave	Exam time	
Medicine	90	-	10	144	-	10 hrs	10 days	20 days	10 days	25 days	244
Surgery	97	30	41	22	22						212
Periodont ology & Oral Pathology	84	60	28	65	-						237
Total											693
(Time for integrated teaching, examination preparatory leave and for formative & summative assessment is common for all subjects of the phase )											

4th Phase											
Subject	Lecture (in hours)	Tutorial (in hours)	Practical (in hours)	Clinical (in hours)	Others/ Demonstr- ation/ Dissection (in hours)	Integrated teaching (in hours)	Formative Exam		Summative exam		Total hours
							Prep- aratory leave	Exam time	Prepara- tory leave	Exam time	
Oral & Maxillofacial Surgery	150	65	-	125 (P+Cli)	-	10 hrs	10 days	20 days	10 days	35 days	340
Conservative Dentistry & Endodontics	90	50	28	96	-						264
Prosthodontics	163	47	71	47	6						334
Orthodontics & Dentofacial Orthopedics	180	30	50	80	-						340
Pedodontics & Dental Public Health	137	144	162	-	-						443
Total											1721
(Time for integrated teaching, examination preparatory leave and for formative & summative assessment is common for all subjects of the phase )											
Preventive aspects of all diseases will be given due importance in teaching learning considering public health context of the country and others parts of the world.											
Related ethical issues will be discussed in all clinical teaching learning											
Few clinical teaching-learning will start from 2nd Phase & 3rd Phase as per need and context of the subjects accommodating in academic calendar											

## 8. Teaching & learning methods

The following teaching and learning methods will be followed:

Large Group Teaching:

- Lecture
- Seminar

Small Group Teaching:

- Tutorial
- Demonstration
- Students interaction Problem based Learning (PBL)

Practical session:

- Use of practical manual
- Performing the task/examination by the student
- Writing the practical note book

Field Placement (Community based medical/dental education):

- In small groups for performing activities by the student themselves

Clinical teaching:

- In ward, OPD, OT, POW, ED etc.
- By concerned persons

Integrated teaching

Encourage to learn ICT through computer lab of the college.

## 9. Assessment:

- A. There will be in-course (card/item/term) and end-course (professional) assessment for the students in each phase (1st, 2nd, 3rd & 4th phase) of the course i.e. formative and professional examination.
- B. Formative assessment will be done through results of items, card and term ending examination & class attendance.
- C. For formative assessment, 10% marks of written examination of each paper of each subject is allocated
- D. For MCQ of each paper, 20% marks are allocated. There will be separate answer script for MCQ part of examination. Total number of MCQ will be 20.
- E. For SAQ of each paper, 70% marks are allocated
- F. Oral part of the examination will be structured
- G. OSPE / OSCE will be used for assessing skills/competencies. Traditional long & short cases will be also used for clinical assessment
- H. There will be phase final professional examination within the each academic phase.
- I. Eligibility for appearing in the professional examination:
  - ☐ Certificate from the respective head of departments regarding students obtaining at least 75% attendance in all classes (theory, practical, tutorial, residential field practice, clinical placement etc.) during the phase.
  - ☐ Obtaining at least 60% marks in examinations.

- ☐ No student shall be allowed to appear in the professional examinations unless the student passes in all the subjects of the previous professional examinations

**J. Pass Marks:**

Pass marks is 60%. Student shall have to pass written (MCQ + SAQ + formative), oral, practical and clinical examination separately.

**K. Examinations & distribution of marks:**

**First Professional Examination**

Subjects	Written Exam marks	Structured Oral Exam marks	Practical Exam marks	Formative Exam marks	Total Marks
Sub 1-Paper I: General Anatomy	90	100	100	10	300
Sub 1-Paper II: Dental Anatomy	90	100	100	10	300
Sub 2-Paper I: Physiology & Biochemistry	90 (45+45)	100 (50+50)	100 (50+50)	10 (05+05)	300
Sub 3-Paper II: Science of Dental Materials	90	100	100	10	300
<b>Total</b>					<b>1200</b>

**Second Professional Examination**

Subjects	Written Exam marks	Structured Oral Exam marks	Practical Exam marks	Formative Exam marks	Total Marks
General Pharmacology & Dental Therapeutics	90 (45+45)	100 (50+50)	100 (50+50)	10 (05+05)	300
Pathology & Microbiology	90 (45+45)	100 (50+50)	100 (50+50)	10 (05+05)	90 (45+45)
<b>Total</b>					<b>600</b>

### Third Professional Examination

Subjects	Written Exam marks	Structured Oral Exam marks	Practical + Clinical Exam marks	Formative Exam marks	Total Marks
Medicine	90	100	100	10	300
Surgery	90	100	100	10	300
Periodontology & Oral Pathology	90 (45+45)	100 (50+50)	100 (50+50)	10 (05+05)	300
<b>Total</b>					<b>900</b>

### Fourth Professional Examination

Subjects	Written Exam marks	Structured Oral Exam marks	Practical + Clinical Exam marks	Formative Exam marks	Total Marks
Oral & Maxillofacial Surgery	90 (45+45)	100 (50+50)	100 (50+50)	10 (05+05)	300
Conservative Dentistry & Endodontics	90 (45+45)	100 (50+50)	100 (50+50)	10 (05+05)	300
Prosthodontics	90	100	100	10	300
Orthodontics & Dentofacial Orthopedics	90 (45+45)	100 (50+50)	100 (50+50)	10 (05+05)	300
Pedodontics & Dental Public Health	90 (45+45)	100 (50+50)	100 (50+50)	10 (05+05)	300
<b>Total</b>					<b>1500</b>

### L. Common Rules for Examinations

- University Professional BDS Examinations will be held twice in a year and will be started in the month of May and November every year.
- University Professional BDS Examinations will be completed within the specified time of the concerned phase.
- After passing all the subjects of First professional BDS Examination, students can appear in Second Professional BDS Examination if all other prerequisites for appearing in Second professional examination

are fulfilled as per curriculum. Only those students who appeared in First Professional BDS Examination will be eligible to attend all classes of 2nd phase including clinical ward placement within 02 (Two) weeks of completion of First Professional BDS Examination.

- d) To appear in Third Professional BDS Examination, students will have to pass all the subjects of the Second Professional BDS Examination and all other prerequisites for appearing in Third Professional BDS Examination must be fulfilled as per curriculum.
  - e) i) To appear in Fourth (Final) Professional BDS Examination, students will have to pass all the subjects of the Third Professional BDS Examination and all other prerequisites for appearing in Fourth (Final) Professional BDS Examination must be fulfilled as per curriculum.  
ii) A student will be eligible to appear in Fourth (Final) Professional BDS Examination only after completion of a period of 12 months from passing all the subjects of Third Professional BDS Examination in order to attain clinical skills and competencies.
- M. Few directives and consensus about the following issues of assessment:
- i. Incase of OSPE/OSCE- Instruments/equipments to be taken to oral boards to ask open questions to the students apart from Structured Oral Examination (SOE). There will be scope of instruments related viva, specially in clinical subjects and where applicable. Central OSPE/OSCE from Dean Office after moderation will be encouraged.
  - ii. Incase of Structured Oral Examination (SOE), instead of preparing specific structured question, topics will be fixed considering wide range of contents coverage. Rating scale will be used for marking the students concurrently. Each student will be asked questions from all topics of the set. Equal or average duration of time will be set for every student.

#### **10. Internship :**

After passing final professional BDS examination students have to enroll for one year log book based rotatory internship programme. Within this one year 11 months and 15 days at dental/medical college hospital and 15 days at UHC. Internship programme will be more structured and supervised. It is compulsory to complete internship training programme designed by BM&DC to get permanent registration for doing independent practice.

# Anatomy & Dental Anatomy

## Paper – I: Anatomy

### Departmental Objectives

At the end of the course, the students should be able to:

- identify, show, draw, mention and describe the structural components of the body responsible for carrying out normal body functions
- describe the process of development of human embryo emphasizing the development & developmental anomalies of oral, dental & maxillofacial structures including head & neck region
- use the above knowledge to understand, correlate and appreciate the other subjects taught in each year of BDS course
- apply the knowledge of Anatomy with the knowledge of other subjects of BDS course to provide standard and high quality oral and dental health care in the country and abroad.

### List of Competencies to acquire:

- Adequate knowledge of the structural (both macroscopic & microscopic) components of the body & correlate it with normal body functions.
- Applying the knowledge of Anatomy with the knowledge of other subjects taught in BDS course to improve the oral & dental healthcare in the country and abroad.

### Distribution of teaching /learning hours

Lecture	Tutorial	Practical (Histology)	Demonstration +Dissection +Card exam	Total Teaching hours	Integrated teaching in Phase I	Formative Exam		Summative exam		Total days for preparation & exam.
						Preparatory leave +post-term leave	Exam time	Preparatory leave	Exam time	
80 hrs	24hrs	24hrs	148+20 = 168hrs	296 hrs	10 hrs	20 days	42 days	30 days	30 days	109 days

### Teaching/learning methods, teaching aids and evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
<ul style="list-style-type: none"> <li>● Lecture</li> <li>● Integrated teaching</li> </ul>	<ul style="list-style-type: none"> <li>● Tutorial</li> <li>● Practical</li> <li>● Demonstration</li> </ul>	<ul style="list-style-type: none"> <li>● Self-study &amp; self-assessment</li> </ul>	<ul style="list-style-type: none"> <li>● Computer / laptop &amp; Multimedia</li> <li>● OHP, Transparency &amp; Transparency marker</li> <li>● White board &amp; different colour white board markers</li> <li>● Black board &amp; white and coloured chalks</li> <li>● Cadavers, prosected parts, bones, viscera</li> <li>● Histology slides and slide projector</li> <li>● Microscope</li> </ul>	<ul style="list-style-type: none"> <li>● Item Examination</li> <li>● Card Final Examination</li> <li>● (written/oral + practical)</li> <li>● Term Final Examination</li> <li>● (written, oral+practical)</li> </ul>

**Related Equipment's:** Flip Chart, Photograph, Model, X-ray films, View box, Diagram, Preserved specimens, Living body for surface marking.

### 1st Professional Examination:

Marks distribution of Assessment of Anatomy

Total marks – 300

- Written=100 (Formative 10+MCQ 20+SAQ 70)
- SOE= 100
- Practical=100

Learning Objectives	Contents	Teaching Hours
<p><b>General Anatomy</b> Student will be able to</p> <ul style="list-style-type: none"> <li>● define anatomy, explain the subdivisions of anatomy &amp; mention the importance of learning anatomy in dental course</li> <li>● describe the anatomical terminology&amp; show the anatomical planes &amp; positions</li> <li>● define &amp; classify the bone. describe the composition ,blood supply &amp;functions of bones.</li> <li>● describe the parts of a developing long bone &amp; explain its blood supply</li> <li>● describe the structure &amp; functions of periosteum &amp; endosteum</li> <li>● define ossification &amp; ossification centres</li> <li>● describe the process of ossification</li> <li>● mention the factors affecting the growth of bone</li> <li>● describe composition, characteristics, types, location and functions of different types of cartilages</li> <li>● define &amp; classify joints, describe the characters, stability &amp; movements of joints . explain the general plan of blood &amp; nerve supply of a joint</li> <li>● classify muscles, their properties and functions</li> <li>● define &amp; classify blood vessels. mention its component parts . describe nutrition &amp; innervations of blood vessels</li> <li>● describe different types of vascular anastomosis with their functional &amp; clinical implications</li> <li>● describe the general plan of arrangement of blood vessels of extremities , head &amp; neck region and correlate with clinical applications /conditions</li> <li>● describe the systemic, portal &amp; pulmonary circulation</li> </ul>	<p><b>Contents</b> <b>CORE :</b></p> <ul style="list-style-type: none"> <li>● Definition, subdivisions of Anatomy and its importance in the study of dental course</li> <li>● Anatomical terminology and anatomical planes &amp; positions</li> <li>● Skeletal system- Bones – classification, composition, functions, parts of a developing long bone, blood supply, periosteum &amp; endosteum. Ossification- definition, centres &amp; processes. Factors affecting growth of bone</li> <li>● Cartilages- composition, types, characters, locations and functions</li> <li>● Joint: Definition, Component parts, classification, characteristics of each type &amp; movements, stability of the joints .General plan of blood supply &amp; nerve supply of joints</li> <li>● Muscular system: classification, characteristics and functions</li> <li>● Blood vascular system: component parts</li> <li>● Blood vessels : classification.</li> <li>● Differences between different types of vessels</li> <li>● Nutrition &amp; innervation of vessels .vascular anastomosis</li> <li>● Arteries and veins of superior&amp; Inferior extremities and head, neck with emphasis to its clinical applications</li> <li>● Circulation : Types, characteristic features of each type</li> </ul>	<p>L= 01 hr</p> <p>L= 01 hr</p> <p>L= 03 hrs</p> <p>L= 02hrs</p> <p>L= 02 hrs</p> <p>L= 03 hrs</p>

Learning Objectives	Contents	Teaching Hours
Students will be able to:		<b>TERM I</b>
<ul style="list-style-type: none"> <li>describe components, functions &amp; the general plan of lymphatic drainage of the whole body</li> </ul>	<ul style="list-style-type: none"> <li>Lymph vascular system : components, characteristic features &amp; functions of lymph capillaries</li> </ul>	L= 02 hrs
<ul style="list-style-type: none"> <li>classify &amp; describe the functions of lymphoid organs</li> </ul>	<ul style="list-style-type: none"> <li>Lymphoid organs: classification &amp; functions</li> </ul>	
<ul style="list-style-type: none"> <li>describe general outline of different parts of respiratory system with functions</li> </ul>	<ul style="list-style-type: none"> <li>Respiratory system: different' parts and functions</li> </ul>	L= 01 hr
<ul style="list-style-type: none"> <li>describe general outline of different parts of digestive system with their functions including the salivary glands and associated organs</li> </ul>	<ul style="list-style-type: none"> <li>Digestive system: different parts with their function including the salivary glands and associated organs</li> </ul>	
<ul style="list-style-type: none"> <li>describe general outline of endocrine and exocrine system, their component parts, situation, functions</li> </ul>	<ul style="list-style-type: none"> <li>Endocrine system: Component parts, situation, functions.</li> </ul>	L= 01 hr
		<b>TERM II</b>
<ul style="list-style-type: none"> <li>describe the parts of special sense organs and their functions</li> </ul>	<ul style="list-style-type: none"> <li>Special sense organs : parts &amp; functions •</li> </ul>	L= 01 hr

Learning Objectives	Contents	Teaching Hours
<p><b>Cell Biology</b></p> <p>Student should be able to:</p> <ul style="list-style-type: none"> <li>● define and describe the human cell &amp; its constituents, structure &amp; functions of cell membrane.</li> <li>● describe the structure &amp; functions of organelles &amp; inclusions</li> <li>● describe the structure &amp; functions of nucleus</li> </ul>	<p><b>CORE:</b></p> <p>Human Cell: types, basic organization, constituents, cell membrane</p> <ul style="list-style-type: none"> <li>● cytoplasm, organelles and inclusions</li> <li>● nucleus</li> </ul>	<p><b>TERM- I</b></p> <p>L= 03 hrs.</p>
<p><b><i>Human Genetics</i></b></p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● describe the basic features of chromosomes and common chromosomal disorders</li> <li>● define gene, genotype and phenotype</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Chromosomes: structure, classification ,biochemical nature &amp; chromosomal disorders (Down Syndrome, Turner's Syndrome, Klinefelter's syndrome)</li> <li>● Gene, genotype and phenotype : definition</li> </ul>	<p>L= 02hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>General Histology</b></p> <p>Student should be able to:</p> <ul style="list-style-type: none"> <li>define and classify the basic tissues in the body</li> <li>describe the different types, characters, distribution and the functions of epithelial tissue .describe the cell surface specialization</li> <li>describe the compositions, characters, distributions and the functions of different types of connective tissue. Describe the structure &amp; functions of different types of connective tissue cells &amp; fibres. describe the structure of bone &amp; cartilage.</li> <li>describe the histological structures of smooth muscle , cardiac muscle &amp; skeletal muscle. explain the differences between different types of muscles. Mention the location/distribution of different types of muscles</li> <li>describe the structure &amp; functions of neuron &amp; neuroglia</li> </ul>	<p><b>Basic tissues:</b> Definition, Classification, Characters, Components, Distribution and Functions of :</p> <ul style="list-style-type: none"> <li>Epithelial tissue</li> <li>Connective tissue</li> <li>Muscular tissue</li> <li>Nervous tissue</li> </ul>	<p><b>TERM I</b></p> <p>L= 04hrs</p> <p>L= 04hrs</p> <p>L= 01hrs</p> <p><b>TERM :II</b> 01 hr</p>
<p><b>Systemic Histology</b></p> <p>Student should be able to:</p> <ul style="list-style-type: none"> <li>describe the histological structures of different parts of body system &amp; organs</li> </ul>	<ul style="list-style-type: none"> <li>Respiratory system</li> <li>Vascular system</li> <li>Lymphoid organs</li> <li>Digestive system &amp; its associated glands</li> <li>Urinary system</li> <li>Reproductive system (male and female)</li> <li>Endocrine glands</li> <li>Nervous system</li> <li>Integumentary system</li> </ul>	<p><b>TERM II</b></p> <p>01 hr</p> <p>01 hr</p> <p>02hrs</p> <p>02 hr</p> <p>01 hr</p> <p>01 hr</p> <p>01hr</p> <p>01 hr</p> <p>01 hr</p>

**NB:** Histological structure of salivary glands will be taught and assessed in Dental Anatomy

Learning Objectives	Contents	Teaching Hours
<p><b>General Embryology</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● define terms related to embryology</li> <li>● explain the importance of study of embryology</li> <li>● explain the events of cell cycle .describe different types of cell division .</li> <li>● describe chromosomal changes during cell division with anomalies</li> <li>● define &amp; describe oogenesis and spermatogenesis</li> <li>● define fertilization. describe the events&amp; results of fertilization</li> <li>● describe the derivatives of germ layers: ectoderm, mesoderm &amp; endoderm.</li> <li>● define &amp; describe the causes of congenital anomalies</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Introduction: Terms and definitions importance of study of embryology</li> <li>● Cell cycle and cell division</li> <li>● Gametogenesis and maturation of germ cells</li> <li>● Fertilization: definition ,events, factors influencing the fertilization and results of fertilization</li> <li>● Derivatives of germ layers: ectoderm, mesoderm &amp; endoderm</li> <li>● Teratology: definition &amp; factors</li> </ul>	<p><b>TERM I</b></p> <p>01 hr</p> <p>01 hr</p> <p>01hrs</p> <p>01 hr</p> <p>01 hr</p> <p><b>TERM II</b></p> <p>01hr</p>

Learning Objectives	Contents	Teaching Hours
<p><b><i>Systemic Embryology</i></b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● describe the process of development of different body system</li> <li>● describe the developmental anomalies of different body systems</li> </ul>	<p><b>CORE:</b> Development and their anomalies of</p> <ul style="list-style-type: none"> <li>● Digestive system with associated glands</li> <li>● Respiratory system</li> <li>● Cardiovascular system</li> <li>● Nervous system</li> <li>● Eye &amp; Ear</li> </ul>	<p><b>TERM II</b></p> <p>02 hr</p> <p>01 hr</p> <p>01hrs</p> <p>02 hrs</p> <p>01 r</p>

**NB:** Development of Face, tongue, palate, tooth, oral cavity, salivary glands, thyroid gland, parathyroid gland , pharyngeal arches, pouches and cleft will be taught and assessed in Dental Anatomy

Learning Objectives	Contents	Teaching Hours
<p><b>Neuroanatomy</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● classify nervous system. describe composition of grey matter and white matter</li> <li>● classify neuron. describe the structure &amp; functions of neuron</li> <li>● explain the structure, process of myelination, degeneration &amp; regeneration of nerve fibres</li> <li>● define &amp; classify synapse, receptors. describe the structure, location &amp; functions of receptor &amp; synapse</li> <li>● define autonomic nervous system. Describe the different parts of autonomic nervous system, nerve plexuses &amp; ganglia. Explain the differences between its different parts.</li> <li>● Describe the extension, folds, spaces, nerve supply &amp; blood supply of pia, arachnoid and dura mater.</li> <li>● describe the location, area of drainage of dural venous sinuses &amp; their communication with extracranial veins with their clinical importance.</li> <li>● explain blood brain &amp; blood CSF barrier</li> <li>● describe the formation, composition, circulation, absorption &amp; functions of CSF</li> <li>● describe the location &amp; contents ventricles of brain</li> <li>● describe the different lobes, gyri, sulci and important functional areas with effects of lesion. explain the mode of blood supply of cerebrum</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Basic organization of nervous system</li> <li>● Neuron and neuroglia</li> <li>● Nerve fibres: structure, classifications &amp; functions, myelination degeneration, regeneration</li> <li>● Receptors : Definition, structure, classifications, locations &amp; functions</li> <li>● Autonomic nervous system, autonomic nerve plexuses &amp; ganglia</li> <li>● Coverings of brain and spinal cord: pia, arachnoid and dura mater- Extension, folds, spaces, nerve supply &amp; blood supply Dural venous sinuses: location, area of drainage, communications with extracranial veins &amp; their clinical importance</li> <li>Barriers of brain</li> <li>● Cerebrospinal fluid (CSF)</li> <li>● Ventricles of brain</li> <li>● <b>Motor system</b> Cerebrum: Lobes, gyri, sulci Functional areas, Blood supply</li> </ul>	<p><b>TERM II</b></p> <p>01 hr</p> <p>01hrs</p> <p>01hr</p> <p><b>TERM I &amp; TERM II</b> 01+01 hrs</p> <p><b>TERM II</b></p> <p>01 hr</p> <p>01 hr</p> <p>02 hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>Neuroanatomy</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>describe origin , course &amp; termination of pyramidal tract&amp; effects of its lesion</li> <li>define UMN &amp; LMN. Explain lesions of UMN &amp; LMN</li> <li>describe functional lobes,nuclei, peduncles, blood supply,functions&amp; clinical conditions of cerebellum</li> <li>classify cranial nerves, explain functional components and mention cranial nerve nuclei, and describe the course &amp; distribution of III, IV,V,VI,VII, IX, X, XI, XII cranial nerves. explain the effects of lesion of V,VII, IX, X,XI,&amp;XII cranial nerves</li> <li>describe the origin , course &amp; functions ofspinothalamic tract, fasciculus gracilis&amp; fasciculus cuneatus with their effects of lesion</li> <li>describe the length, extension, enlargements &amp;sections of spinal cord at different level . explain the blood supply of spinal cord.</li> <li>describe the location &amp; functions of thalamus &amp; hypothalamus</li> <li>explain functional components nuclei, and course of I, II,VIII, cranial nerves . Explain the smell, visual &amp; auditory pathway</li> <li>describe the parts , blood supply, functions and clinical importance of brain stem.</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>Pyramidal tract (corticospinal tract )</li> <li>Upper(UMN) &amp; lower motor neuron(LMN)</li> <li>Cerebellum: parts, functions , blood supply,clinical conditions</li> <li>Motor &amp; mixed cranial nerves</li> <li><b>Sensory system:</b></li> <li>Ascending tracts of spinal cord : spinothalamic tract, fasciculus gracilis&amp; fasciculus cuneatus</li> <li>Spinal Cord: Length, extension, enlargement, blood supply</li> <li>Thalamus and hypothalamus functions</li> <li>Sensory cranial nerves</li> <li>Brain stem : parts , blood supply, functions and clinical importance of brain stem</li> </ul>	<p><b>TERM II</b></p> <p>01 hrs 01 hr</p> <p>02hrs</p> <p>01 hr</p> <p>01hr</p> <p>01 hr</p> <p>01 hr</p> <p>01hr</p>

Learning Objectives	Contents	Teaching Hours
<p><b><i>Living (surface) Anatomy</i></b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● locate and count ribs and costal cartilages</li> <li>● draw and demonstrate on the surface of the body: the important anatomical points and structures of Thorax</li> </ul>	<p><b>Thorax</b> <b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Counting of ribs and costal cartilages</li> <li>● apex of heart and its borders</li> <li>● Lung-borders and apex,</li> <li>● Trachea &amp; its bifurcation</li> <li>● Triangle of auscultation</li> <li>● Jugular notch</li> <li>● Sternal angle</li> <li>● Arch of the aorta</li> </ul>	<p>T= 04 hrs</p>

Learning Objectives	Contents	Teaching Hours
<b>Students will be able to:</b> <ul style="list-style-type: none"> <li>draw and demonstrate on the surface of the body important anatomical points and structures of Head and Neck</li> </ul>	<b>Head and neck</b> <ul style="list-style-type: none"> <li>Facial artery &amp; facial vein</li> <li>Internal jugular vein,</li> <li>Common Carotid artery &amp; its bifurcation</li> <li>Facial Nerve &amp; their branches</li> <li>Vagus nerve in the neck</li> <li>Parotid gland and its duct</li> <li>Frontal and maxillary air sinuses</li> <li>Thyroid gland</li> <li>Tip of the 7th cervical spine</li> <li>Pterion</li> </ul>	T - 12hrs

Learning Objectives	Contents	Teaching Hours
<b><i>Anatomy of Radiology &amp; Images</i></b> Students will be able to: <ul style="list-style-type: none"> <li>describe radio opaque structures radio-lucent structures</li> <li>identify &amp; locate the normal structures of thorax, abdomen and head &amp; neck in radiography</li> </ul>	<b>CORE</b>  Radio opaque structures Radio-lucent structures PlainX-ray of the <ul style="list-style-type: none"> <li>-Chest PA view</li> <li>-Abdomen AP view</li> <li>-Head &amp; neck (cervical spine) AP &amp; lateral view</li> <li>-Paranasalair sinuses OM view</li> </ul>	T =04hrs

Learning Objectives	Contents	Teaching Hours
<b>Clinical Anatomy</b> Students will be able to: <ul style="list-style-type: none"> <li>describe the anatomical basis of clinical disorders of thorax and abdomen.</li> </ul>	<b>Thorax</b> <ul style="list-style-type: none"> <li>Pleurisy</li> <li>Pleural effusion</li> <li>Coronary artery disease</li> <li>Angina pectoris, myocardial infarction</li> <li>Paralysis of the diaphragm</li> </ul>	03hrs
	<b>Acute Abdomen</b> <ul style="list-style-type: none"> <li>Portal vein obstruction</li> <li>Peritonitis</li> <li>Gastric ulcer</li> <li>Duodenal ulcer</li> <li>Cholecystitis</li> <li>Appendicitis</li> <li>Perforation of Abdomen</li> </ul>	04hrs

Learning Objectives	Contents	Teaching Hours
<p><b><i>Clinical Anatomy</i></b></p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>describe the anatomical basis of clinical disorder of Head &amp; Neck and CNS</li> </ul>	<p><b><i>Head &amp; Neck</i></b></p> <ul style="list-style-type: none"> <li>Fracture of the skull</li> <li>Scalp injury</li> <li>Piriform fossa and foreign body</li> <li>Gingivitis, tonsillitis , pharyngitis, laryngitis</li> <li>Obstruction of salivary ducts</li> <li>Parotitis</li> <li>Otitis media</li> <li>Otitis externa</li> <li>Sinusitis</li> <li>Epistaxis</li> <li>Swelling of thyroid gland</li> <li>Dislocation of Temporomandibular joint</li> <li>Cranial nerve palsy : V, VII, IX. X, XI ,XII</li> </ul> <p><b><i>CNS &amp; Eyeball</i></b></p> <ul style="list-style-type: none"> <li>Meningitis</li> <li>Epidural,subdural,subarachnoidhaemorrhage</li> <li>Cerebral ischaemia</li> </ul>	<p>10hrs</p> <p>04hrs</p>

## Regional Anatomy :THORAX CARD (DISSECTION, DEMONSTRATION & TUTORIAL)

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>identify &amp; demonstrate the surfaces, borders, chambers-including structures within the chambers of the heart . know the blood supply &amp; nerve supply of heart identify &amp; demonstrate the layers of pericardium</li> <li>identify &amp; demonstrate the surfaces, borders, fissures, lobes, hilum &amp; bronchopulmonary segments of the lung identify &amp; demonstrate the layers &amp; parts of pleura. explain the blood supply &amp; nerve supply of lung &amp; pleura. identify &amp; demonstrate the trachea, bronchus &amp; bronchial tree. explain blood supply &amp; nerve supply of trachea &amp; bronchial tree.</li> <li>correlate clinical conditions associated with structures of thorax (Heart with its vessels, lung, trachea, bronchus, bronchial tree &amp; the diaphragm)</li> </ul>	<ul style="list-style-type: none"> <li>Heart with pericardium.</li> <li>Lung with pleura, trachea and bronchus.</li> <li>Clinical Anatomy</li> </ul>	18hrs

**Regional Anatomy: ABDOMEN CARD**  
**(DISSECTION, DEMONSTRATION & TUTORIAL)**

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● demonstrate the features of liver &amp; different parts of biliary system explain blood supply, lymphatic drainage &amp; nerve supply of them.</li> <li>● demonstrate the muscles and identify the vessels, nerves of posterior abdominal wall</li> <li>● correlate clinical conditions associated with different organs of the abdomen</li> </ul>	<ul style="list-style-type: none"> <li>● Liver with the biliary apparatus including gall bladder. Portal vein .</li> <li>● Muscles, blood vessels and nerves of the posterior abdominal wall</li> <li>● Clinical Anatomy</li> </ul>	<p>28 hrs</p>

## Regional Anatomy: HEAD & NECK CARD (DISSECTION, DEMONSTRATION & TUTORIAL)

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>Identify &amp; demonstrate the different parts of bones of head &amp; neck. state the gross features &amp; attachments of skull bones including base of skull &amp; cervical vertebrae. demonstrate movements of joints of head &amp; neck. know the artery supply, venous drainage and lymphatic drainage of head &amp; neck</li> <li>demonstrate the layers of scalp identify the contents of temporal region &amp; infratemporal fossa</li> <li>demonstrate the boundary of face. identify muscles and demonstrate sensory supply of face mention the boundaries &amp; contents of orbit. state the parts with their locations of lacrimal apparatus.</li> <li>demonstrate the boundary and identify contents of anterior triangle, posterior triangle &amp; sub-mandibular region</li> <li>describe the location, parts, blood supply functions of thyroid gland</li> <li>demonstrate the boundary and identify contents of mouth cavity. demonstrate the gross features &amp; nerve supply of tongue gum &amp; teeth</li> <li>demonstrate the parts of pharynx with their extension &amp; muscles of pharynx. mention the location, artery supply of palatine tonsil.</li> <li>describe the walls of nose and paranasal air sinuses</li> <li>describe the extension, cartilages &amp; muscles of larynx. Identify structures present in the interior of larynx. mention its nerve supply state the location of parotid gland, sublingual &amp; submandibular salivary glands &amp; mention the mode of termination of their ducts. mention the structures within the parotid gland state the location of thyroid, parathyroid &amp; pituitary glands. mention their blood supply</li> <li>demonstrate the different parts of external, middle &amp; internal ear</li> <li>correlate important clinical conditions associated with structures in head &amp; neck.</li> </ul>	<ul style="list-style-type: none"> <li>Bones &amp; joints of head and neck</li> <li>Blood vessels including dural venous sinuses &amp; lymphatics of head &amp; neck</li> <li>Scalp, temporal region and infratemporal fossa</li> <li>Face, orbit, lacrimal apparatus</li> <li>Anterior triangle and submandibular region Posterior triangle</li> <li>Oral cavity, tongue, gum and teeth</li> <li>Pharynx and tonsils</li> <li>Nose and paranasal air sinuses</li> <li>Larynx</li> <li>Salivary glands</li> <li>Endocrine glands</li> <li>Organs of hearing and equilibrium.</li> <li>Clinical Anatomy</li> </ul>	<p><b>Total: 70hrs</b></p>

## Regional Anatomy: CENTRAL NERVOUS SYSTEM & EYEBALL CARD (DISSECTION, DEMONSTRATION & TUTORIAL)

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● demonstrate the boundary &amp; contents of cranial cavity &amp; orbit.</li> <li>● demonstrate the boundary of different lobes of cerebrum, sulci, gyri &amp; important functional areas</li> <li>● explain the blood supply of cerebrum including the formation of Circle of Willis</li> <li>● demonstrate&amp; describe the parts &amp; functions of thalamus and hypothalamus, pituitary gland, internal capsule</li> <li>● demonstrate the parts of brain stem. describe the functions of brain stem. draw the transverse section of different parts of brain stem at different level.</li> <li>● demonstrate the parts of cerebellum. describe the functions of different parts of cerebellum</li> <li>● describe functional component , origin , supply &amp;the course of cranial nerves</li> <li>● describe the boundary &amp; parts of ventricles circulation of CSF through ventricles</li> <li>● describe the gross features of spinal cord and its meninges and spinal nerves attached to it. describe the functional components , formation , course &amp; distribution of spinal nerve</li> <li>● describe the coats of eyeball &amp; the course of optic nerve describe the parts of refractive media</li> <li>● explain the effects of lesion and loss of blood supply to different parts of nervous system.</li> </ul>	<ul style="list-style-type: none"> <li>● Introduction to the nervous system, cranial cavity and orbit</li> <li>● General examination of the brain</li> <li>● Cerebrum.:lobes of cerebrum, sulci, gyri&amp; important functional areas,blood supply formation of Circle of Willis</li> <li>● thalamus hypothalamus, pituitary gland, internal capsule</li> <li>● Brain stem</li> <li>● Cerebellum</li> <li>● Cranial nerves : functional component , origin , supply &amp; the course</li> <li>● Ventricles and cerebrospinal fluid</li> <li>● Spinal cord&amp; spinal nerves</li> <li>● Visual apparatus including the eyeball</li> <li>● Clinical Anatomy.</li> </ul>	<p><b>Total : 12hrs</b></p>

## Cell Biology & Histology Tutorial & Practical (Card I)

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● demonstrate different parts of light microscope &amp; show how to handle it</li> <li>● describe the parts &amp; constituents of cell &amp; cell membrane explain their functions . describe the different stages of cell division</li> <li>● Identify different types of tissue on slide under microscope</li> <li>● Students will be able to identify different structures of the following on slides under microscope: Respiratory system. Cardiovascular system</li> </ul>	<ul style="list-style-type: none"> <li>● Microscope: Parts &amp; how to handle</li> <li>● Cell and cell division</li> <li>● Epithelial tissue</li> <li>● Simple : squamous, cuboidal,columnar Pseudo stratified, Stratified squamous, cuboidal, columnar Transitional</li> <li>● Connective tissue: General Special : bone, cartilage</li> <li>● Muscular tissue: Smooth, skeletal &amp; cardiac muscle</li> <li>● Respiratory system:trachea, bronchial tree and lung</li> <li>● Cardiovascular system : heart , arteries &amp; veins</li> </ul>	<p><b>Total : 24 hrs</b></p>

## Cell Biology & Histology Tutorial & Practical (Card II)

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Students will be able to identify structures of following system/ organs on slides under microscope:</li> </ul> <p>Lymphatic system</p> <p>Digestive system&amp; associated glands</p> <p>Nervous system</p> <p>Endocrine system</p> <p>Skin</p>	<ul style="list-style-type: none"> <li>Lymphatic system Lymph node, tonsil, spleen &amp; thymus</li> <li>Digestive system &amp; associated glands Tongue, pharynx, oesophagus, stomach, small intestine &amp; large intestine (including vermiform appendix) Liver and gall bladder, Pancreas</li> <li>Nervous system :spinal cord, cerebrum, cerebellum, peripheral nerve</li> <li>Endocrine system: pituitary, thyroid , parathyroid &amp; adrenal glands</li> <li>Thick skin &amp; thin skin</li> </ul>	10 hrs

## Integrated Teaching in Anatomy

- Integrated teaching program on a particular topic/organ /organ system should be organized in each term. The topics which are related should be prepared after discussion with the teachers of Anatomy/Physiology & Biochemistry. The horizontal process of Integrated teaching program will help the students to have a simultaneous views of different aspects of Anatomical/Physiological & Biochemical details of a particular topic/organ /organ system.

Topics	Learning Objectives	Term	Department
1. Cell	Students will be able to <ul style="list-style-type: none"> <li>● describe the structure &amp; functions of different constituents of cell</li> <li>● explain membrane transport, membrane potentials &amp; action potentials</li> </ul>	I	Anatomy and dental anatomy Physiology & Biochemistry
2. Heart	Students will be able to <ul style="list-style-type: none"> <li>● describe the gross anatomy &amp; clinical anatomy of heart</li> <li>● describe the structure &amp; properties of cardiac muscle</li> <li>● describe the phases &amp; events of cardiac cycle</li> </ul>	I	Anatomy and dental anatomy Physiology & Biochemistry
3. Alimentary system	Students will be able to <ul style="list-style-type: none"> <li>● describe the gross anatomy &amp; clinical anatomy of alimentary system</li> <li>● describe the movements, transport &amp; mixing of food in GIT</li> <li>● explain the mechanism of regulation of secretion of digestive juices</li> </ul>	I	Anatomy and dental anatomy Physiology & Biochemistry

Topics	Learning Objectives	Term	Department
4. Mouth cavity & Salivary glands	Students will be able to <ul style="list-style-type: none"> <li>● describe boundaries, contents of mouth cavity</li> <li>● describe location , nerve supply, mode of termination of ducts of salivary glands and their functions</li> </ul>	II	Anatomy and dental anatomy Physiology& Biochemistry
5. Composition and functions of different parts of nervous tissue.	Students will be able to <ul style="list-style-type: none"> <li>● describe&amp; classify neurons &amp; neuroglia</li> <li>● explain the functions of neurons &amp; neuroglia</li> </ul>	II	Anatomy and dental anatomy Physiology& Biochemistry
6. Autonomic Nervous System	Students will be able to <ul style="list-style-type: none"> <li>● describe&amp; classify autonomic nervous system</li> <li>● explain the functions of different parts of autonomic nervous system</li> </ul>	II	Anatomy and dental anatomy Physiology & Biochemistry

## Teaching / Learning & Assessment Methods

Teaching / Learning Method	Teaching Aid	In Course Assessment	Summative Assessment
Lecture	Computer & multimedia Slide projector, overhead projector (OHP), writing board.	<ul style="list-style-type: none"> <li>Item Examination: Oral, Practical</li> </ul>	<ul style="list-style-type: none"> <li>Written</li> <li>Oral</li> <li>Practical</li> </ul>
Regional Anatomy: Demonstration & Tutorial	Cadavers, prosected parts, bones, viscera and other specimens of body parts, models, charts, writing board, Illustration sheets/posters, OHP, video, slide projector, computer with CD ROM, radiographs & other images.	Card Completion Examination Written, Oral Practical	
Regional Anatomy: Dissection	Computer & multimedia Cadavers, prosected parts, specimens and bones.	a) Term Examinations: Written, Oral Practical	
Cell Biology & Histology Tutorial & Practical	Microscope, slide projector, OHP, , Illustration sheets (including photomicrographs & drawings)/posters, video projector, computer with CD ROM drive	<ul style="list-style-type: none"> <li>Preparation of exercise book</li> </ul>	

## Assessment in Anatomy

Component	Marks	Total Marks
Formative assessment	10	100
WRITTEN EXAMINATION paper-I- MCQ SAQ	20 70	
ORAL EXAMINATION(Structured) Hard part Soft part	50 50	
PRACTICAL EXAMINATION Objective structured practical Exam (OSPE) including spotting exam Dissection Anatomy of Radiology and imaging Lucky slides Living Anatomy Practical Khata	30 30 10 10 15 05	100
<b>Grand Total     300</b>		

- There will be separate Answer Script for MCQ
- Pass marks 60 % in each of written, oral and practical parts

## TIME ALLOCATION IN ANATOMY LECTURE & REVIEW - 80 HOURS

Term	General Anatomy Hours	Cell Biology Hours	General Histology Hours	Systemic Histology Hours	General Embryology Hours	Systemic Embryology Hours	Neuro anatomy Hours.	Human Genetics Hours.	Total Hours
First Term	18	03	09	00	09	00	01	02	42
Second Term	02	-	01	10	01	07	17	00	38
Grand Total Hours (Class +Exam)	20	3	10	10	10	07	18	02	80

## CELL BIOLOGY & HISTOLOGY - TUTORIAL & PRACTICAL – 24 HOURS

Term	Class Hours (Including Item Exam Hrs)	Card Completion Exam Hours	Total Hours
First Term (Card I)	10	2	12
Second Term (Card II)	10	2	12
Grand Total Hours	20	4	24

## REGIONAL ANATOMY

### DISSECTION, DEMONSTRATION AND TUTORIAL/REVIEW – 192 HOURS

Term	Cards	Dissection & Demonstration	Tutorial Review			Part Completion Examination Hours	Total Hours
			Living (surface) Anatomy	Anatomy of radiology & Images	Clinical Anatomy		
First Term	Thorax	28	2	1	01	06	38
	Abdomen	38	2	1	01	04	46
Second Term	Head, Neck	70	08	2	02	06	88
	Central Nervous system and Eye ball	12	00	00	04	04	20
Grand Total Hours		148	12	04	08	20	192

## ACADEMIC CALENDAR for ANATOMY

Class/Exam	Hours(including Class exams hrs)	First Term (24 working weeks)		Second Term (24working weeks)
Lecture and Review 80	80	<ul style="list-style-type: none"> <li>General Anatomy-18hrs</li> <li>Cell Biology -03hrs</li> <li>Human Genetics - 02hrs</li> <li>General Histology-09hr</li> <li>General Embryology - 09hrs</li> <li>Neuroanatomy – 01hrs</li> </ul>	Preparatory leave +Exam + Post Term leave = 04 weeks	a) General Anatomy -02 hr b) General histology - 01hr c) Systemic Histology - 10hrs d) General embryology-01hr d) Systemic Embryology - 07hrs e) Neuroanatomy–17 hrs
Tutorial/ Review	24	Thorax Card – 04hrs Abdomen Card – 04hr		Head & Neck Card – 12hrs C.N.S & Eyeball – 04hrs
Dissection& Demonstration	148	Thorax Card - 28hrs Abdomen Card – 38hrs		Head & Neck Card –70hrs C.N.S & Eyeball Card - 12hrs
Card Completion Exam	20	Thorax Card- 06 hrs Abdomen Card– 04hrs		Head & Neck Card –06hrs C.N.S & Eyeball Card - 04hrs
Cell Biology & Histology-Tutorial/ Practical+ Exam	24	Card I – 10+2hrs		Card II – 10+2hrs
Grand Total	296			

Preparatory leave + Term II  
03 weeks  
PREPARATORY LEAVE FOR FIRST PROF: 04 weeks

**N.B.** – Card completion examinations will be arranged on discussion with other departments (Physiology & Biochemistry, Science of Dental Material, Dental Anatomy)

Prerequisite for 1st professional examination

1. A Student must pass all term exam before appearing 1st professional exam.
2. Class attendance must be 75 %

Card no.

Cadaver no.

Total marks

# DEPARTMENT OF ANATOMY

.....DENTAL COLLEGE/UNIT

## THORAX CARD

(ITEM EXAM FOLLOWING DISSECTION, DEMONSTRATION & TUTORIAL)

<b>Year</b>	
<b>Session</b>	
<b>Roll No.</b>	
<b>Batch</b>	

<b>Card no.</b>	
<b>Cadaver no.</b>	
<b>Total marks</b>	
<b>Pass marks</b>	

<b>Name of the student</b>				
<b>Period of placement</b>	<b>From</b>		<b>To :</b>	

Part for dissection (item)	Date of beginning	Date of examination	Marks obtained	Remarks and Signature of the Lecturer
1. Heart with pericardium & great vessels				
2. Lung ,Pleura , trachea and bronchi.				
3. The Diaphragm& Oesophagus				
4. Functional& Clinical anatomy of thorax				
5. Living Anatomy				
6. Anatomy of Radiology &Images				

<b>No. of attendance in the practical classes of the card</b>		<b>Out of</b>	
<b>Marks obtained</b>			
<b>Remarks</b>			
<b>Signature of the Lecturer</b>			
<b>Signature of the Head of the Department</b>			

# DEPARTMENT OF ANATOMY

.....DENTAL COLLEGE/ UNIT

## ABDOMEN CARD

(ITEM EXAM FOLLOWING DISSECTION, DEMONSTRATION & TUTORIAL)

<b>Year</b>	
<b>Session</b>	
<b>Roll No.</b>	
<b>Batch</b>	

<b>Card no.</b>	
<b>Cadaver no.</b>	
<b>Total marks</b>	
<b>Pass marks</b>	

<b>Name of the student</b>				
<b>Period of placement</b>	<b>From :</b>		<b>To :</b>	

Part for dissection (item)	Date of beginning	Date of examination	Marks obtained	Remarks and Signature of the Lecturer
1. Liver and extrahepatic biliary apparatus				
2. Duodenum, Pancreas and spleen				
3. Kidney, suprarenal gland, ureter and urinary Bladder				
4. Major muscles, blood vessels, nerves of posterior abdominal wall				
5. Functional & Clinical anatomy of				
6. Abdomen				

<b>No. of attendance in the practical classes of the card</b>		<b>Out of</b>	
<b>Marks obtained</b>			
<b>Remarks</b>			
<b>Signature of the Lecturer</b>			
<b>Signature of the Head of the Department</b>			

# DEPARTMENT OF ANATOMY

.....DENTAL COLLEGE/ UNIT

## HEAD AND NECK CARD

(ITEM EXAM FOLLOWING DISSECTION, DEMONSTRATION & TUTORIAL)

Year	
Session	
Roll No.	
Batch	

Card no.	
Cadaver no.	
Total marks	
Pass marks	

Name of the student			
Period of placement	From :	To :	

Part for dissection (item)	Date of beginning	Date of examination	Marks obtained	Remarks and Signature of the Lecturer
1. Bones of head and neck				
2. Cranial cavity and base of the skull				
3. Joints of head and neck				
4. Blood vessels including dural venous sinuses and Lymphatics of head and neck				
5. Scalp, temporal region& Infratemporal fossa				
6. Face and orbit , lacrimal apparatus				
7. Anterior triangle and submandibular region.				
8. Posterior triangle.				
9. Oral cavity including gum and teeth.				
10. Tongue.				
11. Pharynx and tonsils				
12. Nose and paranasal air sinuses				
13. Larynx.				
14. Salivary glands				
15. Endocrine glands (pituitary, thyroid and parathyroid)				
16. Ear.				
17. Functional and Clinical anatomy.				
18. Living anatomy				
19. Anatomy of Radiology and Images				

No. of attendance in the practical classes of the card		Out of	
Marks obtained			
Remarks			
Signature of the Lecturer			
Signature of the Head of the Department			

# DEPARTMENT OF ANATOMY

.....DENTAL COLLEGE/ UNIT

## CENTRAL NERVOUS SYSTEM AND EYEBALL CARD (ITEM EXAM FOLLOWING DISSECTION, DEMONSTRATION & TUTORIAL)

<b>Year</b>	
<b>Session</b>	
<b>Roll No.</b>	
<b>Batch</b>	

<b>Card no.</b>	
<b>Cadaver no.</b>	
<b>Total marks</b>	
<b>Pass marks</b>	

<b>Name of the student</b>			
<b>Period of placement</b>	<b>From :</b>		<b>To :</b>

Part for dissection (item)	Date of beginning	Date of examination	Marks obtained	Remarks and Signature of the Lecturer
1. General introduction to the nervous system				
2. Parts of the brain with its nerve attachments and meninges.				
3. Cerebrum- identification, functional areas and blood supply				
4. Thalamus and hypothalamus				
5. Brain stem				
6. Cerebellum				
7. Cranial nerve – nuclei, course, functional components, distribution& lesions				
8. Autonomic nervous system				
9. Spinal cord & Spinal nerves				
9. Ventricles of brain and cerebrospinal fluid.				
10. Eyeball.				
11. Functional and Clinical anatomy				

<b>No. of attendance in the practical classes of the card</b>		<b>Out of</b>	
<b>Marks obtained</b>			
<b>Remarks</b>			
<b>Signature of the Lecturer</b>			
<b>Signature of the Head of the Department</b>			

# DEPARTMENT OF ANATOMY

.....DENTAL COLLEGE/ UNIT

## HISTOLOGY CARD NO. I

Year	
Session	
Roll No.	
Batch	

Total marks	
Pass marks	

Name of the student				
Period of placement	From :		To :	

Item	Date of beginning	Date of examination	Marks obtained	Remarks and Signature
1. Study of microscope				
2. Cell & organelles				
3. Epithelial tissue				
4. Connective tissue-General & Special				
5. Muscular tissue				
6. Cardiovascular system				
7. Respiratory system				

Total No. of attendance		Out of	
Marks obtained			
Remarks			
Signature of the Lecturer			
Signature of the Head of the Department			

# DEPARTMENT OF ANATOMY

.....DENTAL COLLEGE/ UNIT

## HISTOLOGY CARD NO. II

Year	
Session	
Roll No.	
Batch	

Total marks	
Pass marks	

Name of the student				
Period of placement	From :		To :	

Item	Date of beginning	Date of examination	Marks obtained	Remarks and Signature
1. Lymphatic System				
2. Alimentary System & its associated glands				
3. Urinary System				
4. Endocrine Glands				
5. Nervous System				

Total No. of attendance		Out of	
Marks obtained			
Remarks			
Signature of the Lecturer			
Signature of the Head of the Department			

## Paper – II: Dental Anatomy

### Departmental objective

At the end of the course, the students should be able to

- Identify different teeth in different dentition
- Identify and describe different histological structures of Oro-dental Tissues
- Differentiate between normal and pathological state of oral structures.

### List of competencies :

- Explain any tooth by its morphology
- Describe anatomy of any oral structures
- Mention the histological structures of tooth and associated oral structures
- Explain the clinical importance of teeth and oral tissues.

### Distribution of teaching- learning hours

Lecture	Tutorial	Practical	Card exam	Total Teaching hours	Integrated teaching (Common)	Formative Exam		Summative Exam	
						Preparatory Leave	Exam Time	Preparatory Leave	Exam Time
99	146	27	18	290	10 hrs	20 days	42 days	30 days	30days

### Teaching- learning methods, teaching aids and evaluation

Teaching Methods			Teaching Aids	In course evaluation
Large group	Small group	Self learning		
Lecture	Tutorial + Practical+ Demonstration	Assignments, Self-Study	Laptop, Computer, Multimedia projector, Slide Projector, OHP, White board, Study Models, Self-Jaw Model, Microscope, and Internet. 3D animation.	Continuous Evaluation (During delivering lecture) Assessment of learning Item exam Term 1 Term 2

### Related Equipment's:

Multimedia projector, OHP, White board, Microscope, simulator, model, Internet

### Professional Examination:

#### Marks Distribution of assessment of Professional Examination

**Total Marks : 300**

- Written : 100
- SOE : 100
- Practical : 100

## Learning Objectives and Course Contents in Dental Anatomy

### Oral Histology

Learning Objectives	Contents	Teaching Hours
<p>Students should be able to –</p> <ul style="list-style-type: none"> <li>● Define cell.</li> <li>● Describe cellular organelles with functions.</li> <li>● Explain the importance of intercellular junctions and basement membrane.</li> </ul>	<ul style="list-style-type: none"> <li>● Cell</li> </ul>	<p>L=2 hrs. T=2.5hrs</p>
<ul style="list-style-type: none"> <li>● Mention names of collagen producing cells and distributions of collagen in different tissues.</li> <li>● Describe the process of collagen synthesis and degradation.</li> </ul>	<ul style="list-style-type: none"> <li>● Collagen</li> </ul>	<p>L=2 hr T= 1.5 hrs</p>
<ul style="list-style-type: none"> <li>● List the factors influencing hard tissue formation.</li> <li>● Describe hard tissue genesis and degradation.</li> </ul>	<ul style="list-style-type: none"> <li>● Hard Tissue</li> </ul>	<p>L= 2 hrs T= 2 hrs</p>
<ul style="list-style-type: none"> <li>● Mention physical and chemical properties and types of dentine.</li> <li>● Identify and describe dentinal tubules, incremental lines, predentine, peritubular dentine, intertubular dentine, interglobular dentine and granular layer of Tome's.</li> <li>● Describe age changes and sensitivity theories of dentine.</li> <li>● Mention the clinical importance of dentine.</li> </ul>	<ul style="list-style-type: none"> <li>● Dentine</li> </ul>	<p>L= 3 hrs T= 4.5 hrs P= 2 hrs</p>
<ul style="list-style-type: none"> <li>● State composition and function of pulp.</li> <li>● Describe different histological zones of pulp.</li> <li>● Outline the distribution of nerves and vessels in pulp.</li> <li>● Describe pulp stones, age changes of pulp and its clinical importance.</li> </ul>	<ul style="list-style-type: none"> <li>● Pulp</li> </ul>	<p>L= 2 hrs T= 2 hrs P= 2 hrs</p>
<ul style="list-style-type: none"> <li>● Mention physical and chemical properties of enamel.</li> <li>● State the orientation of enamel rods and its clinical importance.</li> <li>● Identify and describe the incremental lines, enamel tufts, enamel lamellae, enamel spindles, Hunter-schreger bands, dentino-enamel junction, cement-enamel junction.</li> <li>● Describe surface features of enamel, age changes and clinical significance.</li> </ul>	<ul style="list-style-type: none"> <li>● Enamel</li> </ul>	<p>L=3 hrs T= 4.5 hrs P= 3 hrs</p>
<ul style="list-style-type: none"> <li>● Describe different types of cementum,, their distribution and function.</li> <li>● State briefly afibrillarcementum, intermediate cementum .</li> <li>● Mention the process of repair of root surface.</li> </ul>	<ul style="list-style-type: none"> <li>● Cementum</li> </ul>	<p>L= 2 hrs T= 2hrs P= 2 hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>Students should be able to –</p> <ul style="list-style-type: none"> <li>● State different cells and fibers of periodontal ligament and their function.</li> <li>● Describe different sources of nutrition of periodontal ligament.</li> <li>● Differentiate between diseased and healthy periodontal tissue.</li> <li>● Mention the clinical importance of periodontal ligament.</li> </ul>	<ul style="list-style-type: none"> <li>● The periodontal Ligament</li> </ul>	<p>L= 2 hrs T= 2.5 hrs P= 2 hrs</p>
<ul style="list-style-type: none"> <li>● Mention types and function of oral mucosa.</li> <li>● Describe structural variations of oral mucosa and gingiva and their functional importance.</li> <li>● Mention normal histological features of oral mucosa.</li> <li>● State dento-gingival junction, muco-cunateous junction and alveolo-gingival junction.</li> <li>● Describe different papillae of tongue, keratinization, non-keratinocytes of oral epithelium.</li> </ul>	<ul style="list-style-type: none"> <li>● Oral mucosa &amp; Gingiva</li> </ul>	<p>L= 3 hrs T= 3 hrs P= 5 hrs</p>
<ul style="list-style-type: none"> <li>● Describe alveolar bone,</li> <li>● Explain clinical importance of alveolar bone.</li> </ul>	<ul style="list-style-type: none"> <li>● Alveolar bone</li> </ul>	<p>L= 2 hrs T= 2.5 hrs P= 1.5 hrs</p>
<ul style="list-style-type: none"> <li>● Define joints and synovial joints.</li> <li>● Describe synovial fluid and synovial membranes.</li> <li>● Mention the characteristics of synovial joint and unusual features of TMJ (temporo-mandibular) as a synovial joints.</li> <li>● Describe different structures related to TMJ.</li> <li>● Describe the histological aspect of TMJ.</li> <li>● Mention clinical symptoms related to TMJ disorder.</li> </ul>	<ul style="list-style-type: none"> <li>● Temporo-mandibular joint</li> </ul>	<p>L= 2 hrs T= 4 hrs</p>
<ul style="list-style-type: none"> <li>● Define saliva and mention its composition and function and relation to dental carries.</li> <li>● Classify salivary glands.</li> <li>● Describe the formation and secretion of saliva.</li> <li>● Mention the distribution of salivary glands.</li> <li>● Differentiate histologically serous and mucous salivary glands.</li> <li>● Describe the ductal systems of salivary glands.</li> <li>● Describe myoepithelial cell.</li> <li>● Explain the clinical importance of salivary gland and some pathological condition related to salivary gland.</li> </ul>	<ul style="list-style-type: none"> <li>● Salivary Glands</li> </ul>	<p>L= 3 hrs T= 5.5 hrs P= 3.5 hrs</p>

## Dental Morphology

Learning Objectives	Contents	Teaching Hours
Students should be able to- <ul style="list-style-type: none"> <li>Describe types of dentition, dental formula and notation.</li> <li>Shows various anatomical landmarks of teeth.</li> <li>Mention the chronology of deciduous and permanent teeth.</li> </ul>	<ul style="list-style-type: none"> <li>Introduction</li> </ul>	L= 2 hrs T= 4 hrs
<ul style="list-style-type: none"> <li>Identify central incisors and their normal landmarks.</li> <li>Mention their normal relationship in dental arch and clinical importance.</li> </ul>	<ul style="list-style-type: none"> <li>Central Incisors</li> </ul>	L= 2 hrs T= 3 hrs
<ul style="list-style-type: none"> <li>Identify lateral incisors and their normal landmarks.</li> <li>Show their normal relationship of lateral incisors in dental arch and mention its clinical importance.</li> </ul>	<ul style="list-style-type: none"> <li>Lateral Incisors</li> </ul>	L= 2 hrs T= 3 hrs
<ul style="list-style-type: none"> <li>Identify canines and their normal landmarks.</li> <li>Mention their normal relationship and clinical importance.</li> </ul>	<ul style="list-style-type: none"> <li>Canines</li> </ul>	L= 2 hrs T= 3 hrs
<ul style="list-style-type: none"> <li>Identify premolars and their normal landmarks.</li> <li>Mention their normal relationship and clinical importance.</li> </ul>	<ul style="list-style-type: none"> <li>Premolars</li> </ul>	L= 2 hrs T=4 hrs
<ul style="list-style-type: none"> <li>Identify maxillary molars and their normal landmarks.</li> <li>Mention their normal relationship and clinical importance.</li> </ul>	<ul style="list-style-type: none"> <li>Maxillary Molars</li> </ul>	L= 3 hrs T= 5.5 hrs
<ul style="list-style-type: none"> <li>Identify mandibular molars and their normal landmarks.</li> <li>Mention their normal relationship and clinical importance.</li> </ul>	<ul style="list-style-type: none"> <li>Mandibular Molars</li> </ul>	L= 4 hrs T= 6.5 hrs
<ul style="list-style-type: none"> <li>Identify deciduous teeth.</li> <li>Differentiate deciduous teeth from permanent teeth.</li> </ul>	<ul style="list-style-type: none"> <li>Deciduous Teeth</li> </ul>	L= 3 hrs T= 5 hrs

## Applied Anatomy

Learning Objectives	Contents	Teaching Hours
Students should be able to- <ul style="list-style-type: none"> <li>● Mention the boundary and relation of maxillary sinus.</li> <li>● State the lining, nerves and vascular supply of maxillary sinus.</li> <li>● Describe clinical importance of maxillary sinus.</li> </ul>	<ul style="list-style-type: none"> <li>● Maxillary Sinus</li> </ul>	<ul style="list-style-type: none"> <li>● L= 2 hrs</li> <li>● T= 1.5 hrs</li> </ul>
<ul style="list-style-type: none"> <li>● Mention vascular supply, lymphatic drainage and innervations of oro-dental tissues.</li> <li>● Describe the route of transmission of pathological lesion from oral cavity to other locations.</li> </ul>	<ul style="list-style-type: none"> <li>● Vascular Supply</li> <li>● Lymphatic Drainage</li> <li>● Innervations of Oro-Dental tissues.</li> </ul>	<ul style="list-style-type: none"> <li>● L= 4 hrs</li> <li>● T= 5 hrs</li> </ul>

## Oral Physiology

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● Students will be able-</li> <li>● Explain normal occlusion.</li> <li>● State the ideal criteria and factors that influence normal occlusion.</li> <li>● Define malocclusion.</li> <li>● Mention types of malocclusion.</li> </ul>	<ul style="list-style-type: none"> <li>● Occlusion</li> </ul>	<ul style="list-style-type: none"> <li>● L= 3 hrs</li> <li>● T= 3.5 hrs</li> </ul>
<ul style="list-style-type: none"> <li>● State different masticatory movements.</li> <li>● Describe the mechanism of mastication.</li> <li>● Describe masticatory muscles, their attachments and function in mastication.</li> <li>● Describe neural control of mastication.</li> </ul>	<ul style="list-style-type: none"> <li>● Mastication</li> </ul>	<ul style="list-style-type: none"> <li>● L= 2 hrs</li> <li>● T= 2 hrs</li> </ul>
<ul style="list-style-type: none"> <li>● Describe different types of physiological tooth movement.</li> <li>● Describe the mechanisms and pattern of shedding.</li> <li>● State mechanisms and theories of tooth eruption.</li> <li>● Mention the molecular determinants of tooth eruption.</li> <li>● chronology and pattern of tooth eruption and its clinical significance.</li> </ul>	<ul style="list-style-type: none"> <li>● Eruption</li> </ul>	<ul style="list-style-type: none"> <li>● L= 2 hrs</li> <li>● T= 3 hrs</li> </ul>
<ul style="list-style-type: none"> <li>● Define shedding.</li> <li>● Describe the mechanism and pattern of shedding.</li> <li>● Describe the histology of odontoclast cell.</li> <li>● Describe the gubernacular cord and canal.</li> <li>● Mention the clinical importance of shedding.</li> </ul>	<ul style="list-style-type: none"> <li>● Shedding</li> </ul>	<ul style="list-style-type: none"> <li>● L= 2 hrs</li> <li>● T= 3 hrs</li> </ul>

Learning Objectives	Contents	Teaching Hours
Students should be able to – <ul style="list-style-type: none"> <li>● Mention the phases of swallowing.</li> <li>● State the difference between mature and immature swallowing.</li> <li>● Describe the mechanisms of control of swallowing., dysphasia and clinical consideration.</li> </ul>	<ul style="list-style-type: none"> <li>● Swallowing</li> </ul>	<ul style="list-style-type: none"> <li>● L= 3 hrs</li> <li>● T= 4.5 hrs</li> </ul>
<ul style="list-style-type: none"> <li>● Describe phonation and neural basis of language.</li> <li>● Classify sounds.</li> <li>● State the clinical significance related to speech.</li> </ul>	<ul style="list-style-type: none"> <li>● Speech</li> </ul>	<ul style="list-style-type: none"> <li>● L= 3 hrs</li> <li>● T= 4.5 hrs</li> </ul>
<ul style="list-style-type: none"> <li>● Define pain.</li> <li>● Describe the physiology of pain in oral region and its pathway to CNS.</li> </ul>	<ul style="list-style-type: none"> <li>● Pain &amp; pain Pathways</li> </ul>	<ul style="list-style-type: none"> <li>● L= 2 hrs</li> <li>● T=1.5 hrs</li> </ul>
<ul style="list-style-type: none"> <li>● Describe taste buds and taste receptors.</li> <li>● State the role of saliva in taste perception.</li> <li>● Describe the pathways of taste sensation.</li> </ul>	<ul style="list-style-type: none"> <li>● Taste &amp; Taste Pathway</li> </ul>	<ul style="list-style-type: none"> <li>● L= 1 hr</li> <li>● T= 1.5 hrs</li> </ul>
<ul style="list-style-type: none"> <li>● Describe the mechanisms of sucking and its clinical consideration.</li> </ul>	<ul style="list-style-type: none"> <li>● Sucking</li> </ul>	<ul style="list-style-type: none"> <li>● L= 1 hrs</li> <li>● T= 4.5 hrs</li> </ul>

## Embryology

Learning Objectives	Contents	Teaching Hours
Students should be able to- <ul style="list-style-type: none"> <li>● Mention germ cell formation and fertilization.</li> <li>● State the formation of three-layered embryo, formation of neural tube and neural crest.</li> <li>● Mention the derivatives of different germ layers and neural crest.</li> </ul>	<ul style="list-style-type: none"> <li>● Basic Embryology</li> </ul>	L= 2 hrs T= 6 hrs
<ul style="list-style-type: none"> <li>● State briefly the formation of pharyngeal arches and pouches.</li> <li>● Describe the derivatives of pharyngeal arches and pouches.</li> </ul>	<ul style="list-style-type: none"> <li>● Pharyngeal Arch, clefts &amp; pouches</li> </ul>	L= 1 hr T= 1.5 hrs
<ul style="list-style-type: none"> <li>● Mention the different prominences involving face development.</li> <li>● State the congenital defects during face development.</li> </ul>	<ul style="list-style-type: none"> <li>● Development of face &amp;</li> <li>● Congenital defects</li> </ul>	L= 2 hrs T= 3 hrs
<ul style="list-style-type: none"> <li>● Outline the development of maxillae, mandible, palate, tongue and lips.</li> <li>● State the congenital defects during their formation.</li> </ul>	<ul style="list-style-type: none"> <li>● The Development of Jaws,</li> <li>● palate, tongue &amp; Lips</li> </ul>	L= 5 hrs T= 6 hrs

Learning Objectives	Contents	Teaching Hours
Students should be able to- <ul style="list-style-type: none"> <li>Define primary epithelial band, dental lamina and successional lamina.</li> <li>Describe the bud, cap and bell stages of tooth development.</li> <li>Describe the physiological process during tooth development.</li> </ul>	<ul style="list-style-type: none"> <li>Early Development of teeth</li> </ul>	L= 4 hrs T= 6 hrs P= 6 hrs
<ul style="list-style-type: none"> <li>Describe the formation of enamel, dentine, cementum, pulp, periodontal ligament, salivary glands and Temporo-mandibular joint.</li> <li>State the defects that may occur during their development and their clinical significance.</li> </ul>	<ul style="list-style-type: none"> <li>Amelogenesis, Dentinogenesis, Cementogenesis, Development of pulp and periodontal ligament, Salivary Gland, TMJ</li> </ul>	L= 8 hrs T= 12 hrs

### Comparative Dental Anatomy

Learning Objectives	Contents	Teaching Hours
Students should be able to- <ul style="list-style-type: none"> <li>Outline the characteristic of human dentition,.</li> <li>Describe the different mode of attachment of teeth and evolution of tooth in vertebrates.</li> </ul>	<ul style="list-style-type: none"> <li>Characteristics of human dentition, Types of Tooth attachment.</li> </ul>	L= 2 hrs T= 3 hrs
<ul style="list-style-type: none"> <li>Describe the variations of the dental tissues into different species.</li> <li>State the characteristic and histology of rodent incisors.</li> </ul>	<ul style="list-style-type: none"> <li>Comparative anatomy of dental tissues and Rodent incisor.</li> </ul>	L= 2 hrs T= 3 hrs

#### NB:

- Details of salivary glands , development of Face, tongue, palate, tooth, oral cavity, salivary glands, thyroid gland, parathyroid gland, pharyngeal arches, pouches and cleft are included both in anatomy and dental anatomy. So it is suggested to teach and assess these topics in Dental Anatomy
- Detail of cell biology and general embryology are included both in anatomy and dental anatomy.

# Physiology & Biochemistry

## Paper –2: Physiology and Biochemistry

### Departmental Objectives of Physiology

At the end of the course in physiology the BDS students will be able to:

- demonstrate basic knowledge and understanding on the normal functions of all the organ systems of human body and apply it as a background for clinical subjects.
- interpret normal function with a view to differentiate from abnormal function.
- perform physiological experiments.
- interpret experimental and investigation data
- develop sound attitude for continuing self-education to improve efficiency & skill in physiology.

### Departmental Objectives of Biochemistry

At the end of the course in biochemistry the students will be able to:

- demonstrate basic knowledge and understanding on major biomolecules, enzymes, hormones and nutrients and of fundamental chemical principles involved in body mechanism upon which life process depends
- demonstrate skills in performing and interpreting common Bio-chemistry laboratory tests and procedures with emphasis on those used in Bangladesh.
- develop sound attitude towards the need for continuing self education

### List of Competencies to acquire in Physiology :

In the process of completing these courses, students will acquire the following competencies:

- Describe transport processes across the plasma membrane, resting membrane potential, action potentials.
- Explain muscle contraction and relaxation.
- Describe the function of heart and circulatory system
- Describe respiratory processes with the knowledge of structures, ventilation, diffusion, blood flow, gas transport, mechanics of breathing, and control of ventilation.
- Explain the mechanism of work of the brain at the neuronal systems level.
- Describe the autonomic nervous system and special sense
- Describe the function of endocrine physiology
- Describe human reproduction, functional changes in the reproductive tract, the formation of sperm & ovum.
- Demonstrate adequate knowledge and develop skill for performing physiology laboratory tests and interpreting these normal functions with a view to differentiate from abnormal conditions. such as:
- Measurement of blood pressure
- Examination of radial pulse.
- Estimation of Hb concentration.
- Determination of differential count of white blood cell (WBC).
- Determination of bleeding time & clotting time.
- Determination of blood grouping & cross matching.

- Determination of erythrocyte sedimentation rate (ESR).
- Recording of body temperature.
- Elicitation of light reflex.

#### **List of Competencies to acquire in Biochemistry:**

After completing the course of biochemistry in BDS course the students will be able to-

- apply the knowledge and understanding of biochemistry in medicine and surgery.
- demonstrate knowledge and understanding of the biomolecules forming the structure of the human body, their functions and their role in health and diseases.
- explain the role of enzymes in the diagnosis of diseases.
- explain metabolic reactions in the body.
- explain the role of liver in metabolism
- explain the mechanism of maintenance of homeostasis by regulating both the composition and volume of ECF compartment by the kidney
- describe the water and electrolyte content of human body and their functions
- describe the types, causes and consequences of dehydration and over hydration.
- explain the causes and the consequences of electrolyte imbalance.
- describe the sources of acids and bases in our body and the mechanism of their normal balance. Explain the causes and consequences of acidosis and alkalosis and the parameters to diagnose them.
- demonstrate knowledge and understanding about nutrients, balanced diet.
- explain the basis of genetics and molecular biology.
- diagnose diabetes mellitus, impairment of renal, liver and thyroid functions.

#### **Organization of the Course**

The course is offered in 2 terms (1st & 2nd) and total 1&1/2 years for phase –1 BDS Course.

#### **Distribution of teaching /learning hours**

Lecture	Tutorial	Practical	Demonstration +Dissection +Card exam	Total	Integrated teaching (Common)	Formative Exam		Summative exam	
						Preparatory leave +post-term leave	Exam time	Preparatory leave	Exam time
132 hrs	124 hrs	60 hrs	-	316 hrs	10 hrs	20 days	42 days	30 days	30 days

#### **Professional Examination:**

Marks distribution of Assessment of Physiology & Biochemistry

(Total marks 300)

- Written = 100 (SAQ=70 + MCQ =20 + Formative Assessment =10)
- SOE = 100
- Practical = 100

## Teaching/learning methods, teaching aids and evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
Lecture, Integrated teaching	Tutorial Practical Demonstration	Assignment, self assessment & self study.	Computer & Multimedia Chalk & board White board & markers OHP Slide projector Flip Chart Models Specimens projector Study guide & manuals.	Item examination(oral) Practical item examination(Oral & practical) Card completion Examination (Written) Term final Examination(Written, oral & practical)

Related Equipments: Microscope, photoelectric colorimeter, test tube, glass slide, centrifuge machine, micro pipette, chemicals & reagents, Sphygmomanometer, Stethoscope, Clinical thermometer, Spirit, Pencil torch, models, specimens, Haemocytometer, Shahlis Haemometer, Haematocrit tube, Westerngren ESR tube & ESR Stand etc.

## General Physiology

Learning Objectives	Contents	Teaching Hours
<p>At the end of the course the students will be able to explain about :</p> <ul style="list-style-type: none"> <li>● Goal of physiology.</li> <li>● Principles of homeostasis and control system</li> <li>● Functional organization of the human body &amp; cell physiology.</li> <li>● Cell membrane transport.</li> <li>● Membrane potential, resting membrane potential and action potential.</li> <li>● Muscles, contraction and relaxation of skeletal muscle.</li> <li>● Neuromuscular transmission.</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Goal of Physiology</li> <li>● Homeostasis: definition, basic concept and feed back mechanism.</li> <li>● The cell: cell organization, cell membrane, cell organelles and their functions.</li> <li>● Transport processes across the cell membrane</li> <li>● Membrane potential, resting membrane potential and action potential.</li> <li>● Contraction and relaxation of skeletal muscle.</li> <li>● Neuromuscular transmission.</li> </ul>	<p>L=5 hrs</p> <p>T=6</p> <p>IT=1</p>

## Blood

Learning Objectives	Contents	Teaching Hours
<p>At the end of the course the students will be able to:</p> <ul style="list-style-type: none"> <li>● Describe the composition &amp; functions of blood.</li> <li>● Demonstrate knowledge about plasma proteins.</li> <li>● Demonstrate knowledge about the formation , morphology, types &amp; functions of RBC,WBC &amp; platelets.</li> <li>● Describe the types, function and fate of haemoglobin.</li> <li>● Demonstrate knowledge about blood grouping &amp; blood transfusion.</li> <li>● Describe about hemostasis &amp; coagulation.</li> <li>● Describe about the bleeding disorders.</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Blood: composition &amp; functions.</li> <li>● Plasma proteins: normal values, properties, functions &amp; effect of hypoproteinaemia</li> <li>● Development and normal values of formed elements.</li> <li>● RBC: morphology, function and erythropoiesis.</li> <li>● Hemoglobin: types, functions &amp; fate of hemoglobin.</li> <li>● Red blood cell indices : PCV, MCV, MCH &amp; MCHC</li> <li>● Anaemia, Polycythemia &amp; Jaundice: definition &amp; classification.</li> <li>● WBC: Classification, morphology, properties &amp; functions, leucocytosis , leucopenia, Platelet: morphology &amp; functions.</li> <li>● Hemostasis: definition &amp; events.</li> <li>● Coagulation: definition, clotting factors &amp; mechanism</li> <li>● Blood grouping: ABO &amp; Rh system</li> <li>● Hazards of blood transfusion &amp; Rh incompatibility.</li> </ul> <p><b>Additional/Applied Physiology</b></p> <ul style="list-style-type: none"> <li>● Bleeding disorder: thrombocytopenic purpura &amp; hemophilia, tests for bleeding disorder.</li> </ul>	<p>L=15</p> <p>T=12</p> <p>P=20</p>

## Blood

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course the students will be able to :</b></p> <ul style="list-style-type: none"> <li>● describe the properties of cardiac muscle</li> <li>● describe the origin and conduction of cardiac impulse.</li> <li>● demonstrate knowledge about events of cardiac cycle.</li> <li>● interpret the heart sounds.</li> <li>● define and interpret a normal ECG.</li> <li>● describe local &amp; humoral control of blood flow</li> <li>● describe cardiac output, venous return &amp; peripheral resistance.</li> <li>● explain about the heart rate &amp; radial pulse.</li> <li>● describe the blood pressure and its regulation.</li> </ul>	<p><b>CORE :</b></p> <ul style="list-style-type: none"> <li>● Cardiac muscle: physiological anatomy, properties.</li> <li>● Junctional tissues of the heart: generation of cardiac impulse &amp; its conduction.</li> <li>● Cardiac cycle: events, pressure &amp; volume changes during different phases</li> <li>● Heart sounds: types &amp; characteristics</li> <li>● ECG: definition &amp; interpretations .</li> <li>● local &amp; humoral control of blood flow</li> <li>● Cardiac output : definition and factors affecting cardiac output.</li> <li>● Venous return &amp; Peripheral resistance: definition &amp; factors affecting..</li> <li>● Heart rate: definition, normal rate &amp; regulation.</li> <li>● Radial pulse: definition &amp; characteristics.</li> <li>● Blood pressure: definition, types, measurement &amp; regulation of arterial blood pressure.</li> </ul> <p><b>Additional /Applied Physiology</b></p> <p>Cardiac arrhythmias: tachycardia, bradycardia &amp; heart block</p>	<p>L=15 T=12 P=10 IT=01</p>

## Cardiovascular System

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course the students will be able to :</b></p> <ul style="list-style-type: none"> <li>● describe the properties of cardiac muscle</li> <li>● describe the origin and conduction of cardiac impulse.</li> <li>● demonstrate knowledge about events of cardiac cycle.</li> <li>● interpret the heart sounds.</li> <li>● define and interpret a normal ECG.</li> <li>● describe local &amp; humoral control of blood flow</li> <li>● describe cardiac output, venous return &amp; peripheral resistance.</li> <li>● explain about the heart rate &amp; radial pulse.</li> <li>● describe the blood pressure and its regulation.</li> </ul>	<p><b>CORE :</b></p> <ul style="list-style-type: none"> <li>● Cardiac muscle: physiological anatomy, properties.</li> <li>● Junctional tissues of the heart: generation of cardiac impulse &amp; its conduction.</li> <li>● Cardiac cycle: events, pressure &amp; volume changes during different phases</li> <li>● Heart sounds: types &amp; characteristics</li> <li>● ECG: definition &amp; interpretations .</li> <li>● local &amp; humoral control of blood flow</li> <li>● Cardiac output : definition and factors affecting cardiac output.</li> <li>● Venous return &amp; Peripheral resistance: definition &amp; factors affecting..</li> <li>● Heart rate: definition, normal rate &amp; regulation.</li> <li>● Radial pulse: definition &amp; characteristics.</li> <li>● Blood pressure: definition, types, measurement &amp; regulation of arterial blood pressure.</li> </ul> <p><b>Additional /Applied Physiology</b> Cardiac arrhythmias: tachycardia, bradycardia &amp; heart block</p>	<p>L=15 T=12 P=10 IT=01</p>

## Respiratory System

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course the students will be able to :</b></p> <ul style="list-style-type: none"> <li>● explain the mechanism of normal respiration</li> <li>● describe pulmonary volumes and capacities</li> <li>● summaries the diffusion of gases through the respiratory membrane.</li> <li>● describe the oxygen &amp; carbon dioxide transport.</li> <li>● describe the respiratory centers &amp; regulation of respiration.</li> <li>● define &amp; classify hypoxia and cyanosis.</li> </ul>	<p><b>CORE</b></p> <ul style="list-style-type: none"> <li>● Respiration: definition of external and internal respiration, muscles of respiration and mechanism of respiration.</li> <li>● Pulmonary and alveolar ventilation, dead space volume</li> <li>● Pulmonary volumes and capacities</li> <li>● Composition of atmospheric, alveolar, inspired and expired air.</li> <li>● Respiratory unit and respiratory membrane.</li> <li>● Diffusion of Gases through the respiratory membrane.</li> <li>● Transport of Oxygen &amp; Carbon dioxide in blood &amp; body fluid.</li> <li>● Nervous &amp; chemical regulation of respiration.</li> <li>● Lung function tests</li> <li>● Hypoxia and cyanosis: definition, types</li> <li>● Definition of Dyspnea, hypercapnea, artificial respiration &amp; Periodic breathing.</li> </ul>	<p>L=12 T=10  IT=01</p>

## Endocrinology and Reproductive system

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course the students will be able to:</b></p> <ul style="list-style-type: none"> <li>● describe the general mechanism of action of hormone.</li> <li>● describe the functions &amp; regulation of secretion of individual hormone.</li> <li>● describe disorders in relation to:</li> <li>● Pituitary gland</li> <li>● Thyroid and parathyroid gland</li> <li>● Adrenal gland</li> <li>● Endocrine pancreas</li> </ul>	<p><b>CORE :</b></p> <ul style="list-style-type: none"> <li>● Endocrine glands : name &amp; name of their hormones.</li> <li>● Hormone: definition, classification, mechanism of action.</li> <li>● Hypothalamic hormones (releasing &amp; inhibitory hormones): name and functions.</li> <li>● Hormones of pituitary gland: name, functions, regulation of secretion and disorders.</li> <li>● Hormones of thyroid gland: biosynthesis, transport, functions, regulation of secretion &amp; disorders.</li> <li>● Hormones of Parathyroid gland: functions, tetany, calcium &amp; phosphate metabolism.</li> <li>● Hormones of Adrenal gland: name, functions, regulation of secretion &amp; disorders.</li> <li>● Hormones of Endocrine pancreas : functions, regulation of secretion, consequences of hyperglycaemia and hypoglycaemia</li> </ul>	<p>L = 10 hrs</p> <p>T = 8 hrs</p> <p>IT = 1 hrs</p>

## Nervous system and special sense

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course the students will be able to:</b></p> <ul style="list-style-type: none"> <li>● explain organization of the nervous system</li> <li>● explain the basic mechanism of synaptic transmission.</li> <li>● describe the motor and sensory system of the body.</li> <li>● describe the functions of cerebellum, thalamus, hypothalamus and basal ganglia</li> <li>● describe organization &amp; function of autonomic nervous system</li> <li>● describe the physiology and regulation of body temperature</li> </ul> <p><b>At the end of the course the students will be able to:</b></p> <ul style="list-style-type: none"> <li>● describe the neurophysiology of vision and audition</li> <li>● describe the physiology of smell and taste</li> </ul>	<p><b>CORE:</b></p> <p>Functional organization of nervous system and functions of major levels of central nervous system(CNS).</p> <p>Neuron: definition, parts, types</p> <p>Nerve fiber: classification, effects of injury/section to the nerve fiber</p> <p>Synapse: definition and synaptic transmission</p> <p>Sensory receptor, reflex: definition, classification</p> <p>Reflex arc: definition, components</p> <p>Pain: receptor, pathway</p> <p>Neurotransmitter: definition and classification</p> <p>General/somatic senses: definition, classification</p> <p>Name and functions of ascending and descending tracts.</p> <p>Functions of cerebellum, thalamus, hypothalamus, basal ganglia and autonomic nervous system</p> <p>Physiology and regulation of body temperature</p> <p>Special sense (vision, audition, smell and taste): receptor, pathway</p> <p><b>Additional/ Applied</b></p> <p>Dual pain pathway, referred pain</p>	<p>L = 14 hrs</p> <p>T = 12 hrs</p> <p>P = 10 hrs</p>

## Physiology Practical

Learning Objectives	Contents	Teaching Hours
<p><b>Students will be able to</b></p> <ul style="list-style-type: none"> <li>● demonstrate the parts of Microscope &amp; skill in using it.</li> <li>● collect &amp; prepare blood sample.</li> <li>● determine differential count of WBC.</li> <li>● estimate haemoglobin.</li> <li>● determine ESR</li> <li>● determine Blood grouping (ABO &amp; Rh system) &amp; cross matching.</li> <li>● determine bleeding time &amp; clotting time.</li> <li>● interpret Red Cell Indices</li> <li>● examine the radial pulse &amp; its application.</li> <li>● measure the blood pressure.</li> <li>● record the body temperature</li> <li>● elicit light reflex</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Developing skill for use of microscope &amp; common laboratory equipments.</li> <li>● Collection &amp; preparation of blood sample.</li> <li>● Determination of differential count of WBC.</li> <li>● Estimation of haemoglobin.</li> <li>● Determination of ESR</li> <li>● Determination of Blood grouping (ABO &amp; Rh system) &amp; cross matching.</li> <li>● Determination of bleeding time &amp; clotting time.</li> <li>● Interpretation of Red Cell Indices: PCV, MCV, MCH, MCHC.</li> <li>● Measurement of Blood pressure</li> <li>● Examination of radial pulse.</li> <li>● Recording of the body temperature</li> <li>● Elicitation of reflex: superficial &amp; deep</li> </ul>	<p style="text-align: center;">40 hr</p>

## Biophysics & Biomolecules

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course, students will be able to:</b></p> <ul style="list-style-type: none"> <li>● define biochemistry and explain its importance in medicine.</li> <li>● define solution, standard solution, colloid and crystalloid .</li> <li>● define pH, , buffer, acid and base..</li> <li>● State the body fluid buffers.</li> <li>● define and classify isotope.</li> <li>● state its biomedical importance.</li> <li>● define and classify carbohydrates, protein &amp; lipid.</li> <li>● define steroids and sterols.</li> <li>● define &amp; classify lipoproteins and mention their biomedical importance.</li> <li>● define and classify enzymes,</li> <li>● describe the factors affecting enzyme activity.</li> <li>● define isoenzyme with example and mention their clinical application.</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Introduction to Biochemistry</li> <li>● Concept of solutions</li> <li>● Colloids and crystalloids.</li> <li>● Concept of pH and buffer.</li> <li>● Concept of isotope.</li> <li>● Concept of biomolecules Carbohydrates.</li> <li>● Amino acids and proteins.</li> <li>● Lipids and fatty acids.</li> <li>● Enzymes</li> </ul>	<p>L = 12 hrs</p> <p>T = 15 hrs</p> <p>P = 8 hrs</p>

## GIT, Bioenergetics and Metabolism

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course, students will be able to:</b></p> <ul style="list-style-type: none"> <li>describe the general principles of gastrointestinal function.</li> <li>describe the functions of saliva</li> <li>demonstrate knowledge about the composition, functions and regulation of secretion of digestive juices.</li> <li>explain the functions of liver.</li> <li>define digestion, absorption, anabolism and catabolism</li> <li>enumerate local hormones of GIT and state their sources and functions.</li> <li>describe oxidative phosphorylation.</li> </ul> <p>Carbohydrate Metabolism:</p> <p>At the end of the course, students will be able to:</p> <ul style="list-style-type: none"> <li>describe the digestion and absorption of carbohydrate.</li> <li>define glycolysis and describe the pathway.</li> <li>describe citric acid cycle and explain why it is called an amphibolic and final common metabolic pathway.</li> <li>define glycogenesis, glycogenolysis and gluconeogenesis</li> <li>describe glucose homeostasis and mention its importance,</li> <li>state the glucostatic functions of liver with other biochemical functions.</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>Local hormones of GIT: name, function &amp; regulation of secretion</li> <li>Digestive juices: composition, functions and their regulation of secretion.</li> <li>Functions of saliva</li> <li>Digestion and absorption of nutrients</li> <li>Motor function of GIT: mastication, deglutition, gastric emptying, defecation</li> <li>Liver: functions</li> <li>Introduction to metabolism</li> <li>Oxidative phosphorylation.</li> <li>High and low energy compounds.</li> <li>Phases of metabolism (digestion, absorption and intermediary metabolism)</li> <li>Glycolysis</li> <li>Citric acid cycle</li> <li>Glycogenesis and glycogenolysis</li> <li>Gluconeogenesis</li> <li>Blood glucose homeostasis</li> </ul>	<p>L = 12 hrs</p> <p>T = 15 hrs</p> <p>IT = 01 hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>Lipid Metabolism</b></p> <p>At the end of the course, students will be able to:</p> <ul style="list-style-type: none"> <li>● describe the digestion and absorption of fat</li> <li>● enumerate the blood lipids with their sources.</li> <li>● state the sources and fate of acetyl-CoA.</li> <li>● State the name, fate and biomedical importance of ketone bodies.</li> <li>● enumerate the lipoproteins and explain the clinical importance of LDL &amp; HDL cholesterol.</li> </ul>	<ul style="list-style-type: none"> <li>● Digestion and absorption of lipid.</li> <li>● Blood lipids: Lipid transport and lipoprotein metabolism.</li> <li>● Ketogenesis and ketosis.</li> </ul>	04 hrs
<p><b>Protein Metabolism</b></p> <p><b>At the end of the course, students will be able to:</b></p> <ul style="list-style-type: none"> <li>● describe the digestion and absorption of protein.</li> <li>● define nitrogen balance, mention its types and state the routes of nitrogen loss.</li> <li>● define deamination and transamination.</li> <li>● describe sources and way of disposal of ammonia, explain ammonia intoxication.</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Digestion and absorption of protein,</li> <li>● Nitrogen balance</li> <li>● Pathways of protein metabolism</li> <li>● Deamination and transamination.</li> <li>● Fate of amino acid in the body</li> <li>● Source and disposal of ammonia</li> </ul> <p><b>ADDITIONAL:</b></p> <ul style="list-style-type: none"> <li>● Role of liver in over all metabolisms.</li> </ul>	04 hrs

## Food, Nutrition, Vitamins and Minerals

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course, students will be able to:</b></p> <ul style="list-style-type: none"> <li>● define and explain nutrients, essential nutrients, macro and micro minerals, food, proximate principles of food, diet, balanced diet.</li> <li>● state the full meaning of the abbreviations- BMR, BMI, SDA, RDA, and also define them.</li> <li>● state the basis of calculating the calorie requirement of a person.</li> <li>● describe the sources, requirement and function of carbohydrate as nutrient and describe the importance of fibers in diet.</li> <li>● describe sources, requirement and function of protein as nutrients; mention the name and significance of essential amino acid;</li> <li>● describe the sources, requirement and function of lipids as nutrients.</li> <li>● define and classify vitamins.</li> <li>● describe the sources, function, RDA, deficiency disorders of water soluble vitamins.</li> <li>● describe the sources, functions, RDA, deficiency disorders and toxicity of fat soluble vitamins.</li> <li>● state the role of minerals as nutrients, define trace elements.</li> <li>● state the importance of minerals: sodium, potassium, calcium, iron, iodine, fluoride, selenium, manganese, copper, zinc etc.</li> </ul>	<p><b>CORE:</b></p> <p>Basic concepts of food, nutrition and dietary principles.            Energy balance and calculation of calorie requirement.            Nutritional aspect of carbohydrates, fats and proteins, Fibers.            Vitamins and minerals.</p>	<p>L = 10 hrs</p> <p>T = 10 hrs</p>

## Kidney, body Fluid, electrolyte and acid-base balance

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course the students will be able to:</b></p> <ul style="list-style-type: none"> <li>● mention the functions of kidney</li> <li>● describe the structure &amp; types of nephron.</li> <li>● define GFR, plasma load, tubular load, transport maximum, renal threshold &amp; plasma clearance.</li> <li>● describe the mechanism of urine formation</li> <li>● describe the body fluid compartments &amp; regulation of body fluid.</li> <li>● describe the mechanism of acid – base, electrolyte and water balance</li> <li>● describe the mechanism of acidification of urine and limiting pH of urine.</li> <li>● state acid base parameters, anion gap and base excess.</li> <li>● state abnormal constituents in urine(glucose, protein &amp; ketone bodies), normal urine volume and obligatory urine volume.</li> <li>● define and classify diuresis with example.</li> </ul>	<p><b>CORE:</b></p> <ul style="list-style-type: none"> <li>● Kidney: physiological anatomy &amp; functions</li> <li>● Nephron: types, parts, structure &amp; functions</li> <li>● Urine formation: basic mechanism</li> <li>● GFR: definition, determinants</li> <li>● Reabsorption and secretion by the renal tubules</li> <li>● Mechanism of formation of concentrated urine &amp; diluted urine.</li> <li>● Body fluid: names of body fluid compartment, major anions and cations of ECF &amp; ICF.</li> <li>● fluid intake and output chart .</li> <li>● Regulation of normal water balance.</li> <li>● Major electrolytes and their homeostasis.</li> <li>● Volume disorders.</li> </ul> <p><b>Additional /Applied Physiology</b></p> <ul style="list-style-type: none"> <li>● plasma clearance, osmolar clearance and free water clearance.</li> <li>● Acid base homeostasis &amp; disorders.</li> </ul>	<p>L = 12 hrs</p> <p>T = 15 hrs</p> <p>IT = 01 hrs</p>

## Fundamentals of Molecular Biology and genetics

Learning Objectives	Contents	Teaching Hours
<p>At the end of the course, students will be able to:</p> <ul style="list-style-type: none"> <li>● Define nucleic acid, nucleosides, and nucleotides.</li> <li>● describe the structure and functions of DNA.</li> <li>● describe the structure, types and functions of RNA.</li> <li>● define gene, genotype, phenotype.</li> <li>● define transcription and translation</li> <li>● mention the importance of medical Biotechnology</li> <li>● explain the concepts of recombinant DNA technology, PCR</li> </ul>	<p>CORE:</p> <ul style="list-style-type: none"> <li>● Basic concepts of molecular biology.</li> <li>● Nucleic acid, nucleosides, and nucleotides.</li> <li>● transcription and translation.</li> <li>● Gene, genetic code, mutation.</li> <li>● PCR, recombinant DNA technology</li> <li>● importance of medical biotechnology.</li> </ul>	<p>L = 05 hrs</p> <p>T = 06 hrs</p>

## Clinical Biochemistry and clinical endocrinology

Learning Objectives	Contents	Teaching Hours
<p><b>At the end of the course, students will be able to:</b></p> <ul style="list-style-type: none"> <li>● state the basic concepts of clinical biochemistry.</li> <li>● mention the measurements of unit, SI unit</li> <li>● state the laboratory hazards with its types.</li> <li>● state the normal level of serum bilirubin and describe the common liver function tests with interpretation.</li> <li>● explain the basis of application of clinical enzymology in disease.</li> <li>● state the lipid profiles of blood &amp; their clinical importance.</li> <li>● state OGTT and its interpretation, define IFG, IGT and HBA1c</li> <li>● state renal function tests, define proteinuria and microalbuminuria</li> <li>● state thyroid function tests with interpretation</li> </ul>	<p><b>CORE :</b></p> <ul style="list-style-type: none"> <li>● Introduction to clinical biochemistry.</li> <li>● Normal biochemical values in conventional and SI. Units.</li> <li>● Clinical enzymology related to liver and myocardial diseases.</li> <li>● Lipid profiles and dyslipoproteinemias.</li> <li>● Organ function tests ( liver, kidney &amp; thyroid)</li> <li>● Diagnosis of diabetes mellitus</li> <li>● Bilirubin metabolism and Jaundice.</li> <li>● Proteinuria and microalbuminuria.</li> </ul>	<p>L = 6 hrs</p> <p>T = 6 hrs</p> <p>P = 6 hrs</p>

## Biochemistry practical

Learning Objectives	Contents	Teaching Hours
<p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● list the laboratory hazards and the precautions to prevent them.</li> <li>● Estimate blood glucose</li> <li>● Estimate abnormal constituents of urine( sugar, protein &amp; ketone bodies) and their clinical significance.</li> <li>● interpret the result of:</li> <li>● Serum urea</li> <li>● Serum creatinine</li> <li>● Serum total protein</li> <li>● Serum bilirubin</li> </ul>	<p><b>CORE</b></p> <ul style="list-style-type: none"> <li>● Estimation of blood glucose</li> <li>● Estimation of abnormal constituents of urine(sugar, protein &amp; ketone bodies and their clinical significance.</li> <li>● interpretation of result of:</li> <li>● Serum urea</li> <li>● Serum creatinine</li> <li>● Serum total protein</li> <li>● Serum bilirubin .</li> </ul>	<p>20 hrs</p>

## Summative Assessment of Physiology and Biochemistry (First Professional Examination)

### Assessment systems and mark distribution

Components	Marks	Total Marks	Contents
WRITTEN EXAMINATION Formative Assessment + MCQ + SAQ	10+20+70 = 100	100	Group – A 1. General Physiology 2. Blood 3. Cardiovascular System 4. Respiratory System 5. Endocrinology & Reproductive system 6. Nervous system & Special sense Group – B 1. Biophysics & Bimolecules 2. Kidney, Body fluid. Electrolyte & Acid-base balance 3. GIT, Bioenergetics & Metabolism 4. Food, Nutrition, Vitamins & Minerals 5. Fundamental of Molecular Biology & Genetics 6. Clinical biochemistry & Clinical Endocrinology
PRACTICAL EXAMINATION OSPE Traditional practical methods and experiments Practical Note Book	40 40 20	100	
ORAL EXAMINATION (SOE)	100	100	
Grand Total		300	

**Pass marks 60% in each of written, oral and practical.**

***Honors Marks 85%***

## Systems in Term Examination

Term –I Examination	Term –II Examination
<ol style="list-style-type: none"> <li>1. General Physiology</li> <li>2. Blood</li> <li>3. Cardiovascular System</li> <li>4. Respiratory System</li> <li>5. Biophysics &amp; Biomolecules</li> <li>6. GIT, Bioenergetics &amp; Metabolism</li> </ol>	<ol style="list-style-type: none"> <li>1. Kidney, Body fluid. Electrolyte &amp; Acid-base</li> <li>2. Endocrinology &amp; Reproductive system</li> <li>3. Nervous system &amp; Special sense</li> <li>4. Food, Nutrition, Vitamins &amp; Minerals</li> <li>5. Fundamental of Molecular Biology &amp; Genetics</li> <li>6. Clinical biochemistry &amp; Clinical Endocrinology</li> </ol>

## Distribution of Teaching Hours

### Physiology (Group-A) 1. Biophysics and Biomolecules

Systems	Lecture hours	Tutorial hours	Practical hours	Integrated teaching hours
1. General Physiology	04	6		
2. Blood	10	10	10	
3. Cardiovascular system	12	10	05	1
4. Respiratory system	10	10		
5. Endocrinology & Reproductive system	12	12		1
6. Nervous system, Special Senses & temperature regulation	12	12	05	
Total	60	60	20	2

### Biochemistry (Group B)

Systems	Lecture hours	Tutorial hours	Practical hours	Integrated teaching hours
1. Biophysics and Biomolecules	12	12	8	
2. GIT, Bioenergetics and metabolism	12	12		1
3. Kidney, Body fluid, electrolytes and acid base balance	12	12	6	1
4. Food, nutrition, vitamins and minerals	12	10		
5. Clinical biochemistry and clinical endocrinology	8	8	6	
6. Fundamental of molecular biology and genetics	4	6		
Total	60	60	20	2

## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card 1: (General Physiology & Blood)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature &
1.	Definition, goal & importance of physiology. Homeostasis: definition, major functional systems, control systems of the body	10		
2.	The cell: Organization, cell membrane, cell organelles and their functions.	10		
3.	The cell membrane transport: active & passive transport, exocytosis & endocytosis. Membrane potential: definition and basic physics of membrane potential. Resting membrane potential Nerve Action potential & propagation of action potential.	10		
4.	Neuromuscular junction: skeletal muscle contraction and relaxation. Transmission of impulse from nerve ending to the muscle fiber.	10		
5.	Composition & functions of blood, Plasma proteins: Origin, normal values & functions.	10		
6.	RBC: normal count, morphology, functions, erythropoiesis. Hemoglobin: types, functions & fate. Red blood cell indices: PCV, MCV, MCH & MCHC. Anaemia: definition & classification Polycythemia: definition & type. Jaundice: definition & classification	10		
7.	WBC: classification with normal count, morphology & functions. Leucocytosis, leucopenia .	10		
8.	Platelets: normal count & functions. Hemostasis: definition & events Coagulation: definition, blood clotting factors . Mechanism of coagulation Anticoagulant: name. Bleeding disorder: thrombocytopenic purpura & hemophilia. Tests for bleeding disorder: bleeding time, coagulation time and prothrombin time.	10		
9.	Blood grouping: ABO & Rh system, hazards of blood transfusion & Rh incompatibility.	10		

Signature of batch teacher :

Signature of head of department :

## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card No.—2: (Cardiovascular System)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Properties of cardiac muscle. Junctional tissues of the heart. Generation of cardiac impulse & its conduction in the heart.	10		
2.	Cardiac cycle: definition, events, pressure & volume changes during different phases of cardiac cycle. Heart sounds : type, characteristics ECG : definition and interpretations	10		
3.	Functional classification of blood vessels Local & humoral control of blood flow in the tissues. Exchange of fluid through the capillary membrane.	10		
4.	SV, EDV, ESV: definition & factors affecting them. Cardiac output : definition and factors affecting cardiac output. Venous return: definition & factors affecting. Heart rate: factors affecting & regulation. Tachycardia, bradycardia Pulse: definition, characteristics	10		
5.	Peripheral resistance: definition & factors affecting. Blood pressure: definition, types, measurement & regulation of arterial blood pressure.	10		

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## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card 3: (Respiratory System)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Respiration: definition, mechanism. Pulmonary & Alveolar ventilation. Pulmonary volumes and capacities Dead space: physiological & anatomical Lung function tests : name & significance	10		
2.	Composition of atmospheric, alveolar, inspired and expired air. Respiratory unit and respiratory membrane. Diffusion of Gases through the respiratory membrane.	10		
3.	Transport of Oxygen & Carbon dioxide in blood.	10		
4.	Respiratory centers: name, location & functions. Nervous & chemical regulation of respiration. Hypoxia: definition, types Cyanosis: definition & types. Definition of dyspnea, hypercapnea & periodic breathing.	10		

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## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card 4: (Endocrinology & Reproductive system

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Endocrine glands: name Hormones: definition, classification, mechanism of action	10		
2.	Hypothalamic hormones ( releasing, inhibitory), Pituitary hormones ( anterior & posterior): name and functions.	10		
3.	Thyroid hormones: biosynthesis, transport and functions.	10		
4.	Parathyroid hormone: functions, mechanism of action. Calcium & Phosphate metabolism, tetany.	10		
5.	Adrenocortical hormones: name, functions and regulation of secretion.	10		
6.	Hormones of endocrine pancreas: functions, consequences of hyperglycaemia and hypoglycaemia	10		
7.	Introduction to male reproductive physiology, spermatogenesis, functions of testosterone	10		
8.	Introduction to female reproductive physiology Menstrual cycle, ovarian and endometrial cycle Definition of ovulation, menstruation, menarche & menopause. Functions of oestrogen and progesterone	10		

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## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card 5: (Nervous system & special sense)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Functional organization and functions of major levels of central nervous system (CNS). Neuron: definition, parts, types Nerve fiber: classification, effects of injury to the nerve fiber Synapse: properties & synaptic transmission Neurotransmitters: definition, types & functions	10		
2.	Sensory systems of the body: Sensory receptors, reflex, reflex arc, general/somatic senses, Ascending tracts/sensory pathways: name & function	10		
3.	Descending tracts/ motor pathways: name, function. Upper motor neuron and lower motor neuron: definition, effect of lesion.	10		
4.	Function of cerebellum, thalamus, hypothalamus and basal ganglia	10		
5.	Normal body temperature, site of measurement, sources of heat gain, channels of heat loss, regulation of body temperature in hot and cold environment.	10		
6.	Autonomic Nervous system: functional organization, functions.	10		
7.	Basic concept of vision: visual receptor, visual pathway, refractive errors	10		
8.	Basic concept of hearing: auditory apparatus, receptor, Deafness.	10		
9.	Smell: receptor and pathway. Taste: receptors, modalities of taste sensation and pathway.	10		

Signature of batch teacher :

Signature of head of department :

## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card 6: Physiology Practical

( I hear and I forget, I see and I remember, I do and I understand )

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Use of microscope, laboratory equipment, collection (venous & capillary ) of blood.	10		
2.	Preparation & staining of blood film for differential count of WBC with interpretation and analysis of result.	10		
3.	Estimation of haemoglobin with interpretation and analysis of result.	10		
4.	Determination of packed cell volume (PCV), Calculation of MCV, MCH & MCHC with interpretation and analysis of result.	10		
5.	Estimation of ESR by Westergren method with interpretation and analysis of result.	10		
6.	Determination of bleeding time, clotting time with interpretation and analysis of result.	10		
7.	Determination ABO & Rh blood groups with interpretation and analysis of result.	10		
8.	Clinical examination of radial pulse / respiratory rate.	10		
9.	Measurement of normal blood pressure.	10		
10.	Recording of ECG	10		
11.	Recording of oral & axillary temperature.	10		
12.	Observation of reflexes: superficial & deep.	10		

Signature of batch teacher :

Signature of head of department :

## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card No- 1. Biophysics and Biomolecules

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Introduction of biochemistry, acid, base, pH, pK, buffer.	10		
2.	Define solutions, standard solution, crystalloid and colloid. Define & classify isotope and state its biomedical importance	10		
3.	Define & classify carbohydrates, protein & lipids	10		
4.	Define & classify enzymes, coenzymes, cofactors, isoenzymes. Describe the factors affecting enzyme activity.	10		
5.	Define steroids and sterols. Describe the sources & biomedical importance of cholesterol. Define & classify lipoproteins and mention their biomedical importance.	10		

### Card No- 2. Food, nutrition and vitamins

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Basic concepts of Nutrient, food, diet, balanced diet, essential dietary components, calculation of calorie requirement. BMR, BMI, SDA and RDA.	10		
2.	Dietary fibers, nutritional importance of carbohydrate, lipid & protein.	10		
3.	Minerals (macro & micro), trace elements, common nutritional disorders, PEM, BMI. obesity, iron metabolism and its deficiency, iodine deficiency.	10		
4.	Water soluble vitamins: definition, classification, sources, functions, RDA and deficiency disorders.	10		
5.	Fat soluble vitamins: definition, classification, sources, functions, RDA and deficiency disorders and toxicity.	10		

Signature of batch teacher :

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## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card 3 : GIT, Bioenergetics and Metabolism

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Physiologic anatomy of gastrointestinal tract (GIT). Enteric nervous system. Movements of the GIT. Local hormones of GIT: name, functions & regulation of secretion	10		
2.	Digestive juices: composition, functions and regulation of secretion	10		
3.	Digestion and absorption of carbohydrate, protein and fat	10		
4.	Functions of liver and liver function tests.	10		
5.	Bioenergetics: biological oxidation, high energy phosphates, oxidative phosphorylation. Metabolism: definition, phases; anabolism, catabolism	10		
6.	Carbohydrate metabolism: glycolysis, fate of pyruvate, TCA cycle, definition of gluconeogenesis, glycogenesis & glycogenolysis.	10		
7.	Lipid metabolism: lipolysis, fate of Acetyl-CoA, ketone bodies, ketosis , lipoproteins & their importance, cholesterol metabolism	10		
8.	Protein metabolism: Amino acid pool, Transamination, Deamination. Source & fate of ammonia, ammonia intoxication.	10		

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## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card 4 : (Kidney, Body fluid, electrolytes and acid base balance)

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Body fluids compartments, fluid intake and output chart.	10		
2.	Kidney: functions of kidneys. Nephron : structure, types, parts & functions	10		
3.	Mechanism of urine formation Glomerular filtration rate (GFR), determinants of GFR	10		
4.	Reabsorption and secretion by the renal tubules Renal threshold, tubular load & plasma load.	10		
5.	Mechanism of formation of concentrated & dilute urine. Diuresis: definition & types	10		
6.	Acidification of urine Micturition reflex	10		
7.	Acid-Base Balance- origin of acids & bases, maintenance of static blood pH.	10		
8.	Serum Electrolytes- Serum electrolytes & their reference ranges. Functions, regulations, hypo & hyper states of serum Na <sup>+</sup> , K <sup>+</sup> , Ca <sup>++</sup> & PO <sub>4</sub> <sup>--</sup>	10		

Signature of batch teacher :

Signature of head of department :

## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card No-5 . Clinical biochemistry and clinical endocrinology

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Clinical biochemistry: S I unit, laboratory hazards, Sample collection, photometry.	10		
2.	Clinical enzymology: lipid profiles of blood and their clinical importance.	10		
3.	Diagnosis of diabetes mellitus. OGTT and its interpretation, definition of IGT, IFG and HbA1c.	10		
4.	Thyroid function tests and their interpretation.	10		
5.	Common liver function tests (LFT). Jaundice.	10		
6.	Renal function tests and their interpretation.	10		

### Card No-6. Fundamental of molecular biology and genetics

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Definition of Nucleic acids, nucleotides, DNA. transcription and translation	10		
2.	Definition of Gene, Genetic code, mutation, Genotype, Phenotype, RNA.	10		
3.	Recombinant DNA technology, PCR, concept of biotechnology	10		

Signature of batch teacher :

Signature of head of department :

## Continuous Assessment Card

Department of Physiology..... Dental college/ Unit.....  
 Students name..... Roll no. ....  
 Session..... Year..... Batch.....  
 Date of starting..... Date of ending .....

### Card 7: Biochemistry Practical

Sl. No.	Name of item	Full Marks	Marks Obtained	Remarks (signature & Date)
1.	Laboratory etiquette, common laboratory mishaps and its prevention.	10		
2.	Identification of laboratory glass wares & equipments, photoelectric colorimeter	10		
3.	Preparation of solution from supplied solute, solvent and standard solution.	10		
4.	Estimation of blood glucose	10		
5.	Benedict's test, heat coagulation test and Rotherus test in urine.	10		
6.	Interpretation of results of blood glucose, serum urea, serum creatinine, serum total protein and serum bilirubin	10		

Signature of batch teacher :

Signature of head of department :

## Integrated Teaching in Physiology and Biochemistry

Integrated teaching program on a particular topic/organ /organ system will be organized in each term. The topics which are related should be prepared after discussion with the teachers of Anatomy/Physiology/Biochemistry. The horizontal process of Integrated teaching program will help the students to have a simultaneous views of different aspects of Anatomical/Physiological and Biochemical details of a particular topic/organ /organ system.

TOPICS	LEARNING OBJECTIVES	TERM	DEPARTMENT
1. Cell	Students will be able to <ul style="list-style-type: none"> <li>describe the structure &amp; functions of different constituents of cell</li> <li>explain membrane transport, membrane potentials &amp; action potentials</li> <li>state the composition of ECF &amp; ICF compartments</li> </ul>	I	Anatomy Physiology & Biochemistry
2. Heart	Students will be able to <ul style="list-style-type: none"> <li>describe the gross anatomy &amp; clinical anatomy of heart</li> <li>describe the types &amp; regulation of blood pressure</li> <li>describe &amp; interpret the cardiac markers</li> </ul>	I	Anatomy Physiology & Biochemistry
3. Lung	Students will be able to <ul style="list-style-type: none"> <li>describe the gross anatomy &amp; clinical anatomy of Lungs</li> <li>describe the spirometry &amp; its clinical application</li> <li>describe the regulation of respiration</li> </ul>	I	Anatomy Physiology & Biochemistry
4. Hepatobiliary system	Students will be able to <ul style="list-style-type: none"> <li>describe the gross anatomy &amp; clinical anatomy of hepatobiliary system</li> <li>interpret the liver function test &amp; explain its clinical importance</li> <li>explain the role of liver in metabolism</li> </ul>	II	Anatomy Physiology & Biochemistry
5. Kidney	Students will be able to <ul style="list-style-type: none"> <li>describe the gross anatomy &amp; clinical anatomy of kidney</li> <li>explain the mechanism of urine formation</li> <li>interpret kidney function test</li> <li>explain the role of kidney in regulation of water, electrolytes &amp; acid base balance</li> </ul>	II	Anatomy Physiology & Biochemistry
6. Thyroid & Parathyroid gland	Students will be able to describe <ul style="list-style-type: none"> <li>the gross anatomy &amp; clinical anatomy of thyroid &amp; parathyroid gland</li> <li>the hormones of thyroid &amp; parathyroid gland : biosynthesis , transport, functions , mechanism of action &amp; regulation of secretion</li> <li>hypo &amp; hyperthyroidism</li> <li>tetany</li> <li>thyroid function tests &amp; their interpretation</li> </ul>	II	Anatomy Physiology & Biochemistry

## **Paper –3: Science of Dental Materials**

### **Departmental Objectives:**

After completing this course, the students will be able to:

- Explain general properties [chemical, physical, mechanical and biological] of the materials
- Identify the materials to be used in dentistry
- Describe the composition, properties of the individual material
- Explain the bio-compatibility of the materials
- Discuss the toxic and side effects of the materials and protective measures to be taken
- Describe the manipulation of the materials, its clinical and laboratory uses
- Explain the variables that affect the properties of the final products of the materials
- Discuss the tarnish and corrosion and the preventive measures of the metallic made prostheses and restoratives used in the oral cavity
- Describe the proper handling and caring of the materials
- Select the appropriate material for the clinical use

### **List of Competencies:**

- Gain knowledge on the Selection of the required instruments and its proper use.
- Know the proper use of the instruments.
- Can do to manipulate the dental materials perfectly.
- Can care the materials in the self without loss of its properties.

### **Hands on training, practical exposure:**

1. A fully fledged science of dental laboratory well equipped with the instruments and materials should be established in every institution.
2. The students should be guided by the experienced and expert teachers of the subject concerned
3. A technologist per 15 students should be appointed to the laboratory
4. Practical works should be set based on the total course curriculum and the students must have to perform these practical works as a prerequisite to appear at the final examination.
5. In every term examination, a part of the practical works should be set to perform

### Distribution of teaching – learning hours

Lecture	Tutorial	Practical	Demonstration+ card exam	Total teaching hours	Integrated teaching for phase (Common)	Formative exam.		Summative exam.	
						Preparatory leave	Examination time	Preparatory leave	Eax. time
110	40	70	69	289	10 hours	20 days	42 days	30 days	30 days

### Teaching – learning method, teaching aid and evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
Lecture	Demonstration/tutorial		Multimedia/White board/Black board/Hand out	Term i & ii exams., Item exam,

#### Professional examination:

#### Marks distribution of assessments

Total marks: 300

Written: 100: [Formative: 10; SAQ: 70 [Group: A-35; Group B-35]; MCQ: 20  
[Group: A-10, Group B-10]

SOE: 100

OSPE: 100 [Spotting: 60; Practical: 20; Assignment: Box: 10; practical Khata:10]

# Learning Objectives and Course Contents in Science of Dental Materials

## Part -1 General classes and properties of dental materials

Learning Objectives	Contents	Teaching Hours
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>Classify Dental Materials</li> <li>Explain the Specification no. of the materials by international association like ADA</li> </ul>	<p><b>1. Overview of Materials for Dental Applications</b></p> <p>What are Dental Materials, International Standards, US standard for Dental Materials ADA certification</p>	<p>L : 2 Hrs T:1 Hrs</p>
<ul style="list-style-type: none"> <li>Describe the different types of bonds</li> <li>Explain the Bonding forces and Thermal energy</li> </ul>	<p><b>2. Structure of Matter and Principles of Adhesion</b></p> <p>Change of state, Intra-atomic primary bond, Ionic bond, Covalent bond, metallic bond, inter-atomic secondary bond, hydrogen bonding, vander walls forces, Bonding forces, Thermal energy</p>	<p>L : 3Hrs T:1 Hrs</p>
<ul style="list-style-type: none"> <li>Explain the physical properties like Abrasion, abrasion resistance, viscosity, Structural stress relaxation, Creep and flow</li> <li>Describe the thermal expansion coefficient of material and its dental consideration</li> </ul>	<p><b>3. Physical Properties of Dental Materials</b></p> <p>What are physical properties, Abrasion and abrasion resistance, viscosity, Structural and stress relaxation, Creep and flow, color and color perception, Thermo-physical properties [Thermal conductivity, thermal diffusivity, coefficient of thermal expansion]</p>	<p>L : 2 Hrs T:1 Hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>Describe the mechanical properties of materials like Stress, strains, elasticity, Strength, diametral tensile strength, fracture[toughness, ductility and malleability resilience</li> <li>Describe the measurement of ductility, hardness</li> <li>Describe the fatigue and fatigue strength</li> <li>Explain the importance of proper knowledge on the mechanical properties on the materials using in the construction of restorations/prostheses</li> </ul>	<p>4. Mechanical properties</p> <p>What are the mechanical properties, Stress and strains curve[Tensile stress, compressive stress, shear stress, flexural stress], Mechanical properties based on elastic deformation [elastic modulus ,flexibility, resilience, Poisson's ratio] Strength properties [proportional limit, elastic limit, yield strength, Permanent deformation, cold working, diametral tensile strength, flexure strength, fatigue strength, impact strength]</p> <p>Other mechanical properties [toughness, fracture toughness, brittleness, ductility and malleability, measurement of ductility, hardness]</p>	<p>L: 3 hrs T:1 hrs</p>
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>Describe the metallic bonds, Solidification of metals</li> <li>Explain grain refinement and importance of grain size of the alloys</li> </ul>	<p>5. Solidification and microstructure of metals</p> <p>Metals, metallic bonds, Alloys, Solidification of metals [Nucleus formation, solidification modes and effects on properties], Grain refinement and grain size</p>	<p>L : 2 Hrs T:1 Hrs</p>
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>Classify the alloys</li> <li>Explain the equilibrium phase diagram</li> <li>Explain the Solid state reactions of different alloys like Gold copper system, Silver copper system</li> </ul>	<p>6. Equilibrium phases in cast alloys</p> <p>Classification of alloys, Solid solution [Solutes and solvents, condition of solid solubility, physical properties of solid solutions], Constitution of equilibrium phase [diagrams, interpretation of the phase diagram, coring, homogenization, dendrite formation in the alloys], Eutectic alloys [Silver copper system], physical properties, Solid state reactions [Gold copper system, Silver copper system] Other binary systems [Gold alloys, palladium alloys]</p>	<p>L : 2 Hrs T:1 Hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>● Explain the Applications of resins in dentistry, classification, Requisites for dental polymer</li> <li>● Describe the fundamental nature of polymers</li> <li>● Describe Physical properties of polymer</li> <li>● Describe the Chemistry of polymerization</li> </ul>	<p><b>7. Dental Polymer</b></p> <p>Applications of resins in dentistry, classification, Requisites for dental resins [Biological compatibility, physical properties, manipulation, Aesthetic properties, economic considerations, chemical stability, fundamental nature of polymers, chain length and molecular weight, chain branching and cross linking, molecular organization], Physical properties of polymers [deformation and recovery, rheometric properties,</p>	<p>L : 3Hrs T: 1 Hrs</p>
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>● Describe the adverse effects from dental materials</li> <li>● Explain the Biological response in the dental environment ,</li> <li>● Describe the Clinical guidelines for selecting biocompatible materials</li> </ul>	<p><b>8. Biocompatibility of dental materials</b></p> <p>Adverse effects from dental materials</p> <p>[Toxicity, inflammation, Allergy, local and systemic effects of materials]</p> <p>Biological response in the dental environment ,Osseointegration, the oral immune system.</p> <p>Current biocompatibility issues in dentistry [latex, nickel, beryllium, mercury and amalgam, biological effects of resins]</p> <p>Clinical guidelines for selecting biocompatible materials</p>	<p>L : 3Hrs T:1 Hrs</p>

## Part II Auxiliary Dental Materials

Learning Objectives	Contents	Teaching Hours
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>● Classify impression materials and list the ideal requirements of it.</li> <li>● Differentiate between elastic and non-elastic impression materials. b. Reversible and irreversible materials</li> <li>● Describe the setting mechanism, composition of different types of impression materials and their properties</li> <li>● Identify the most useful materials</li> <li>● Prepare the custom tray for elastomeric impression material</li> <li>● Describe the manipulation techniques of different types of impression materials with the effects of water, temp.</li> <li>● Describe the biocompatibility, disinfection, dimensional stability, compatibility with gypsum, shelf life, effect of mishandling of the impression materials</li> </ul>	<p><b>9. Impression Materials</b></p> <p>Define Impression, Impression materials, Purpose and requirements, Materials used for making impressions, setting mechanism, mechanical properties, uses of impression materials.</p> <p>Elastomeric impression materials</p> <p>Characteristics, Visco-elastic properties, Elastomeric impression materials: Chemistry and composition, Polysulphide, condensation silicone, Addition silicone, polyether</p> <p>Elastomeric materials: making an impression, preparation of impression materials, impression trays, steps required to make an impression, removal of the impression, preparation of stone cast and die.</p> <p><b>Elastomeric impression materials:</b></p> <p>Properties, working and setting times, dimensional stability, reproduction of oral detail, disinfection, rheological properties, elasticity, tear strength, bio-compatibility, shelf life, effect of mishandling,</p> <p>Hydrocolloids: sol to gel transformation, gel strength, dimensional effects, Agar (reversible)hydrocolloids, composition, Manipulation, preparation and conditioning of the agar material, tempering of the material, making the agar impression, accuracy, viscosity of the sol, distortion during gelation</p> <p>Alginate hydrocolloids, composition. Gelation process, controlling of the setting time, manipulation, making the impression, strength, accuracy, laminate technique [alginate-agar method], duplicating materials, modified alginates, biocompatibility, disinfection, dimensional stability, compatibility with gypsum, shelf life, Effect of mishandling,</p> <p>Impression compound: Composition, manipulation, dimensional stability, disinfection</p> <p>Zinc-oxide eugenol Paste:</p> <p>Composition, manipulation, dimensional stability, disinfection,</p> <p>Non-eugenol paste, surgical paste, bite registration pastes</p>	<p>L : 7 Hrs T:2 Hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>Describe the uses of gypsum and production.</li> <li>Discuss the differences between dental plaster and hard plaster</li> <li>Describe the setting of gypsum products and test of setting expansion, control of setting expansion, accelerators and retarders: practice and theories [Accelerators, retarders]</li> <li>Discuss ADA classification, the setting mechanism, mixing process and caring</li> </ul>	<p><b>10 . Gypsum Products</b>          Uses of gypsum in dentistry, Production of calcium sulphate hemihydrates, setting of gypsum products, Test of setting expansion, control of setting expansion, accelerators and retarders: practice and theories[Accelerators, retarders], Hygroscopic setting expansion, strength, types of gypsum products [impression plaster Type-I, Model plaster-Type II, Dental Stone-Type III, Dental stone High strength type –IV, Dental stone high strength High expansion-Type V, synthetic gypsum], Proportioning, mixing and caring for gypsum products [proportioning, mixing, caring for cast, special gypsum product, caring for gypsum products], Infection control</p>	<p>L : 5 Hrs T: 1 Hrs</p>
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>Describe the different types of investment materials and their composition and ideal requirements</li> <li>Explain the different factors affecting the setting expansion of Gypsum bonded investment materials</li> <li>Describe the setting reaction of Phosphate bonded investment with its properties, setting reactions</li> <li>Describe the Ethyl silicate with its Compensation and setting reaction</li> <li>Describe the Preparation of the master die</li> <li>Describe the principles of optimal sprue design</li> <li>Describe the technique involved in Investing procedure</li> </ul> <p>Casting procedure</p> <ul style="list-style-type: none"> <li>Describe the different steps involved in casting procedure.</li> <li>Describe the melting and casting machines</li> <li>Explain the causes of defective castings and its preventive measures</li> </ul>	<p><b>11. Casting Investment and Procedures</b>          Definition, Types of investment materials.          Gypsum bonded investment materials [composition, setting time, ]          Normal setting expansion [Effect of different factors on the setting expansion]          Thermal contraction, strength, porosity, storage.          Phosphate bonded investment: Composition, setting reactions, setting and thermal expansion, working and setting time, miscellaneous properties.          Ethyl silicate.          Compensation of solidification shrinkage, Preparation of the master die          Variables and principles of optimal sprue design, Wax pattern removal, sprue diameter, Sprue position, sprue attachment, Sprue direction, sprue length.          Casting ring liner. Investing procedure: vacuum mixing, compensation for shrinkage.          Casting procedure          Wax elimination and heating, hygroscopic low heat technique, high heat thermal expansion technique.          Time allowable for casting, casting machines, torch melting/centrifugal casting machine, Torch melting of noble metal, cleaning the casting, melting of base metal, Technique consideration for phosphate bonded investment, causes of defective castings</p>	<p>L : 6 Hrs T:2 Hrs</p>

Learning Objectives	Contents	Teaching Hours
<b>The student will be able to</b> <ul style="list-style-type: none"> <li>Describe the classification of separating medium</li> <li>Describe the Properties, application &amp; uses of it in dental field.</li> <li>Describe the setting mechanism and technique involved in its application</li> </ul>	<b>12. Separating medium</b> Chemistry of separating media, Classification, Properties, application & uses in dental field	L : 5 Hrs T: 1 Hrs
<b>The student will be able to</b> <ul style="list-style-type: none"> <li>Classify dental waxes</li> <li>Describe the Types of inlay wax, composition, desirable properties, flow, thermal properties, wax distortion</li> <li>Explain the manipulation technique involved in different waxes</li> </ul>	<b>13. Dental Waxes</b> Classification of dental waxes, Types of inlay wax, composition, desirable properties, flow, thermal properties, wax distortion, manipulation of inlay wax, other dental waxes and their properties and uses	L : 3 Hrs T: 1 Hrs
<b>The student will be able to</b> <ul style="list-style-type: none"> <li>Describe the Dental fluxes and its ideal requirements</li> <li>Explain the Types of dental fluxes and their uses</li> </ul>	<b>14. Dental Fluxes</b> Dental fluxes, ideal requirements of dental fluxes, Types of dental fluxes, Uses of dental fluxes	L : 3 Hrs T:1 Hrs
<b>The student will be able to</b> <ul style="list-style-type: none"> <li>Describe the classification and necessity of polishing materials</li> <li>Describe the principles of cutting by the polishing materials</li> <li>Describe the abrasive instrument design,</li> <li>Describe the finishing and polishing procedures</li> <li>Explain the biological hazards of the finishing process</li> <li>Explain the Dentifrices and its composition</li> </ul>	<b>15. Finishing and Polishing Materials</b> Definition, necessity, classification of materials used for these purposes in dentistry. Principles of cutting, grinding, finishing and polishing, abrasion, and erosion, abrasive instrument design, Types of abrasive, finishing and polishing procedures, Biological hazards of the finishing process Dentifrices: composition, abrasiveness, tooth brushes	L : 3Hrs T:1 Hrs

### Part-III : Direct Restorative Materials

Learning Objectives	Contents	Teaching Hours
<b>The student will be able to</b> <ul style="list-style-type: none"> <li>● Explain the Mechanism of Adhesion</li> <li>● Describe the Acid Etch technique,</li> <li>● List the Dentine bonding agents</li> <li>● Explain the bonding of Glass ionomer restorative, Amalgam bonding</li> <li>● Describe the Pits and fissures sealers</li> </ul>	<b>16. Bonding</b> Mechanism of Adhesion, Acid Etch technique, Dentine bonding agents Measurements of bond strength [micro leakage], Glass ionomer restorative, Amalgam bonding, Pits and fissures sealers	L : 3Hrs T:1 Hrs
<b>The student will be able to</b> <ul style="list-style-type: none"> <li>● List the aesthetic restorative materials and their uses</li> <li>● Describe the Dental composites, its composition and function of components, Resin matrix, Filler particles</li> <li>● Explain the activator-initiator system</li> <li>● Explain the chemical activation, light activation, curing lamps, depth of cure and exposure of time</li> <li>● Describe the Classification of resin based composites</li> </ul>	<b>17. Restorative resins [Composite]</b> Aesthetic restorative materials, Uses of restorative materials, Dental composites, composition and function of components, Resin matrix, Filler particles and its benefits, coupling agents, Activator-initiator system, Chemically activated resins, inhibitors, Curing of resin-based composites: chemical activation, light activation, curing lamps, depth of cure and exposure of time, dual-cure resins and extra-oral curing, reduction of residual stresses, incremental building and cavity configuration and delayed curing. Soft-start, ramped curing and delayed curing, precautions for using curing lamps Classification of resin based composites, Traditional composites, Small particle filled composites, clinical consideration of SPF, microfilled composite, flowable composites for posterior restorations[direct and indirect posterior composites], finishing of composites, bio-compatibility of composites, repair of composites. Explain the direct and indirect posterior composites Describe the finishing of composites, bio-compatibility of composites, and repair of composites	L : 5 Hrs T: 2 Hrs

Learning Objectives	Contents	Teaching Hours
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>• Enumerate the different cements used in dentistry</li> <li>• Describe the composition, properties and uses of different cements</li> <li>• Describe the manipulation techniques involved in different cements</li> <li>• Explain the manipulation variables that affects the properties of the cements</li> <li>• Describe the setting mechanism of some cement.</li> <li>• Describe the modified forms of glass ionomer cements with their properties, uses</li> </ul>	<p><b>18. Dental Cements and Filling Materials</b></p> <p>Zinc phosphate cement: Composition, setting, working and setting times, physical properties, retention, biological properties, manipulation.</p> <p>Zinc Polycarboxylate cement: Composition and chemistry, Bonding to tooth structure, film thickness, working and setting times, mechanical properties, solubility, biological preconsideration, manipulation, surface and retention, removal of excess cement</p> <p>Glass ionomer cement composition, chemistry of setting, physical properties, manipulation consideration, surface preparation, preparation of the materials, Placement of the restorative material and removal of the excess material</p> <p>Metal reinforced glass ionomer and resin modified cements: general properties, clinical consideration</p> <p>Hybrid glass ionomer: composition and setting reaction, characteristics of hybrid GIC, fissure sealants applications, liner and base applications, Compomer: composition and chemistry, characteristics of compomer, manipulation of compomers</p> <p>Resin cements: Composition and chemistry, Characteristics, Manipulation, Metallic prosthesis</p> <p>Zinc-oxide eugenol cement: Composition, setting of chemistry, Characteristics of this cement, Temporary ZOE restorations, intermediate ZOE restorations, Temporary ZOE luting cement</p> <p>Calcium hydroxide cement: cavity liners, bases, solubility and disintegration of the cement</p>	<p>L : 6 Hrs T: 2 Hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>● Describe dental amalgam and its Classification, composition,</li> <li>● Explain the metallurgical phase of dental amalgam,</li> <li>● Explain the dimensional stability, dimensional change of dental amalgam</li> <li>● Describe the manufacture of alloy powder</li> <li>● Describe the amalgamation and resulting microstructures</li> <li>● Explain the manipulation of amalgam</li> <li>● Explain the effect of moisture contamination,</li> <li>● Explain the significance of creep on amalgam performance.</li> <li>● Explain the Influence of manipulative variables on creep.</li> <li>● Describe the Tarnish and corrosion of amalgam</li> <li>● Describe the Factors affecting success of amalgam</li> </ul>	<p><b>19. Dental Amalgam</b>            Definition of dental amalgam , Classification of Dental amalgam, Alloy composition, Metallurgical phase of dental amalgam, The silver-tin system, dimensional stability, dimensional change, Influence of Ag-Tin phase on amalgam properties, Manufacture of alloy powder, lathe cut powder, homogenization, particle treatment. Atomized powder, particle size, lathe cut powder compared with atomized spherical powder, amalgamation and resulting microstructures, low copper alloys, high copper alloys. Admixed alloys, single composition, Effect of moisture contamination, strength of amalgam hardening rate, condensation, effect of porosity, , effect of trituration, effect of mercury contents,            Creep, Significance of creep on amalgam performance. Influence of manipulative variables on creep. Tarnish and corrosion of amalgam, Factors affecting success of amalgam, Clinical significance of dimensional change, Side effects and toxicity of Mercury, Marginal deterioration</p>	<p>L : 6 Hrs T:2 Hrs</p>
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>● Describe the types of Gold foils</li> <li>● Explain the technique involved in direct gold filling &amp; its Properties</li> </ul>	<p><b>20. Direct Gold Filling</b>            Metallurgical Principles:            Welding, Work hardening            Materials; Gold foils sheet, Mat gold, powdered gold, Non-cohesive gold, direct gold alloys            Manipulation: degassing, compaction            Properties: density, mechanical properties, other properties, Critique of gold foils</p>	<p>L : 2 Hrs T:1 Hrs</p>

## Part-IV : Indirect restorative and prosthetic materials

Learning Objectives	Contents	Teaching Hours
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>Describe the properties of dental casting alloys and classification</li> <li>Explain the Karat and fineness,</li> <li>Describe the Heat treatment techniques involved in High noble and noble metal Alloys</li> <li>Explain the Casting shrinkage of alloys</li> <li>Explain the Re-melting of previous casting alloys</li> <li>Explain the discolouration of porcelain by silver</li> <li>Explain the thermo-compatibility and incompatibility metal ceramic systems</li> <li>List the alloys for conventional veneering porcelains and ultra low fusing porcelain</li> </ul>	<p><b>21. Dental Casting and Soldering Alloys</b></p> <p>Desirable properties of dental casting alloys and classification, Karat and fineness, Alloys for all metal and resin veneered restorations, Heat treatment of High noble and noble metal Alloys, Softening heat treatment of gold casting alloys, Silver and its alloys, Copper and its alloys, Platinum and its alloys, Casting shrinkage, Silver palladium alloys, Silver-nickel and cobalt chromium alloys, titanium and titanium alloys, Hardening heat treatment of gold casting alloys, Re-melting of previous casting alloys, Gold-Palladium- Silver Alloys, Palladium- Gold Alloys, Palladium- Gold-Silver Alloys, Discoloration of porcelain by silver, Thermocompatibility and incompatibility metal ceramic systems, Alloys for conventional veneering porcelains, Alloys for ultra low fusing porcelain</p>	<p>L : 5 Hrs</p> <p>T:2 Hrs</p>
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>Describe the Ideal requirements of the alloys of cast partial denture.</li> <li>Enlisted alloys of cast partial denture</li> <li>Explain the parts of cast partial denture</li> <li>Differentiate between Cobalt-chromium alloys and gold alloys as cast partial denture alloys</li> </ul>	<p><b>22. Cast Partial Denture Alloys</b></p> <p>Ideal requirements, Enlisted alloys of cast partial denture, parts of cast partial denture, Cobalt-chromium alloys, Silver-Palladium Alloys, Type IV gold alloys, Titanium and titanium alloys, Ni-Cr-Be alloys</p>	<p>L : 2 Hrs</p> <p>T:1 Hrs</p>
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>Describe the Requirements of alloys for inlays, crowns and bridges</li> <li>Explain the classification gold alloys</li> <li>Explain the classification gold alloys, composition and its uses</li> <li>Describe the heat treatment, mechanical properties of gold alloys</li> <li>Describe the alloys of silver palladium alloys, nickel-chromium</li> </ul>	<p><b>23. Alloys for Inlays, Crowns and Bridges</b></p> <p>Requirements, , Gold alloys with 75% noble metal alloys, classification of gold alloys, composition, dental uses, heat treatment, Mechanical properties, silver palladium alloys, nickel- chromium alloys</p>	<p>L : 2 Hrs</p> <p>T:1 Hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>● Describe Types of Corrosion and the oral environment</li> <li>● Explain the Electrolytic cell, galvanic cell</li> <li>● Explain the factors responsible for corrosion</li> <li>● Describe the Prevention of galvanic pain</li> </ul>	<p><b>24. Tarnish and Corrosion</b>            Definition and Types of Corrosion, The oral environment, Electrochemistry [Electrolytic cell, galvanic cell], Examples of galvanic corrosion [difference of materials, electrolytes, stress, stress corrosion], corrosion and galvanic pain, Prevention of galvanic pain, Electro deposition</p>	<p>L: 2 Hrs T: 1Hrs</p>
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>● Describe Types of alloys for PFM prostheses and their Requirements</li> <li>● Explain the Cooling technique of metal –Ceramic Prosthesis</li> <li>● Explain Creep or sag resistance</li> <li>● Explain the mechanisms involved in Bonding of Porcelain to metal</li> <li>● Explain Benefits and drawbacks of metal ceramics</li> </ul>	<p><b>25. Porcelain Fused to Metal</b>            Introduction, Types of alloys for PFM prostheses, Requirement, Aesthetic potential of Metal-Ceramic Crowns versus All ceramic Crowns, Overglazing and shading of Ceramics, Cooling of metal –Ceramic Prosthesis, Creep or sag resistance, Coping of metal ceramic prostheses, Bonding of Porcelain to metal, Benefits and drawbacks of metal ceramics            The alloys designated for PFM            Prostheses: Gold, alloy, cobalt chromium alloy, Silver palladium alloys Nickel Chromium alloys, Choice of Ceramic</p>	<p>L : 3 Hrs T:1 Hrs</p>
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>● Explain wrought alloys</li> <li>● Annealing of cold worked metals,</li> <li>● Describe sensitization and prevention of S.S. wires, ,</li> <li>● Soldering and welding of stainless steel, corrosion resistance properties of austenitic stainless steel</li> <li>● Describe the orthodontic wire alloys composition, its super-elasticity and shape memory,</li> <li>● Describe mechanical properties of beta-titanium wires</li> </ul>	<p><b>26. Wrought alloys</b>            Introduction of wrought alloys and orthodontic wires, point defect, dislocations, Effects of annealing cold worked metals, Carbon steels, stainless steel, corrosion resistance properties of austenitic [stainless steel, sensitization, stabilization, general causes of corrosion, mechanical properties, recovery heat treatment, braided and twisted wires, soldering and welding of stainless steel wire, nickel titanium alloys[orthodontic wire alloys composition, super-elasticity and shape memory, nickel titanium endodontic instruments], beta-titanium alloys, titanium alloys, mechanical properties of beta-titanium wires, welding, corrosion resistance, noble metal wrought wire</p>	<p>L : 2 Hrs T: 1Hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>Describe the Definition, Classes of Dental Ceramics and its Composition</li> <li>Explain the techniques involved in Porcelain Condensation</li> <li>Describe the different Methods involving in strengthening of Ceramics</li> <li>Explain the Abrasiveness of Dental Ceramics, Wear of ceramics and Guidelines for minimizing excessive Wear of enamel by Dental Ceramic</li> <li>Describe Clinical Performance of Ceramic Prosthesis</li> <li>Describe the Criteria for Selection and Use of Dental Ceramics</li> </ul>	<p><b>27. Dental Ceramics</b>            Definition, Classes of Dental Ceramics, Ceramic Processing Methods, Composition of Dental            Porcelains, Glass modifiers, Feldspathic porcelain, Other additives, Porcelain Condensation, Sintering of Porcelain, Ceramic Prostheses [Aluminous Porcelain Crowns, Castable and Machinable Glass-Ceramics, CAD-CAM Ceramics, Methods of strengthening Ceramics[ Minimize the Effect of stress Raisers, Develop Residual Compressive Stresses, Minimize the Number of firing Cycles, Ion Exchange, Thermal tempering, Dispersion Strengthening ], Abrasiveness of Dental Ceramics, Wear of ceramics Compared with other Materials, Wear of Enamel by Ceramic Products and other Restorative Materials, Reducing Abrasiveness of Ceramics by Polishing and Glazing, Guidelines for minimizing Excessive Wear of enamel by Dental Ceramic s, Clinical Performance of Ceramic Prosthesis, Porcelain Denture teeth, Factors affecting the color of Ceramics, Criteria for Selection and Use of Dental Ceramics</p>	<p>L : 6 Hrs T:2 Hrs</p>
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>Define die, counter die, Swaging</li> <li>Describe the construction of S.S, denture base</li> <li>Explain the differences between metallic denture base and non metallic denture base</li> </ul>	<p><b>28. Alloys for Die and Counter Die</b>            Definition of die, counter die, Swaging, construction of S.S, denture base, difference between metallic denture base and non metallic denture base</p>	<p>L : 3 Hrs T:1Hrs</p>
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>Classify and define solders, soldering, welding.</li> <li>Explain Ideal requirements of solder and its different types and composition</li> <li>Describe the heating sources, zones of a flame</li> <li>Describe the techniques involved in the different joining processes</li> <li>Explain the successful soldering, and causes of failure</li> <li>Explain the causes of defective soldering , antifix used in soldering processes, technique of S.S. wire soldering</li> </ul>	<p><b>29. Soldering, Brazing, and Welding</b>            Definition[solders, soldering, welding, brazing], Ideal requirements of solder, Types of solders, Composition, properties of solder, heating sources, zones of a flame, types of soldering process[techniques], requirement of successful soldering, Principles of soldering, causes of failure, antifix , pitted soldering, S.S. wire soldering, Buckling, welding, types of welding, welding technique</p>	<p>L : 3 Hrs T:1 Hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>• Classify dental implants</li> <li>• Describe the implant design,</li> <li>• Explain the properties of implant and its attachment mechanisms</li> <li>• Describe the different implant components and success and failure of dental implants</li> <li>• Describe different types of implant materials</li> <li>• Describe the selection criteria of implant materials</li> <li>• Describe its biocompatibility and biomechanics</li> </ul>	<p><b>30. Dental Implants</b></p> <p>Classification of dental implants, implant design, implant properties, indications and contraindications, attachment mechanism, implant components, clinical success of dental implants, implant materials, metallic implant, ceramic and ceramic coated implants, selection of implant materials, biocompatibility of implants, biomechanics</p>	<p>L : 3 Hrs T:1 Hrs</p>
<p><b>The student will be able to</b></p> <ul style="list-style-type: none"> <li>• Classify denture base Materials</li> <li>• Enumerate the Requirements of polymeric denture base materials</li> <li>• Summarize the fundamental nature of polymer</li> <li>• Describe the components of Heat activated denture base resins and its storage</li> <li>• Describe the steps involved in the construction of a denture</li> <li>• Explain the causes of development of different defects during curing and their preventive measures</li> <li>• Describe the Chemically activated resins and Light Activated resin and technique of manipulation</li> <li>• Describe the technique involved in Repair Resins, Relining Resins Denture Bases, Rebasing Resin Dentures</li> <li>• Describe the infection control procedures, hygienist's role in maintenance of denture base and allergic reactions</li> </ul>	<p><b>31. Denture Base Resins</b></p> <p>Classification of denture base materials, polymeric denture base materials.: Requirements of polymeric denture base materials. Fundamental nature of polymer, Heat activated denture base resins [composition, storage], compression moulding technique [preparation of the mould, selection and application of the separating medium], Polymer-monomer interaction [dough time, working time, packing, injection moulding technique, polymerization procedure, temperature rise, internal porosity, polymerization cycle] Chemically activated resins, [technical consideration, processing considerations], Light Activated Denture Base Resins, Physical Properties of Denture Base Resins, [Polymerization shrinkage, Porosity, Water absorption, Solubility, Processes stresses, Crazeing, Strength, Creep, Miscellaneous properties], Repair Resins, Relining Resins Denture Bases, Rebasing Resin Dentures, Short term and long term soft denture liners, resin impression tray materials, Denture cleansers, infection control procedures, Allergic reactions, Toxicology</p>	<p>L : 5 Hrs T:2 Hrs</p>
<p>The student will be able to</p> <ul style="list-style-type: none"> <li>• Describe the importance, properties of the important base metals used in dentistry</li> </ul>	<p><b>32. Base Metal and its Importance</b></p> <p>Base metal like Zn, Ni, Cr, Pb</p> <p>Its importance in dentistry, sources, properties and dental use of base metals</p>	<p>L : 2 Hrs T:1 Hrs</p>

## Items

The total no. of items is 28. Each item bears 10 marks and the pass marks is 6. The students have to appear at the item exam. [viva] after the completion of the chapter. The total number of items has been divided into 4 cards. The students have to appear at the card final examination [both written and viva].

1st Card		
Sl. No.	Name of the item	Marks
1	Overview of Dental Materials and Applications	10
2	Structure of Matter and Principles of Adhesion	10
3	Physical Properties & Chemical Properties of Solids	10
4	Mechanical Properties of Dental Materials	10
5	Structure and Properties of Cast Dental Alloys:	
	a. Solidification and Microstructure of Metals	
	b. Equilibrium Phase Diagram	10
6	Dental Polymer	10
7	Biocompatibility of Dental Materials	10
2nd card		
8	Impression Material	10
9	Gypsum products	10
10	Dental Waxes	10
11	Separating Media	10
12	Casting investments and Procedures	10
13	Materials and Process for Cutting, Grinding, Finishing and Polishing	10
3rd Card		
14	Bonding and Bonding Agents	10
15	Resin based composite	10
16	Dental Cements	10
17	Dental Amalgam	10
18	Direct Gold Filling	10
4th Card		
19	Dental Casting Alloys:	
	a. Cast Partial Denture Alloys	
	b. Alloys for inlays, Crowns and Bridges	10
20	Soldering Alloys	10
21	Tarnish and Corrosion	10
22	Dental Ceramics, Porcelain Fused to Metal	10
23	Wrought Alloys	10
24	Alloys for Dies and Counter Dies	10
25	Dental Fluxes, Soldering, Brazing and Welding	10
26	Dental Implants	10
27	Denture Base Resins	10
28	Base Metals and its Importance	10

## Practical phase on Science of Dental Materials

### Related equipments:

Purpose	Related instruments
1. Manipulation of different types of impression materials	Rubber bowl, Plaster spatula, impression trays of different types [Plastic; disposable, stainless steel perforated, plain], Mixing gun [elastomeric impression materials], Sprit lamp, Bunsen burner, Wax knife, Wax carver, Copper band, Glass slab or oil impervious paper, Steel spatula [Broad blade, Stiff but flexible]. For Agar impression Material: Conditioning unit, Rim lock trays
2. Manipulation of gypsum products	Plaster spatula, Rubber bowl, Glass slab, Mechanical mixer
3. Application of separating media	Camel hair brush
4. Preparation of wax pattern	Wax knife, wax carver, plaster knife, sprit lamp, Bunsen burner
5. Manipulation of acrylic resin and construction of denture base [for practice on model]	A narrow porcelain container, Dental flask, Press
6. Manipulation of cement [different types]	Cement spatula, Glass slab, mixing pad, Ball ended instrument [for calcium hydroxide cement]
7. Manipulation of composite resin	[for practice on model]: Paper pad, plastic spatula, Light curing unit, S.S. spatula
8. Manipulation of amalgam filling	Pestle and mortar [hand mixing], Amalgamator [mechanical mixing], Amalgam gun, Condenser, Amalgam carver, Polisher
9. Casting procedure	Casting ring, ring liner, crucible former, crucible, vibrator, Preheating furnace, casting machine [centrifugal], Gas burner, Gas cylinder [titanium and oxygen]
10. Manipulation of dental porcelain	S.S. spatula, camel hair brush [special brush to condense porcelain slurry mix is available], special mixing pot [ceramic], Preheating furnace, Porcelain furnace,
11. For polishing purpose	Hanging mortar, a grinding mortar, Turbine hand piece, slow speed hand piece, Diamond bur of different sizes, polishing rubber cup, polishing agents
12. Auxiliary works [to prepare practicing models]	Mould of Edentulous, Dentulous and partial Denture

## List of Manipulative works

Sl. No.	Name of the materials	Learning method	Teaching aids and expected hours
1	Manipulation of compound impression material [Sheet Variety]. Taking impression with Compound impression [materials & Phantom head or mouth].	Demonstration on composition, uses, properties and required instruments in SDM lab.	Aids: Multimedia Expected hours: 2
2	Manipulation of Low fusing compo. Seal the Boarder of the special tray.	Demonstration on Identification of low fusing compo, its properties uses and manipulation process and on the required instruments.	Aids: Multimedia Expected hours: 2
3	Copper band impression technique by low fusing compo.	Demonstration on Identification of different types of materials to be used as copperband impression materials and their other uses and manipulation process. Demonstration on copperband and the required instruments.	Aids: Multimedia Expected hours: 2
4	Manipulation of Zinc oxide eugenol paste and Taking impression of on an edentulous model.	Demonstration on Identification of Zinc oxide eugenol pastes, their uses, properties composition and manipulation process. Identification of the required instruments.	Aids: Multimedia Expected hours: 2
5	Manipulation of alginante.& Taking impression of an edentulous model.	Demonstration and Identification of alginate powder, its properties, uses and manipulation process. Demonstration on different types of impression trays and how to take an impression with alginate and manipulation process of alginate.	Aids: Multimedia Expected hours: 3
6	Preparation of custom tray with self cured acrylic and take an impression of a model.	Demonstration on custom tray with its purposes. Demonstration on a model to show technique of manipulation of a custom tray by self cured acrylic resins.	Aids: Multimedia Expected hours: 2

Sl. No.	Name of the materials	Learning method	Teaching aids and expected hours
7	Elastomeric impression material: Two stage putty wash technique.	Demonstration on an elastomeric impression materials with its composition, uses, properties and technique to load a custom made tray by elastomeric impression material to take an impression.	Aids: Multimedia Expected hours: 3
8	Manipulation of gutta percha and loading into a copper band tray to take an impression of a prepared tooth.	Demonstration on different forms of gutta percha with its uses, properties and composition. Demonstration on the technique to load copper band tray with the manipulated stick gutta percha to take an impression of a single prepared tooth.	Aids: Multimedia Expected hours: 2
9	Manipulation of plaster of paris :Hand mixing and mechanical mixing.a). Cast an impression taken either by alginate or compo.	Identification of different types of gypsum products, their properties, composition and technique to manipulate plaster of paris and how to cast an impression to make a model .	Aids: Multimedia Expected hours: 3
10	b). Test of setting time by setting time tester.	Demonstration on base plate waxes and a readymade special tray/ temporary base. Discussion on purposes of a special tray/ temporary base and uses, composition, properties of base plate wax with its manipulation technique.	Aids: Multimedia Expected hours: 3
11	Manipulation of a Base plate wax to make a special tray/temporary base	Demonstration on modeling wax with its uses, composition, properties. Show a ready made wax pattern and wax rim made on special tray. Discuss the technique to manipulate a modeling wax piece to make a wax pattern on edentulous model.	Aids: Multimedia Expected hours: 3
12	Manipulation of modeling wax to make a wax pattern.	Demonstration on different forms of inlay casting waxes and ready made pattern wax for casting purpose.	Aids: Multimedia Expected hours: 3

Sl. No.	Name of the materials	Learning method	Teaching aids and expected hours
13	Manipulation of sticky wax [Joining of the fractured parts by softened sticky wax].	Demonstration on a piece of sticky wax. Demonstration on a joined fractured part with sticky wax. Discuss on the uses and properties of sticky wax.	Aids: Multimedia Expected hours: 3
14	Application of cold mould seal on a plaster model.	Demonstration on the required instruments. Demonstration on cold mould seal and some other separating media like vaseline. Discuss the composition, setting reaction and purpose of the use of separating media like cold mould seal.	Aids: Multimedia Expected hours: 3
15	Manipulation of acrylic resin [dough adaptation technique].	Demonstration on acrylic resins on its uses, properties and manipulation technique. Show different stages as recognized during its manipulation.	Aids: Multimedia Expected hours: 3
16	Technique to construct a denture base by acrylic resin.	Demonstration on the different instruments necessary to construct a denture base. Demonstrate how a defect free denture base can be constructed. Demonstration on the different types of porosities with their preventive measures.	Aids: Multimedia Expected hours: 2
17	Technique to repair fractured denture/model.	Practically demonstrate on the technique to repair the two fractured parts of a model or denture for subsequent repairing procedures. Show why sticky wax is good for repairing.	Aids: Multimedia Expected hours: 2
18	Application of varnish.	Identification of the instruments required to application of varnish. Demonstration on varnish emphasizing on its importance, composition and technique to varnish the dentinal walls of a prepared cavity.	Aids: Multimedia Expected hours: 1

Sl. No.	Name of the materials	Learning method	Teaching aids and expected hours
19	Manipulation of Zinc oxide eugenol cement.	Demonstration on the required instruments and materials required to prepare a temporary filling or temporary luting cement.	Aids: Multimedia Expected hours: 3
20	Manipulation of calcium hydroxide cement.	Demonstration on required instruments. Demonstration on the two tubes of calcium hydroxide and also on the powder of the cements. Discuss on the uses, composition, properties and technique to manipulate the cement.	Aids: Multimedia Expected hours: 3
21	Manipulation of zinc oxyphosphate cement.	Demonstration on the required instruments. Discuss on the uses, composition and properties of this cement. Demonstrate the manipulation technique on the cement.	Aids: Multimedia Expected hours: 2
22	Manipulation of Glass ionomer cement.	Demonstration on the required instruments. Discuss on the uses, composition and properties of this cement. Demonstrate the manipulation technique on the cement.	Aids: Multimedia Expected hours: 2
23	Manipulation of polycarboxylate cement.	Demonstration on the required instruments. Discuss on the uses, composition and properties of this cement. Demonstrate the manipulation technique of the cement.	Aids: Multimedia Expected hours: 2
24	Manipulation of light cured composite resin. Experiment: a) Effect of curing time on the depth of composite layer.	Demonstration on the composite. Identification on the required instruments to restore a cavity by light cured resin.	Aids: Multimedia Expected hours: 2

Sl. No.	Name of the materials	Learning method	Teaching aids and expected hours
25	Manipulation of self cured composite resin.	Demonstration on the resin and the required instruments.	Aids: Multimedia Expected hours: 2
26	Manipulation of amalgam alloy: Hand mixig and mechanical mixing.	Demonstration on the different forms of amalgam alloy available. Demonstration on the required instruments and techniques [mechanical and hand mixing]. Demonstration on Hg about its toxicity and preventive measures.	Aids: Multimedia Expected hours: 2
27	Introduction to cast partial denture frame work and denture.	Discuss on this frame work. Give a brief note on the differen alloys used for this purpose. Demonstrate the different parts of the PD denture as identified in this framework.	Aids: Multimedia Expected hours: 2
28	Casting procedure.	Demonstration on the different instrument required to carry out casting and its different uses. Demonstrate on the investment materials. Give the technique to invest the wax pattern for burn out process. Burnout of the wax pattern and carryout casting process by practicing metal.	Aids: Multimedia Expected hours: 2
29	Free hand soldering.	Demonstration on the free hand soldering process and the soldering machine. Technique to solder S.S. wire.	Aids: Multimedia Expected hours: 1
30	Spot welding.	Demonstration on the spot welding. Instruments requiredfor this purpose.	Aids: Multimedia Expected hours: 2

**Assignment :( Minimum no. of Contents of Practical Box)**

1. One Pair of Models [Edentulous -1, Dentulous- Upper/Lower]
2. Temporary Base by base plate wax (Upper/Lower)
3. Wax Pattern with Modeling Wax (Upper/Lower)
4. Special tray Made by Self cured acrylic resin (upper/lower)
5. Joining of broken Model by sticky wax
6. Fill up a Class-I cavity on model by Amalgam filling

# General Pharmacology & Dental Therapeutics

## General Pharmacology & Dental Therapeutics

### Departmental Objectives:

- At the end of the course the student will be able to
- Describe the principles of rational prescribing and the basis of therapeutic decision making.
- State the principles underlying the concepts of essential medicines.
- Recognize the implications of polypharmacy and other means of irrational prescribing.
- Describe reactions, interactions and manage problems due to misuse and abuse of medicines.
- Demonstrate knowledge and understanding of teratogenic medicines.
- Select appropriate learning resources periodically.
- Evaluate the ethical and legal issues involved in drug prescribing
- Develop attitude for continuing self learning.
- Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in dentistry
- List the indications, contraindications, interactions and adverse reactions of commonly used drugs in dentistry with reasons
- Tailor the use of appropriate drugs in disease with consideration to its cost, efficacy, safety for individual and mass therapy needs
- Prescribe common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal or hepatic damage and immuno-compromised patients

### List of competencies to acquire:

- Therapeutic decision making.
- Writing rational prescription.
- Management of common dental infections.
- Management of dental pain.
- Proper use of local anesthetic agents.
- Prescribing from essential medicine list.
- Providing Chemoprophylaxis.
- Describe indications, contraindications and side effects of medicines related to dental practice.
- Management of Shock
- Prescribe drugs for common dental problems
- Demonstrate knowledge and understanding of adverse reactions and drug interactions of commonly used drugs in dentistry
- Critically evaluate drug formulations and interpret the clinical pharmacology of marketed preparations commonly used in dentistry

## Distribution of teaching /learning hours

Subjects	Lecture	Tutorial	Practical + Clinical	Total Teaching hours	Integrated teaching (Common)	Formative Exam		Summative exam	
						Preparatory leave	Exam time	Preparatory leave	Exam time
General Pharmacology	50 hrs	35 hrs	22 hrs	210	10hrs	10 days	20 days	10 days	25 days
Dental Therapeutics	50 hrs	35 hrs	12+6 hrs						

## Teaching/learning methods, Teaching aids and evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
Lecture Seminar	Tutorial Discussion Question answering session Practical	Assignment, Self study	Laptop, Computer & multimedia OHP, Transparency & Marker White board & Marker, Black board & chalks, Flip Chart, Slide projector Video, X-ray plate, View Box Model, Television, VCR, Cassette, Specimen, Analysis report	Item examination(oral)  Card completion Examination (Written) Term examination  Term final Examination (Written, oral & practical)

### Related equipments:

Local Anaesthetic Cartidge syringe (Metallic)

1. Rubber Dam, Reamers, Files, Apex Locator
2. Rotatory Instruments used For Endodontics, including Endodontic Instruments
3. Condensor
4. Filling Materials, Amalgam Gun
5. Autoclave, Hot Air Woven
6. Glass Bead Sterilizer
7. Disposable Plastic Syringe
8. Bottles of Anesthetics
9. Anesthetic Spray For Topical application
10. Flouride Applicator
11. Tube For Topical Gel
12. Spirit Lamp
13. Stainless Steel Tray (Large, Medium & small)
14. Inhalation Agents & Container
15. Gingival Retraction Cord/ Liquid.

### Professional Examination:

**Marks distribution of Assessment of General & Dental Pharmacology**

**(Total marks 300)**

- Written = 100 (SAQ=70 + MCQ =20 + Formative Assessment =10)
- SOE = 100
- Practical = 100

## Learning Objectives and Course Contents of General Pharmacology

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to-</p> <ul style="list-style-type: none"> <li>● Define Pharmacology, branches of pharmacology, Drug, doses, therapeutic index and mention the sources of drugs.</li> <li>● State the routes of drug administration</li> <li>● Describe absorption of drugs, processes and factors modifying drug absorption.</li> <li>● Describe distribution of drugs, processes and factors modifying drug distribution</li> <li>● Describe, aim and describe factors modifying biotransformation.</li> <li>● State the processes and routes of drug elimination.</li> <li>● State the mechanism of drug action and dose-response relationship.</li> <li>● State the Drug interaction, Drug combination and Drug antagonism.</li> <li>● State and identify adverse drug reaction</li> <li>● Write prescription and mention legal, ethical and economic aspects.</li> <li>● Identify the preparation of various formulations.</li> <li>● Write prescriptions on common dental problem</li> </ul>	<p><b>1. Basic concept of pharmacology</b></p> <ul style="list-style-type: none"> <li>● Pharmacology, branches of pharmacology, Drug, doses, therapeutic index and sources of drugs.</li> <li>● Routes of drug administration, processes and factors modifying drug absorption, and processes and factors modifying drug distribution</li> <li>● Factors modifying biotransformation. And processes and routes of drug elimination.</li> <li>● Mechanism of drug action and dose-response relationship. Drug combination and Drug antagonism. adverse drug reaction</li> <li>● Prescription writing and legal, ethical and economic aspects.</li> </ul>	<p>L-10 hours T-9 hours</p> <p>P-7 hour</p>
<p>Students will be able to</p> <ul style="list-style-type: none"> <li>● Define neurotransmitter. Neurotransmission, mention criteria of neurotransmitter and classify autonomic receptor.</li> <li>● Describe cholinergic drugs-classification, pharmacokinetic, pharmacodynamic, indication, contraindication and adverse drug reaction.</li> <li>● Describe Anticholinergic drugs-classification, pharmacokinetic and pharmacodynamic, indication, contraindication and adverse drug reaction.</li> <li>● Describe clinically important adrenergic drugs.</li> <li>● List the clinically important alpha and beta blockers and their indication, contraindication and side effects.</li> </ul>	<p><b>2. Drugs acting on autonomic nervous system</b></p> <ul style="list-style-type: none"> <li>● Neurotransmitter. Neurotransmission, criteria of neurotransmitter and autonomic receptor.</li> <li>● Cholinergic drugs-classification, pharmacokinetic, pharmacodynamic, indication, contraindication and adverse drug reaction. And anticholinergic drugs-classification, pharmacokinetic and pharmacodynamic, indication, contraindication and adverse drug reaction.</li> <li>● Clinically important adrenergic drugs. Clinically important alpha and beta blockers and their indication, contraindication and side effects.</li> </ul>	<p>L-7hours T-4 hours</p> <p>P-7 hours</p>

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to-</p> <ul style="list-style-type: none"> <li>State the role of histamine in health and disease.</li> <li>Classify anti histamine, their pharmacological effects, indications, contraindications. and toxicity</li> <li>Describe eicosanoids-PGs</li> </ul>	<p><b>3. Autacoids</b></p> <ul style="list-style-type: none"> <li>of histamine in health and disease.</li> <li>Classification of anti histamine, their pharmacological effects, indications, contraindications. and toxicity ,and eicosanoids-PGs</li> </ul>	L-1 hour
<ul style="list-style-type: none"> <li>Define and classify sedative and Hypnotic and its mechanism,indicationcontraindication and toxicity.</li> <li>Define and classify analgesic and their pharmacological effects,indication,contraindication and toxicity.[opioids and NSAIDs]</li> <li>Define and classify general and local anaesthetic and mention their mechanism of action,indication,contraindication and toxicity</li> </ul>	<p><b>4. Drugs acting on central nervous system</b></p> <ul style="list-style-type: none"> <li>Sedative and Hypnotic and its mechanism, indicationcontraindication and toxicity.</li> <li>Analgesic and their pharmacological effects, indication, contraindication and toxicity.[opioids and NSAIDs]</li> <li>General and local anaesthetic and mention their mechanism of action,indication,contraindication and toxicity.</li> </ul>	L-8 hours T-10 hours
<ul style="list-style-type: none"> <li>Classify antihypertensive drugs.</li> <li>State the management of hypertension.</li> <li>List anticoagulants and antiplatelets and mention their mechanism, indication, contraindication and toxicity</li> <li>Mention commonly used diuretics.</li> <li>List the anti angina drugs[basic knowledge].</li> </ul>	<p><b>5. Drugs acting on cardiovascular and renal system</b></p> <ul style="list-style-type: none"> <li>Classification of antihypertensive drugs.</li> <li>Management of hypertension.</li> <li>anticoagulants and antiplatelets and their mechanism, indication, contraindication and toxicity name of commonly used diuretics and anti angina drugs[basic knowledge]</li> </ul>	L-5 hours T-5 hours
<ul style="list-style-type: none"> <li>Mention the treatment of peptic ulcer.</li> <li>Mention the management of diarrhea and emesis</li> </ul>	<p><b>6. Drugs acting on Gastrointestinal system</b></p>	L-3 hours

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to</p> <ul style="list-style-type: none"> <li>● Classify anti-diabetic drugs and mention their mechanism, indications, contraindication and toxicity.</li> <li>● List the steroids and mention their mechanism, kinetics, indication, contraindication and toxicity</li> </ul>	<p><b>7. Endocrine pharmacology</b></p> <ul style="list-style-type: none"> <li>● Classification of anti-diabetic drugs and their mechanism, indications, contraindication and toxicity.</li> <li>● Steroids and their mechanism, kinetics, indication, contraindication and toxicity.</li> </ul>	L-2 hours
<ul style="list-style-type: none"> <li>● List the anti-microbial drugs and mention their mechanism and resistance.</li> <li>● Mention the general principles of use of anti-microbial drugs.</li> <li>● Classify penicillin and cephalosporins and mention their indication, contraindication and toxicity.</li> <li>● List tetracycline and mention their indication, contraindication and toxicity of tetracycline.</li> <li>● List Macrolides and Quinolones and mention their indication, contraindication and toxicity.</li> <li>● List the anti-tubercular drugs and mention toxicity and management of tuberculosis in short.</li> <li>● List the antiamoebic drugs and mention the indication, contraindication and toxicity of metronidazole.</li> <li>● List the anthelmintic and antifungal drugs and mention their toxicity and management of helminthiasis and fungal infection.</li> <li>● State anti cancer drugs</li> </ul>	<p><b>8. Antimicrobial Agents</b></p> <ul style="list-style-type: none"> <li>● Anti-microbial drugs and their mechanism and resistance.</li> <li>● The general principles of use of anti-microbial drugs.</li> <li>● Classification of penicillin and cephalosporins and their indication, contraindication and toxicity.</li> <li>● Tetracycline and their indication, contraindication and toxicity.</li> <li>● Macrolides and Quinolones and their indication, contraindication and toxicity.</li> <li>● The anti-tubercular drugs and toxicity and management of tuberculosis in short.</li> <li>● Antiamoebic drugs and indication, contraindication and toxicity of metronidazole.</li> <li>● Anthelmintic and antifungal drugs and their toxicity and management of helminthiasis and fungal infection.</li> <li>● anti cancer drugs.</li> </ul>	L-12 hours T-9 hours
<ul style="list-style-type: none"> <li>● State essential drug and mention the criteria of rational use of drugs.</li> <li>● Mention the guide line of a rational prescription.</li> <li>● Selection of P-drug.</li> </ul>	<p><b>9. Essential drug concept and rational drug use</b></p>	L-2 hours  P-6 hour

## Learning Objectives and Course Contents in Dental Therapeutics

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>Define anesthetics, anesthesia, local anesthetics &amp; local anesthesia</li> <li>Describe the chemistry and classification of local anesthetics</li> <li>Describe the differences and or comparison among the local anesthetics</li> <li>Describe the uses and mechanism of action of local anesthetics</li> <li>State the routes of administration of local anesthetic</li> <li>State the doses and effect of overdose of local anesthetics</li> <li>Describe the indications, contraindications, complications and management of complications of local anesthetics.</li> <li>Describe pharmacological effects, adverse effects, advantages and disadvantages of local anesthesia.</li> <li>State the preparation &amp; composition of local anesthetics</li> <li>Describe causes of failure to obtain local anesthesia with how to overcome the failure.</li> <li>State pharmacology of individual local anesthetic drugs</li> <li>Calculate the local anesthetics and vasoconstrictor dosages</li> </ul>	<p><b>1. Local Anesthetics</b></p> <ul style="list-style-type: none"> <li>Definition of anesthetics, anesthesia, local anesthetics &amp; local anesthesia, chemistry and classification of local anesthetics, comparison among the local anesthetics</li> <li>Uses and ,routes of administration of local anesthetic, and doses and effect of overdose of local anesthetics</li> <li>Indications, contraindications, complications and management of complications of local anesthetics.</li> <li>Pharmacological effects, adverse effects, advantages and disadvantages of local anesthesia, preparation &amp; composition of local anesthetics Causes of failure to obtain local anesthesia with how to overcome the failure.</li> <li>Pharmacology of individual local anesthetic drugs, Calculation of local anesthetics and vasoconstrictor dosages</li> </ul>	<p>Lecture: 07 hours</p> <p>Tutorial: 03 hours</p> <p>Practical: 01 hours</p> <p>Clinical: 02 hours</p>
<ul style="list-style-type: none"> <li>Define sterilization and state the aims and objectives of sterilization</li> <li>Classify different methods sterilization</li> <li>Describe the different methods of sterilization</li> <li>Describe the advantages, disadvantages, differences among the different methods of sterilizations</li> <li>Describe the procedure of sterilize dental instruments</li> <li>Describe the ideal methods of sterilization in dental clinic</li> <li>State the procedure of sterilizing dental hand pieces</li> <li>Explain infection control and state the transmissible diseases of concerned to dental surgeons &amp; auxiliaries</li> <li>Mention the groups of high risk of contracting hepatitis B</li> <li>Describe the methods of infection control in dental clinic</li> </ul>	<p><b>2. Sterilization &amp; Infection Control in Dental Clinic</b></p> <ul style="list-style-type: none"> <li>Definition of sterilization, aims and objectives of sterilization</li> <li>Classification and description of different methods sterilization, advantages, disadvantages, differences among the different methods of sterilizations</li> <li>The procedure of sterilization of dental instruments and, the ideal methods of sterilization in dental clinic</li> <li>State the procedure of sterilizing dental hand pieces</li> </ul>	<p>Lecture: 04 hours</p> <p>Tutorial: 03 hours</p> <p>Practical: 01 hours</p> <p>Clinical: 01 hours</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>● Define RCT and state the aims and objectives of RCT</li> <li>● State the causes of pulp damage and causes of disease of the pulp</li> <li>● State the systemic aspects of Dental pain</li> <li>● State the indications &amp; contraindications of RCT</li> <li>● Describe the RCT of Vital &amp; Non vital tooth</li> <li>● State the procedure of testing the vitality of tooth</li> <li>● Explain the single visit &amp; multi-visit RCT</li> <li>● Describe the steps of RCT</li> <li>● State the drugs used in RCT for local application &amp; systemic uses</li> <li>● Describe the properties &amp; functions of drugs used in different steps of RCT</li> <li>● State the causes of root canal failure</li> <li>● Describe the precaution for RCT for the patients of infective endocarditis &amp; patient taking steroids</li> </ul>	<p><b>3. Root Canal Therapy (RCT)</b></p> <ul style="list-style-type: none"> <li>● Aims and objectives of RCT</li> <li>● Causes pulp damage and causes of disease of the pulp</li> <li>● Systemic aspects of Dental pain</li> <li>● Indications &amp; contraindications of RCT</li> <li>● RCT of Vital &amp; Non vital tooth, and procedure of testing the vitality of tooth</li> <li>● Single visit &amp; multi-visit RCT</li> <li>● Steps of RCT, and the drugs used in RCT for local application &amp; systemic uses</li> <li>● Properties &amp; functions of drugs used in different steps of RCT</li> <li>● State the causes of root canal failure, and precaution for RCT for the patients of infective endocarditis &amp; patient taking steroids</li> </ul>	<p>Lecture: 03 hours</p> <p>Tutorial: 02 hours</p> <p>Practical: 01 hours</p> <p>Clinical: 01</p>
<ul style="list-style-type: none"> <li>● Define &amp; classify antiseptics, disinfectants</li> <li>● Adverse effect of antiseptics &amp; disinfectants</li> <li>● State difference between antiseptic &amp; disinfection</li> <li>● Describe ideal properties of antiseptic &amp; disinfectant</li> <li>● Mention the uses of antiseptics and disinfectants</li> <li>● Describe the mechanism of action of antiseptics &amp; disinfectants</li> <li>● Describe the popularly used antiseptics, disinfectants in dentistry</li> </ul>	<p><b>4. Antiseptic &amp; disinfectants</b></p> <ul style="list-style-type: none"> <li>● Classification of antiseptics, disinfectants</li> <li>● Adverse effect of antiseptics &amp; disinfectants</li> <li>● difference between antiseptic &amp; disinfection</li> <li>● ideal properties of antiseptic &amp; disinfectant</li> <li>● Uses of antiseptics and disinfectants</li> <li>● mechanism of action of antiseptics &amp; disinfectants</li> <li>● popularly used antiseptics, disinfectants in dentistry</li> </ul>	<p>Lecture: 04 hours</p> <p>Tutorial: 02 hours</p> <p>Practical: 01 hours</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>● Define &amp; classify astringent ,state ideal properties of astringent &amp; styptics</li> <li>● Mention their dental uses &amp; mode of action</li> <li>● Describe the popularly used astringents in dentistry</li> <li>● Mention the dose &amp; administration of astringent &amp; styptics &amp; describe side effect of astringent</li> <li>● Describe the uses, types, indication &amp; contraindications of gingival retraction cord and other gingival displacement products</li> </ul>	<p><b>5. Astringents and gingival displacements products</b></p> <ul style="list-style-type: none"> <li>● Classification of astringent , ideal properties of astringent &amp; styptics and, their dental uses &amp; mode of action</li> <li>● The popularly used astringents in dentistry</li> <li>● Dose &amp; administration of astringent &amp; styptics and side effect of astringent</li> <li>● Uses, types, indication &amp; contraindications of gingival retraction cord and other gingival displacement products</li> </ul>	<p>Lecture: 02 hours Tutorial: 02 hours Practical: 01 hours</p>
<ul style="list-style-type: none"> <li>● Define &amp; classify mummifying agents</li> <li>● Describe the popularly used mummifying agents in dentistry</li> <li>● State the ideal properties, dental uses &amp; mode of action of mummifying agents</li> <li>● State the uses and adverse effect of mummifying agents</li> <li>● State the procedure of mummification</li> </ul>	<p><b>6. Mummifying agents</b></p> <ul style="list-style-type: none"> <li>● Classification of mummifying agents and popularly used mummifying agents in dentistry</li> <li>● Ideal properties, dental uses &amp; mode of action of mummifying agents</li> <li>● Uses and adverse effect of mummifying agents</li> <li>● Procedure of mummification</li> </ul>	<p>Lecture: 01 hours Tutorial: 01 hours Practical: 01 hours</p>
<ul style="list-style-type: none"> <li>● Define obtundents</li> <li>● Classify dental desensitizing agents</li> <li>● Describe the ideal properties, mode of action, adverse effect and dental uses of desensitizing agents</li> <li>● Describe the popularly used desensitizing agents in dentistry</li> <li>● State the mechanism of dentin sensitivity</li> <li>● State the treatment of dentinal hypersensitivity</li> </ul>	<p><b>7. Dental desensitizing agents and pharmacological control of dentin hypersensitivity</b></p> <ul style="list-style-type: none"> <li>● Definition of obtundents and classification of dental desensitizing agents, the ideal properties, mode of action, adverse effect and dental uses of desensitizing agents</li> <li>● Popularly used desensitizing agents in dentistry and mechanism of dentin sensitivity</li> <li>● Treatment of dentinal hypersensitivity</li> </ul>	<p>Lecture: 02 hours Tutorial: 02 hours Practical: 01 hours</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>● Explain the way of control of dental caries</li> <li>● Define dental caries</li> <li>● State the organism &amp; factors responsible for dental caries</li> <li>● Define and compare different fluoride component</li> <li>● Describe the uses of fluoride in dentistry</li> <li>● State the adverse reaction of fluoride</li> <li>● Describe the mechanism action of fluoride</li> <li>● State fluoride toxicity</li> <li>● Perform fluoride application</li> </ul>	<p><b>8. Anti-caries agents and pharmacological control of dental caries</b></p> <ul style="list-style-type: none"> <li>● Way of control of dental caries</li> <li>● dental caries, organism &amp; factors responsible for dental caries</li> <li>● compare different fluoride component, uses of fluoride in dentistry, and adverse reaction of fluoride, the mechanism action of fluoride</li> <li>● fluoride toxicity, fluoride application</li> </ul>	<p>Lecture: 03 hours</p> <p>Tutorial: 02 hours</p> <p>Practical: 01 hours</p>
<ul style="list-style-type: none"> <li>● Define anti-plaque agents</li> <li>● Describe the mechanism of actions anti-plaque agents</li> <li>● State the methods of application of anti-plaque agents</li> <li>● Describe the uses &amp; adverse effects of anti-plaque agents</li> <li>● Perform application of anti-plaque agents.</li> <li>● State the organism &amp; factors responsible for periodontal disease</li> <li>● Explain the way of control of periodontal disease</li> <li>● Compare different anti-plaque agents</li> <li>● State the drug treatment of periodontal disease</li> </ul>	<p><b>9. Anti-plaque / anti-gingivitis agents and pharmacological control of periodontal disease</b></p> <ul style="list-style-type: none"> <li>● anti-plaque agents, mechanism of actions anti-plaque agents, methods of application of anti-plaque agents, and uses &amp; adverse effects of anti-plaque agents</li> <li>● application of anti-plaque agents, control of periodontal disease, and organism &amp; factors responsible for periodontal disease</li> <li>● Compare different anti-plaque agents, and drug treatment of periodontal disease</li> </ul>	<p>Lecture: 03 hours</p> <p>Tutorial: 02 hours</p> <p>Practical: 01 hours</p> <p>Clinical: 01</p>
<ul style="list-style-type: none"> <li>● Describe the causes of the following dental diseases due to systemic drug treatment: Abnormal haemostasis, Altered host resistant, Angioedema, Coated tongue (black hairy tongue), Dry socket, Dysgeusia, Erythema Multiforme, Gingival enlargement, Leukoplakia &amp; Neutropenia, Lichenoid lesions, Movement disorder, Osteonecrosis Salivary gland enlargement, Sialorrhea, Soft tissue reactions, Xerostomia</li> <li>● State principles of cancer chemotherapy and state the chemotherapeutic drugs</li> <li>● State the direct and indirect oral toxic effects of cancer chemotherapy, and complications of cancer radiotherapy</li> </ul>	<p><b>10. Oral manifestations of systemic agents, oral complications of cancer therapy and antineoplastic drugs</b></p>	<p>Lecture: 03 hours</p> <p>Tutorial: 01 hours</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>● Define Haemostatic agents</li> <li>● Describe the mechanism of actions of Haemostatic agents</li> <li>● State the methods of application of Haemostatic agents</li> <li>● Describe the uses and adverse effects of Haemostatic agents</li> <li>● Perform application of Haemostatic agent</li> <li>● Describe the uses, types &amp; contraindications of gingival retraction cord</li> <li>● State the anticuogulants</li> <li>● Explain the uses of anticuogulant</li> <li>● Take the necessary action before giving dental treatment of anticuogulant taking patient</li> <li>● Take precaution before giving surgical dental treatment for a patient taking low dose aspirin</li> </ul>	<p><b>11.Procoagulant, anticoagulant, haemostatics and haemostasis</b></p> <ul style="list-style-type: none"> <li>● Haemostatic agents, mechanism of actions of Haemostatic agents, and methods of application of Haemostatic agents, uses and adverse effects of Haemostatic agents</li> <li>● Application of Haemostatic agent</li> <li>● Uses, types &amp; contraindications of gingival retraction cord</li> <li>● Anticuogulants, uses of anticuogulant and necessary action before giving dental treatment to anticuogulant taking patient</li> <li>● Precaution before giving surgical dental treatment for a patient taking low dose aspirin</li> </ul>	<p>Lecture: 03 hours</p> <p>Tutorial: 02 hours</p> <p>Practical: 01 hours</p>
<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>● Define &amp; classify Vitamins</li> <li>● Describe the source, function, daily requirement, deficiency syndrome and prophylactic uses of different Vitamins</li> <li>● State the requirements &amp; deficiency syndrome of mineral</li> </ul>	<p><b>12. Vitamins &amp; Minerals</b></p> <ul style="list-style-type: none"> <li>● Classification of Vitamins</li> <li>● the source, function, daily requirement, deficiency syndrome and prophylactic uses of different Vitamins and, requirements &amp; deficiency syndrome of mineral</li> </ul>	<p>Lecture: 02 hours</p> <p>Tutorial: 01 hours</p>
<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>● Define Mouth wash &amp; Dentifrices</li> <li>● State the ideal properties of Mouth wash &amp; Dentifrices</li> <li>● State the ideal Composition of Mouth wash &amp; Dentifrices</li> <li>● Classify Mouth wash &amp; Dentifrices</li> <li>● State the uses and the side effects of Mouth wash &amp; Dentifrices</li> <li>● Select mouth wash</li> <li>● State the indication, mechanism of action and side effects of Chlorhexidine containing mouth wash</li> <li>● State the Doses administration &amp; age limit for mouth wash</li> </ul>	<p><b>13. Mouth Wash &amp; Dentifrices</b></p> <ul style="list-style-type: none"> <li>● Mouth wash &amp; Dentifrices ,the ideal properties of Mouth wash &amp; Dentifrices and ,the ideal Composition of Mouth wash &amp; Dentifrices</li> <li>● Classification of Mouth wash &amp; Dentifrices, uses and the side effects of Mouth wash &amp; Dentifrices</li> <li>● indication, mechanism of action and side effects of Chlorhexidine containing mouth wash</li> <li>● State the Doses administration &amp; age limit for mouth wash</li> </ul>	<p>Lecture: 02 hours</p> <p>Tutorial: 02 hours</p> <p>Clinical: 01</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>● Define Tooth bleaching</li> <li>● State the causes of tooth discoloration</li> <li>● Describe the agents used for tooth bleaching</li> <li>● State the different methods of tooth bleaching</li> <li>● State the risk of tooth bleaching</li> </ul>	<p><b>14. Tooth bleaching agents</b></p> <ul style="list-style-type: none"> <li>● Causes of tooth discoloration</li> <li>● Agents used for tooth bleaching</li> <li>● Different methods of tooth bleaching and, the risk of tooth bleaching</li> </ul>	<p>Lecture: 02 hours</p> <p>Tutorial: 01 hours</p> <p>Practical: 01 hours</p>
<ul style="list-style-type: none"> <li>● Define &amp; classify Sialogogues &amp; antisialogogues</li> <li>● State the indications &amp; contraindication of Sialogogues &amp; antisialogogues</li> <li>● State the causes of Xerostomia</li> <li>● Describe the Xerogenic drugs</li> <li>● Describe the causes of increased and decreased salivation</li> <li>● State the pharmacology of sialogogues and antisialogogues</li> </ul>	<p><b>15. Agents affecting salivation</b></p> <ul style="list-style-type: none"> <li>● Classification of Sialogogues &amp; antisialogogues, indications &amp; contraindication of Sialogogues &amp; antisialogogues</li> <li>● Causes of Xerostomia, Xerogenic drugs</li> <li>● Causes of increased and decreased salivation</li> <li>● Pharmacology of sialogogues and antisialogogues</li> </ul>	<p>Lecture: 02 hours</p> <p>Tutorial: 01 hours</p> <p>Practical: xx hours</p>
<ul style="list-style-type: none"> <li>● State the physiologic, non-physiologic and pharmacologic changes associated with aging</li> <li>● State the management of fear and anxiety</li> <li>● Take the necessary measures before giving the dental treatment of the following patients: Anaemia, Leukaemia, Lymphoma, Haemorrhagic disorder, Immunodeficiencies &amp; HIV disease, Liver &amp; kidney disease</li> <li>● Describe the following dental problems &amp; give the drug treatment of: Dental Hypersensitivity, Acute Pulpitis, Periapical abscess, Periodontal abscess, Cellulitis, Ludwig's angina, Osteomyelitis, Pericoronitis, Gingivitis, Teething, Oral ulcers, Post operative dental pain, Sinusitis, Candidal infection, Thrush, Mercury Dental Amalgam Toxicity</li> </ul>	<p><b>16. Geriatric pharmacology, Treatments for Medically compromised patients and common dental problems</b></p> <ul style="list-style-type: none"> <li>● the physiologic, non-physiologic and pharmacologic changes associated with aging</li> <li>● the necessary measures before giving the dental treatment of the following patients: Anaemia, Leukaemia, Lymphoma, Haemorrhagic disorder, Immuno-deficiencies &amp; HIV disease, Liver &amp; kidney disease, Pregnant women, Young children, Health and Environment</li> </ul>	<p>Lecture: 02 hours</p> <p>Tutorial: 02 hours</p> <p>Practical: 01 hours</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to:</p> <ul style="list-style-type: none"> <li>● State the general concepts of pain</li> <li>● Define Pain, Allodynia, Analgesia, Causalgia, Dyaesthesia, Hyperalgesia, Hyperaesthesia, Hyperpathia, Neuralgia, Trigeminal Neuralgia, Neuritis, Neuropathy, Neuropathic pain, Nociception, Nociceptor, Pain Threshold, Pain tolerance level, Referred pain</li> <li>● State the Neuroanatomy of pain, Nociceptive pathways, Neurophysiology of pain, Central processing of pain, its control by therapeutic agents, Methods of relieve pain</li> </ul>	<p><b>17. The Pharmacology of Pain and antinociceptive drugs</b></p> <ul style="list-style-type: none"> <li>● General concepts of pain</li> <li>● Allodynia, Analgesia, Causalgia, Dyaesthesia, Hyperalgesia, Hyperaesthesia, Hyperpathia, Neuralgia, Trigeminal Neuralgia, Neuritis, Neuropathy, Neuropathic pain, Nociception, Nociceptor, Pain Threshold, Pain tolerance level, Referred pain</li> <li>● Neuroanatomy of pain, Nociceptive pathways, Neurophysiology of pain, Central processing of pain, its control by therapeutic agents, Methods of relieve pain</li> </ul>	<p>Lecture: 02 hours Tutorial: 02 hours Practical: xx hours</p>
<ul style="list-style-type: none"> <li>● State the emergency prevention, emergency preparedness, emergency drugs</li> <li>● Manage medical emergencies of relevance to dental practice of the following:               <ul style="list-style-type: none"> <li>○ Syncope</li> <li>○ Angina Pectoris, Myocardial infarction, Cardiac arrest</li> <li>○ Hypertension, hypotension</li> <li>○ Hemorrhage</li> <li>○ Cerebrovascular accident</li> <li>○ Asthma</li> <li>○ Insulin shock / diabetic coma</li> <li>○ Anaphylaxis / other acute allergic reactions</li> </ul> </li> </ul>	<p><b>18. Drugs for Medical Emergencies in Dental Practice and Management</b></p> <ul style="list-style-type: none"> <li>● Emergency prevention, emergency preparedness, emergency drugs</li> <li>● Medical emergencies of relevance to dental practice of the following:               <ul style="list-style-type: none"> <li>○ Syncope</li> <li>○ Angina Pectoris, myocardial infarction, Cardiac arrest</li> <li>○ Hypertension, hypotension</li> <li>○ Hemorrhage</li> <li>○ Cerebrovascular accident</li> <li>○ Asthma</li> <li>○ Insulin shock / diabetic coma</li> <li>○ Anaphylaxis / other acute allergic reactions</li> </ul> </li> </ul>	<p>Lecture: 03 hours Tutorial: 02 hours Practical: 02 hours</p>

## Item Cards

1. Local Anesthetics
2. Sterilization & Infection Control in Dental Clinic
3. Root Canal Therapy (R.C.T)
4. Antiseptic and Disinfectants
5. Astringents and Gingival displacement products
6. Mummifying agents
7. Dental Desensitizing agents and Pharmacological control of Dentine hypersensitivity
8. Anti-caries agents and Pharmacological control of Dental Caries
9. Anti-plaque/Anti-gingivitis agents and Pharmacological control of periodontal disease
10. Oral manifestations of systemic agents, oral complications of cancer therapy and anti-neoplastic drugs
11. Procoagulant, Anticoagulant, Haemostatics and Haemostasis
12. Vitamins and Minerals
13. Mouth Wash and Dentifrices
14. Tooth bleaching Agents
15. Agents affecting Salivation
16. Geriatric Pharmacology, treatments for Medically compromised patients, pregnant women and common Dental problems
17. The Pharmacology of Pain and Anti-nociceptive drugs
18. Drugs for Medical Emergencies in Dental Practice and Management

## Professional Examination:

### Marks distribution of Assessment of General Pharmacology (Group A) (Total marks 100)

- Written = 50 (SAQ =35 + Formative assessment = 5+ MCQ = 10)
- SOE = 50
- Practical = 50

#### PRACTICAL MARKS DISTRIBUTION

Total Marks – 50 (general pharmacology)

##### A. OSPE:

Marks-20

01. Question Stations: Marks (5x4) =20

- |             |   |  |
|-------------|---|--|
| STATION- 01 | } | – Sources of Drug, Drug Formulations (Dosage forms) & Drug         |
| STATION- 02 |   | – Delivery System  |
| STATION- 03 |   | – Identification of Drug   |
| STATION- 04 |   | – Selection of P drugs/Essential drug Concept /                    |
| STATION -05 |   | – Principle of Rational Prescribing / Drug information sources etc |

##### B.TRADITIONAL

Marks - 30

1. Prescription writing - 01 [Format of Ideal prescription]

Marks - 10

2. Drug Interactions - 01

Marks - 10

3. Practical note book

Marks- 10

## Marks distribution of Assessment of Dental Therapeutics (Group B) (Total marks 100)

- Written = 50 (SAQ =35 + marks of formative assessment = 5+ MCQ = 10)
- SOE = 50
- Practical = 50

### PRACTICAL MARKS DISTRIBUTION

**Total Marks – 50 Dental Pharmacology)**

**A. OSPE: Marks-20**

**01. Question Stations:Marks (5x4) =20**

STATION- 01	}	Identification of Drugs, Sources of the drugs, Indications, Contraindications, Uses, Properties, Mode of action
STATION-02		
STATION-03		
STATION- 04		
STATION -05		

**B.TRADITIONAL**

Marks - 30

1. Prescription writing - 01 [Format of Dental Prescription]

Marks - 10

2. Hands on practical work- 01

Marks - 10

**3. Practical note book**

**Marks- 10**

# Pathology & Microbiology

## (Group A Pathology & Group B Microbiology)

### Departmental Objectives

At the end of the course, the students should be able to:

- Describe causes & pathogenesis of diseases
- Demonstrate knowledge and understanding of micro-organisms & their role in disease
- Demonstrate knowledge and understanding of immunology for prevention of diseases
- Describe Haematological disease and Haematological disorders
- Interpret clinical pathological specimen to evaluate the diagnosis of disease

### List of Competencies to acquire:

- Demonstrate knowledge and understanding of general pathological, microbiological & preventive knowledge about diseases
- Interpret the pathological, microbiological & serological laboratory test for diagnosis of diseases
- Apply pathological & microbiological knowledge in practicing of dental surgery to improve the oral & dental health in the country & abroad

### Distribution of teaching - learning hours

Lecture	Tutorial	Practical	Total Teaching hours	Integrated teaching (Common)	Formative Exam		Summative exam	
					Preparatory leave	Exam time	Preparatory leave	Exam time
116	102	22	240	10hrs	10 days	20days	10 days	25days

### Teaching - learning methods, teaching aids and evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
Lecture Integrated teaching	Tutorial Practical Demonstration	Self-study & self-assessment	Computer/laptop & Multimedia OHP, Transparency & Transparency marker White board & different colour white board markers Black board & white and coloured chalks Cardavers, prosected parts, bones, viscera Slide and slide projector Microscope	Item Examination Card final Examination written/oral+ practical) Term final (written, oral+ practical)

**Related Equipments:** Flip Chart, Photograph, Model, Diagram, Preserved specimens

**Professional Examination:**

**Marks distribution of Pathology (G-A) & Microbiology (G-B)**

**Total marks – 300**

- **Written** = 100 (SAQ=70 (G-A 35+ G-B 35) + MCQ =20 (G-A 10+ G-B 10) + Formative Assessment =10 (G-A 05+G-B 05)
- **SOE** = 100 (G-A 50+G-B 50)
- **Practical** = 100 (G-A 50+G-B 50)

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Learning Objectives	Contents	Teaching Hours
<p>Student will be able to :</p> <ul style="list-style-type: none"> <li>State the causes of diseases &amp; Pathology</li> <li>State the causes of cell injury, types with examples.</li> <li>State reversible and irreversible cell injury, Necrosis – types and morphology. Apoptosis, Fate, Pathogenic calcification</li> <li>Identify gross specimen &amp; microscopic examples of necrosis.</li> </ul>	<p><b>1. Cell injury:</b></p> <ul style="list-style-type: none"> <li>Causes and types of cell injury</li> <li>Reversible and irreversible cell injury</li> <li>Necrosis</li> </ul> <p><b>2. Inflammation :</b></p> <ul style="list-style-type: none"> <li>Acute and chronic inflammation</li> <li>Causative agents, cardinal sign of inflammation</li> <li>Classification and structure of granuloma</li> <li>Basic tissue changes in inflammation</li> <li>Chemical mediators, compliment system.</li> <li>Fate of different types of inflammation.</li> <li>Common inflammatory lesions of oral cavity.</li> </ul>	<p>Lecture-4 hrs</p>
<p>Student will be able to :</p> <ul style="list-style-type: none"> <li>Define acute and chronic inflammation-granulomatous inflammations.</li> <li>Mention causative agents, cardinal sign of inflammation,</li> <li>Classify and mention typical structure of granuloma.</li> <li>State basic tissue changes in inflammation, acute and chronic, Utilities &amp; drawback of inflammatory responses.</li> <li>Mention morphological types of inflammation, chemical mediators complement system.</li> <li>State fate of different types of inflammation.</li> <li>State common inflammatory lesions of oral cavity.</li> <li>Identify acute, chronic and granulomatous inflammation.</li> </ul>		<p>L-6 hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to :</p> <ul style="list-style-type: none"> <li>● Define healing, repair and regeneration, angiogenesis</li> <li>● Outline of Primary and secondary cutaneous wound healing</li> <li>● State stages of wound healing, Factors influencing wound healing,</li> <li>● Mention complication and demonstrate understanding of healing after dental surgery (tooth extraction)</li> <li>● Identity granulation tissue under microscope.</li> </ul> <p>Student will be able to :</p> <ul style="list-style-type: none"> <li>● Define oedema and types, aetiopathology of oedema( localized &amp; generalized), mechanism of generalized oedema.</li> <li>● Define thrombosis, embolism and infarction. Mention their formations &amp; fate.</li> <li>● Define and mention types of shock, mechanism of septic shock, stages of shock.</li> <li>● Mention body's response to acute hemorrhage. Define Hyperemia and congestion with example.</li> </ul>	<p><b>3. Wound healing :</b></p> <ul style="list-style-type: none"> <li>● Definition of healing, repair and regeneration, angiogenesis</li> <li>● Primary and secondary cutaneous wound healing</li> <li>● Stages of wound healing,</li> <li>● Factors influencing wound healing,</li> <li>● Complication of dental surgery (tooth extraction)</li> <li>● Healing after dental surgery (tooth extraction)</li> </ul> <p><b>4. Hemodynamic disorders</b></p> <ul style="list-style-type: none"> <li>● Oedema and types, aetiopathology of oedema( localized &amp; generalized),</li> <li>● Mechanism of generalized oedema.</li> <li>● Thrombosis, embolism and infarction, their formations &amp; fate.</li> <li>● Types of shock, mechanism of septic shock, stages of shock.</li> <li>● Body's response to acute hemorrhage. Hyperemia and congestion.</li> </ul>	<p>L-4 hrs</p> <p>L-7 hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to :</p> <ul style="list-style-type: none"> <li>● Define atrophy, hyperplasia, hypertrophy, metaplasia with examples.</li> <li>● Identify gross and microscopic example of adaptive changes.</li> </ul> <p>Student will be able to :</p> <ul style="list-style-type: none"> <li>● Define Neoplasia, mention nomenclature, features of benign &amp; malignant neoplasia with difference.</li> <li>● Mention Biological behavior of Neoplasia, anaplasia, invasion, metastasis, carcinogen, para-neoplastic syndrome, precancerous conditions.</li> <li>● Mention common tumours &amp; tumour like lesions of the oral cavity.</li> <li>● State different diagnostic procedure of tumour.</li> <li>● State principles of tissue preservation and procedure of sending a biopsy specimen to the laboratory and cytology.</li> </ul> <p>Student will be able to :</p> <ul style="list-style-type: none"> <li>● Define common terms used in medical genetics – examples, Cytogenetic disorders, single gene disorders, molecular basis disorders, Diagnosis of genetic disease (Barr body).</li> <li>● State Pathogenesis of commonly encountered genetic diseases of oral cavity.</li> </ul>	<p><b>5. Adaptive changes:</b></p> <p>Atrophy, hyperplasia, hypertrophy, metaplasia with examples.</p> <p><b>6. Neoplasia (tumour) :</b></p> <ul style="list-style-type: none"> <li>● Neoplasia, Nomenclature, features of benign &amp; malignant neoplasia with difference,</li> <li>● Biological behavior of Neoplasia, anaplasia, invasion, metastasis, carcinogen, para-neoplastic syndrome, precancerous conditions.</li> <li>● Common tumours &amp; tumour like lesions of the oral cavity.</li> <li>● Different diagnostic procedure of tumour.</li> <li>● Principles of tissue preservation and procedure of sending a biopsy specimen to the laboratory and cytology</li> </ul> <p><b>7. Genetics:</b></p> <ul style="list-style-type: none"> <li>● Cytogenetic disorders, single gene disorders, molecular basis disorders, Diagnosis of genetic disease (Barr body).</li> <li>● Pathogenesis of commonly encountered genetic diseases of oral cavity.</li> </ul>	<p>L-1 hr</p> <p>L-8 hrs</p> <p>L-1 hr</p> <p>Total tutorial-20hrs</p> <p>Total practical--3 hrs</p>

## B- Hematology

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to :</p> <ul style="list-style-type: none"> <li>● State introduction of haematology: Haemopoiesis,</li> <li>● Describe collection of blood for haematological investigation, anticoagulant and blood film staining</li> <li>● Define Anaemia, and state classification &amp; aetiology of anaemia, Common anaemias: Iron deficiency anaemia, megaloblastic, pancytopenia &amp; aplastic anemia, Haemolytic anaemia: Thalassaemia &amp; Haemoglobinopathies.</li> <li>● Mention Laboratory investigations of anaemia including haemolytic anaemia</li> <li>● Describe white blood cell disorders: Leucocytosis, Leucopenia, lymphocytosis and leucomoid blood picture.</li> <li>● State -classification, aetiology, clinical features and laboratory diagnosis of leukaemia (Acute and Chronic).</li> <li>● State Multiple myeloma: Definition and laboratory investigation.</li> <li>● Describe hemorrhagic disorders- classification, etiology, causes of gum bleeding, DIC, ITP, Investigation procedures ( screening tests)</li> <li>● Interpret, TC, DC, absolute values. PCV, Blood film, ESR, platelet counts, Bone marrow examination, BT, CT &amp; PT. &amp; determine clinical significance</li> </ul>	<p><b>B. Hematology (Disorders of blood)</b></p> <ul style="list-style-type: none"> <li>● Introduction of haematology: Haemopoiesis,</li> <li>● Anaemia, and classification &amp; Aetiology of Anaemia,</li> <li>● Common anaemias: Iron deficiency anaemia, megaloblastic, pancytopenia &amp; aplastic anaemia, Haemolytic anaemia: Thalassaemia &amp; Haemoglobinopathies.</li> <li>● Laboratory investigations of anaemia including haemolytic anaemia</li> <li>● White blood cell disorders- Leucocytosis, Leucopenia, lymphocytosis and leucomoid blood picture.</li> <li>● Classification, aetiology, clinical features and laboratory diagnosis of leukaemia (Acute and Chronic).</li> <li>● Multiple myeloma: Definition and laboratory investigation</li> <li>● hemorrhagic disorders- classification, etiology, causes of gum bleeding, DIC, ITP, Investigation procedures (screening tests)</li> <li>● Interpretation of TC, DC, absolute values. PCV, Blood film, ESR, platelet counts, Bone marrow examination, BT, CT &amp; PT.</li> </ul>	<p>Lecture-16hrs</p> <p>Tutorial-20 hrs</p> <p>Practical-5 hrs</p>

## C-Clinical Pathology

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to :</p> <ul style="list-style-type: none"> <li>● Define and classify of DM</li> <li>● Describe hypoglycaemia and hyperglycaemia, Diagnose DM with OGTT,</li> <li>● Describe complications of DM, Glycosuria and Benedict's test, importance of DM in dentistry</li> <li>● Define jaundice &amp; state classification of jaundice,</li> <li>● Mention indication of LFT, and normal values of liver enzymes and bilirubin with their interpretation,</li> <li>● Mention importance of jaundice in dentistry.</li> <li>● Mention indications of RFT, and describe urine examination, proteinuria, haematuria and pyuria, heat coagulation test, Azotemia, uraemia,</li> <li>● Mention biochemical values of urea and creatinine with their interpretation.</li> <li>● Name electrolyte and lipid metabolic disorders and name major electrolytes with their normal values and units of measurements.</li> <li>● State definition and components, indication and clinical importance of lipid profile.</li> </ul>	<p><b>C. Clinical Pathology</b></p> <ul style="list-style-type: none"> <li>● Carbohydrate metabolic disorders: Define and classification of DM</li> <li>● Hypoglycaemia and hyperglycaemia, Diagnosis of DM with OGTT</li> <li>● Complications of DM, Glycosuria and Benedict's test, importance of DM in dentistry</li> <li>● Liver functions test: jaundice, classification of jaundice, indication of LFT, normal values of liver enzymes and bilirubin with their interpretation, importance of jaundice in dentistry.</li> <li>● Renal function test: Indication of RFT, Urine examination, proteinuria, haematuria and pyuria, Heat coagulation test, Azotemia, uraemia, Biochemical values of urea and creatinine with their interpretation.</li> <li>● Electrolyte and lipid metabolic disorders: Major electrolytes with their normal values and units of measurements.</li> <li>● Lipid profile: Definition and components, indication and clinical importance of lipid profile.</li> </ul>	<p>Lecture-10 hrs</p> <p>Tutorial-15hrs</p> <p>Practical-3 hrs</p>

## Microbiology

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to :</p> <ul style="list-style-type: none"> <li>● Define &amp; classify micro-organism-bacteria, virus &amp; fungus.</li> <li>● State bacterial, anatomy, physiology, growth &amp; death.</li> <li>● Define Sterilization, mention different methods &amp; importance in dental practice.</li> <li>● State normal flora – pathogenesis and host defense. Virulence factors of bacteria.</li> <li>● State pathogenesis of dental caries.</li> <li>● Classify Antimicrobial agents and state their mode of action and drug resistance.</li> <li>● State culture media with sensitivity &amp; its clinical importance.</li> <li>● State (a) gram positive cocci - Staphylococcus, Streptococcus, Pnuemococci (b) gram positive bacilli- C.diphtheriae ,Clostradium species (c) gram negative cocci- Neisseria species (d) gram negative bacilli- Enterobacteriaceae .With common diseases they produce.</li> <li>● State mycobacteria, actinomyces and their pathogenesis.</li> <li>● Describe (a) Urine-R/E, aetiology of UTI and lab diagnosis (b) Stool R/E, aetiology of Diarrhoea and lab diagnosis (c) Lab tech of Gram staining and AFB staining (d) lab diagnosis of-. (1) Sore throat (2) STD (3) PUO.</li> </ul>	<p><b>1. Bacteriology</b></p> <ul style="list-style-type: none"> <li>● Classification of micro-organism-bacteria, virus &amp; fungus.</li> <li>● Bacterial anatomy, physiology, growth &amp; death.</li> <li>● Sterilization, different methods of sterilization &amp; importance in dental practice.</li> <li>● Normal flora – pathogenesis and host defense. Virulence factors of bacteria.</li> <li>● Pathogenesis of dental caries.</li> <li>● Classification of antimicrobial agents and their mode of action and drug resistance.</li> <li>● Culture media with sensitivity &amp; its clinical importance.</li> <li>● (a) Gram positive cocci - Staphylococcus, Streptococcus, Pnuemococci (b) gram positive bacilli- C. diphtheriae , Clostradium species (c) gram negative cocci- Neisseria species (d) gram negative bacilli- Enterobacteriaceae .With common diseases they produce.</li> <li>● Mycobacteria, actinomyces and their pathogenesis.</li> <li>● Clinical Microbiology – (a) Urine-R/E, aetiology of UTI and lab diagnosis (b) Stool R/E,aetiology of Diarrhoea and lab diagnosis (c) Lab tech of Gram staining and AFB staning (d) lab diagnosis of-. (1) Sore throat (2) STD (3) PUO</li> <li>(4) Different swab and pus</li> </ul>	<p>General bacteriology Lecture-10 hrs</p> <p>Systemic bacteriology lecture-20 hrs</p> <p>Tutorial-30 hrs</p> <p>Practical-8 hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to :</p> <ul style="list-style-type: none"> <li>State the classification, structure, difference route of transmission of virus with examples.</li> <li>State hepatotrophic viruses and describe their pathogenesis &amp; lab. diagnosis</li> <li>Name important respiratory virus and state their pathogenesis, clinical importance &amp; lab. Diagnosis</li> <li>Name enteric viruses and state Polio &amp; Rota virus and also herpes family viruses.</li> <li>Demonstrate knowledge of new emerging virus – HIV, Birdflue, Nipa and Corona virus etc.</li> </ul> <p>Student will be able to :</p> <ul style="list-style-type: none"> <li>Demonstrate knowledge about general concept of fungus with clinical importance. State common fungal diseases of oral cavity (oral thrush)</li> <li>Classify according to site of infection and describe clinical presentation &amp; lab diagnosis.</li> <li>State in short about Systemic &amp; opportunistic funguses.</li> </ul> <p>Student will be able to :</p> <ul style="list-style-type: none"> <li>Define parasitology</li> <li>Classify Potozoa (broad classification),describe life cycle with lab diagnosis of–Ent-Histolytica, G-Intestanalis, Leish-donovani, malarial parasite</li> <li>Describe Life cycle &amp; lab diagnosis of Nematodes –(a) Intestinal – Ascaris lumbricoides Ankylostoma doudenale, Trichuris trichiura,Enterobius vermicularis. (b) Tissue Nematodes – Wuchereria bancrofti.</li> <li>Mention short description of Cestodes and Trematode .</li> </ul>	<p><b>2. Viruses</b></p> <ul style="list-style-type: none"> <li>Introductory virology – General concept of virus, classification, structure, difference route of transmission with examples.</li> <li>Hepatotrophic viruses their pathogenesis &amp; lab. diagnosis</li> <li>Important respiratory virus with their pathogenesis, clinical importance &amp; lab. Diagnosis</li> <li>Enteric viruses – Polio &amp; Rota virus and also herpes family viruses.</li> <li>New emerging virus – HIV, Bird flue, Nipa and Corona virus etc.</li> </ul> <p><b>3. Fungus</b></p> <ul style="list-style-type: none"> <li>Introduction and general concept of fungus with clinical importance. Common fungal diseases of oral cavity (oral thrush)</li> <li>Classification according to site of infection with clinical presentation &amp; lab diagnosis.</li> <li>Systemic &amp; opportunistic funguses</li> </ul> <p><b>4. Parasitology</b></p> <ul style="list-style-type: none"> <li>Introduction of parasitology</li> <li>Potozoa (broad classification), life cycle with lab diagnosis of– Ent. Histolytica, G.Intestanalis, Leish-donovani, malarial parasite</li> <li>Life cycle &amp; lab diagnosis of Nematodes –(a) Intestinal – Ascaris lumbricoides Ankylostoma doudenale,Trichuris trichiura, Enterobius vermicularis. (b) Tissue Nematodes: Wuchereria bancrofti.</li> <li>Cestodes and Trematode–short description</li> </ul>	<p>Lecture-8hrs Tutorial-6hrs</p> <p>Lecture-3hrs Tutorial-2hrs</p> <p>Lecture-10hrs Tutorial-5hrs Practical-3 hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to :</p> <ul style="list-style-type: none"> <li>● Demonstrate knowledge about general concepts of immunology and its applications,</li> <li>● classify immunity</li> <li>● Define – Antigen, immunogenic, hapten and antibody.</li> <li>● Classification of antigen.</li> <li>● State structure, types, functions of immunoglobulin &amp; Ag-Ab reaction.</li> <li>● Mention definition, sources &amp; different pathways of complement.</li> <li>● Mention definition, distribution &amp; types with their functions of major histocompatibility complex (MHC)-.</li> <li>● Describe formation &amp; maturation of T &amp; B Cell and their differences &amp; functions</li> <li>● Mention definition &amp; classification of hypersensitivity and state mechanism &amp; function.</li> <li>● Demonstrate knowledge of introduction of Immunodeficiency, Immuno therapy, Autoimmunity &amp; Tumour immunity.</li> </ul>	<p><b>Immunology</b></p> <ul style="list-style-type: none"> <li>● General concepts of immunology and its applications, immunity – classification &amp; difference.</li> <li>● Antigen, immunogen, hapten and antibody. Classification of antigen.</li> <li>● Immunoglobulin – structure, types, functions &amp; Ag-Ab reaction.</li> <li>● Complement – definition, sources, functions, pathways and their disorder.</li> <li>● Major histocompatibility complex (MHC): Definition, distribution &amp; types with their functions.</li> <li>● Lymphatic traffic system – Formation &amp; maturation of T &amp; B Cell their differences &amp; functions</li> <li>● Hypersensitivity – Definition &amp; classification with mechanism &amp; function.</li> <li>● Introduction of Immunodeficiency, Immuno therapy, Autoimmunity, Tumour immunity and transplant.</li> </ul>	<p>Lecture-8 hrs</p> <p>Tutorial-4 hrs</p>

## Department of Pathology & Microbiology

### Evaluation Card Haematology

Serial No	Subject	Marks Obtained	Signature
1.	Introduction of haematology: Haemopoiesis, Collection of blood of haematological investigation anticoagulant, blood film staining		
2.	Basic haematologic techniques including – Hb% estimation, R.B.C. count, T.C. & W.B.C. Determination of P.C.V. with absolute values, E.S.R. estimation & values of E.S.R., bone marrow examination.		
3.	The Anaemia- aetiology, classification, iron deficiency anaemia- cause, clinical, laboratory diagnosis		
4.	Megaloblastic anaemia- cause, clinical features, laboratory diagnosis		
5.	Aplastic anaemia and pancytopenia- aetiological classification, clinical features, laboratory diagnosis		
6.	Haemolytic anaemia- aetiological classification, clinical features, laboratory diagnosis		
7.	Haemoglobin disorders- haemoglobinopathies & Thalassaemia, laboratory diagnosis		
8.	Leukaemia- classification- acute & chronic leukaemia, multiple myeloma, laboratory diagnosis		
9.	Leukocytosis, leucopenia, lymphocytosis, eosinophilia, polycythemia		
10.	Outline of haemorrhagic disorders- classification, investigation of haemorrhagic disorders (BT, CT & PT), haemophilia, ITP		

NAME OF THE STUDENT : SESSION :  
 CLASS ROLL NO. : BATCH :  
 YEAR :

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## Department Of Pathology & Microbiology

### Evaluation Card General & Systemic Bacteriology

Serial No	Subject	Marks Obtained	Signature
	<b>A. BACTERIOLOGY</b>		
1.	Prokaryotic, Eukaryotic Cell, bacterial cell structure, classification of bacteria.		
2.	Growth requirement of bacteria, growth curve & generation time		
3.	Culture medium, classification with example & uses		
4.	Staining- Gram stain, AFB stain & Albert stain, Procedure of Gram & AFB stain		
5.	Sterilization, disinfections, antiseptic & incineration		
6.	Normal Flora, pathogenesis and host defence		
7.	Antibacterial drugs..... Mechanism of action & drug resistant		
8.	Gram positive cocci ..... staphylococcus & pneumococcus		
9.	Gram Positive Cocci .... Streptococcus, & strepto viridance		
10.	Gram Negative Cocci ... Neisseria species		
11.	Gram Positive bacilli .... Aerobic, anaerobic including spore		
12.	Oral microbiology with clinical importances		
13.	Gram Negative bacilli ... Enterobacteriaceae – Lactose fermenter & nonlactose fermenter		
14.	Acid fast bacilli .... Mycobacteria & lepra bacilli		
	<b>B. PARASITOLOGY</b>		
1.	General concept- Introduction, definition of host, parasite, Definitive host, intermediate host, paratenic host, classification of protozoa		
2.	Protozoa – E. histolytica, G. histolytica, Leishmania & malarial parasite (Life cycle in short)		
3.	Intestinal & tissue nematodes (A.L., A.D., T.T., E.V. & W.Bancroft) their short life cycle		
	<b>C. MYCOLOGY</b>		
1.	General Concept, introduction of Fungus with clinical importance		
2.	Classification- According to site of infection with clinical presentation & lab. diagnosis		
3.	Systemic & opportunistic fungi		

NAME OF THE STUDENT : SESSION :  
 CLASS ROLL NO. : BATCH :  
 YEAR :

**Department Of Pathology & Microbiology**

## Evaluation Card

### Immunology & Virology

Serial No	Subject	Marks Obtained	Signature
	<b>A. IMMUNOLOGY</b>		
1.	General Concepts of Immunology and its applications, Immunity- classification & differences		
2.	Define – antigen, Immunogen, Hapten a antibody Classification of Antigen		
3.	Serological Test- antigen-Antibody reaction		
4.	Compliment – definition, sources & different pathways		
5.	Major histocompatibility complex (MHC)- definition, distribution & types with their functions		
6.	Lymphatic traffic system – formation & maturation of T & B Cell their differences & functions		
7.	Hypersensitivity – definition & classification with mechanism & function		
	<b>B. VIROLOGY</b>		
1.	Introductory virology- general concept of virus, classification, structure, Different route of transmission with examples		
2.	Hepatotrophic viruses their pathogenesis & lab. diagnosis		
3.	Important respiratory virus with their pathogenesis clinical importance & lab. diagnosis		
4.	Enteric virus- Polio, Rota virus, Herpes & Rabies virus		
5.	New emerging virus- HIV, Birds Flue, Nipa etc.		

NAME OF THE STUDENT :  
CLASS ROLL NO. :  
YEAR :

SESSION :  
BATCH :

## Department of pathology & Microbiology

### Evaluation Card General Pathology

Serial No	Subject	Marks Obtained	Signature
	<b>A. IMMUNOLOGY</b>		
1	Cellular adaptation- atrophy, Hypertrophy, Hyperplasia, Metaplasia & Dysplasia		
2	Cellular Injury, necrosis and apoptosis		
3	Inflammation- Acute inflammation- definition, causative agents, cardinal sings, Vascular and cellular events, mechanism, exudates, transudate, chemical mediators & fate		
4	Chronic inflammation- definition, mechanisms, histologic Hallmarks, granuloma, systemic, effects, morphologic patterns of Inflammation		
5	Healing & wound repair- definition, type, mechanism, influencing factors & complications of wound healing		
6	Hyperemia, congestion, oedema, haemorrhage & shock		
7	Thrombosis, embolism, ischemia & infarction		
8	Neoplasm- definition, classification, nomenclature, characteristics of benign & malignant tumors, spread of tumour, clinical effects.		
9	Carcinogens, oncogenic viruses, precancerous conditions, Laboratory diagnosis of neoplasm with tumour markers.		
10	Genetics: Common term use in genetics (gene, genotype, phenotype and karyotype), classification of genetic disease, mendalian disorder, multifactorial disorder with example laboratory diagnosis of genetic diseases (Barr body).		

NAME OF THE STUDENT :  
CLASS ROLL NO. :  
YEAR :

SESSION :  
BATCH :

# Medicine

## Departmental Objectives

**At the end of the course, the students should be able to:**

- Mention the various manifestations of common diseases.
- Mention the basic principle of history taking and clinical examinations.
- Elicit required history; perform a physical examination including examination of an unconscious patient and patient of syncope.
- Correlate the clinical symptoms and physical signs to make a provisional diagnosis of common diseases and suggest relevant investigation& Interpret reasonably.
- Initiate initial management of commonly encountered health problem.
- Diagnose and refer acute medical emergencies like acute myocardial infarction, acute pulmonary oedema acute anaphylactic and hypovolumic shock, status asthmaticus, tension pneumothorax, hyperpyrexia, haemoptysis, gastro-intestinal bleeding, diabetic coma, common poisoning etc.
- Acquire the skills to perform minor procedure like – IV cannulation, insertion of nasogastric tube, urinary bladder catheterization etc.
- Demonstrate communication skills to establish effective communications with patients and with scientific community.
- Be familiar with various national health programs.
- Practice medical ethics in service delivery.
- Mention the prophylaxis of common infectious diseases.
- Interpret common haematological report, x-ray chest, ECG, ultra sonogram and CT scan of brain.

**List of Competencies to acquire:**

- History taking, communication skill, clinical examination.
- Diagnosis of common clinical problems.
- Able to record the arterial pulse, blood pressure, temperature and respiration.
- Insertion of a cannula
- Insertion of Ryle's tube
- Catheterization
- Drawing of blood
- Writing a BT order and transfusion note.
- Identification of instruments used in medicine
- Able to interpret common X rays, ECG, ultra sonogram and CT scan of brain.
- Perform CPR.

## Distribution of Teaching - Learning Hours

Lecture	Tutorial	Practical	Clinical Teaching	Total Teaching hours	Integrated teaching (Common)	Formative Exam		Summative exam	
						Preparatory leave	Exam time	Preparatory leave	Exam time
90 hrs	—	10hrs	144 hrs	244 hrs	10 hrs	10 days	20 days	10 days	25 days

## Teaching - Learning Methods, Teaching Aids and Evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
<ul style="list-style-type: none"> <li>Lecture</li> </ul>	<ul style="list-style-type: none"> <li>Bed side teaching</li> <li>(Problem based learning)</li> <li>OPD- teaching</li> <li>Demonstration in wards</li> </ul>	<ul style="list-style-type: none"> <li>Assignment</li> <li>Self study</li> </ul>	<ul style="list-style-type: none"> <li>Laptop</li> <li>Computer</li> <li>Multimedia</li> <li>White board &amp; Marker</li> <li>Video</li> <li>X-ray plate</li> <li>View Box</li> <li>ECG</li> <li>Haematological report</li> <li>CT scan and USG report</li> </ul>	<ul style="list-style-type: none"> <li>Item Examination</li> <li>Card final</li> <li>Term Examination</li> <li>Term final (written, oral, OSPE, clinical)</li> </ul>

### Related Equipments/Instrument:

- Foley's catheter
- Plain rubber catheter
- I/V cannula
- Bone marrow aspiration needle
- Lumber puncture needle
- ESR tube
- Ryle's tube
- Tongue depressor.
- Syringe
- I/V fluid ,infusion & transfusion set.
- ORS

### Professional Examination:

**Marks distribution of Assessment : total marks = 300**

- Written = 100 (SAQ=70 + MCQ=20+ 10 formative assessment)
- SOE = 100 ( two boards 4 examiners, 50 marks in each board)
- Clinical + practical = 100 ( long case-40, short case-15x2= 30, OSPE-30 )

## Learning Objectives and Course Contents in Medicine

**Lecture – 90 hrs**

Learning Objectives	Contents	Teaching Hours
<p>Students should be able to –</p> <ul style="list-style-type: none"> <li>● Mention the principles of medical ethics</li> <li>● Describe the clinical features common genetic diseases</li> <li>● Mention the investigations required for common genetic diseases</li> <li>● Counsel about common genetic disorder, e.g. Hemophilia, thalassemia.</li> </ul>	<p><b>General</b></p> <ul style="list-style-type: none"> <li>● Principles of medical ethics</li> <li>● Clinical genetics - common types, investigation</li> <li>● Prevention of genetic diseases and genetic counseling.</li> </ul>	L - 2
<p>Students should be able to –</p> <ul style="list-style-type: none"> <li>● Assess nutritional status properly</li> <li>● Evaluate nutritional problem from the history.</li> <li>● Assess nutritional ailments, by physical examination.</li> <li>● Interpret &amp; correlate physical findings with investigation.</li> <li>● Assess BMI</li> </ul>	<p><b>Nutritional and metabolic disorders</b></p> <ul style="list-style-type: none"> <li>● Nutritional assessment &amp; needs</li> <li>● Protein energy malnutrition</li> <li>● Obesity</li> <li>● Vitamin and mineral deficiency &amp; excess</li> </ul>	L - 3
<p>Students should be able to –</p> <ul style="list-style-type: none"> <li>● Diagnose water and electrolyte imbalance</li> <li>● Diagnose acid based disorder.</li> <li>● Interpret investigation report e.g. Serum electrolyte, ABG</li> <li>● Manage emergencies</li> </ul>	<p><b>Water, electrolyte and acid-base imbalance</b></p> <ul style="list-style-type: none"> <li>● Acid-base disorders</li> <li>● Fluid and electrolyte disturbances</li> </ul>	L - 2

Learning Objectives	Contents	Teaching Hours
Students should be able to – <ul style="list-style-type: none"> <li>● Diagnose critically ill patient</li> <li>● Provide initial emergency management and proper referral.</li> </ul>	<b>Critical care Medicine</b> <ul style="list-style-type: none"> <li>● Major manifestations of critical illness</li> <li>● Circulatory failure: shock</li> <li>● Respiratory failure</li> <li>● Renal failure</li> <li>● Coma</li> <li>● Sepsis</li> <li>● Disseminated intravascular coagulation</li> <li>● General principles of critical care management</li> </ul>	L -3
Students should be able to – <ul style="list-style-type: none"> <li>● Classify psychiatric illness</li> </ul>	<b>Medical Psychiatry</b> <ul style="list-style-type: none"> <li>● Classification of psychiatric disorder and evaluation.</li> <li>● Symptoms analysis</li> </ul>	L -2
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>● Diagnose common poisoning</li> <li>● Manage emergency with proper referral</li> </ul>	<b>Poisonings</b> <ul style="list-style-type: none"> <li>● General approach to the poisoned patient</li> <li>● Poisoning by specific pharmaceutical agent, chemicals and pesticides.</li> </ul>	L - 3
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>● Describe environmental occupational hazard.</li> <li>● Manage emergencies</li> </ul>	<b>Specific environmental and occupational hazard</b> <ul style="list-style-type: none"> <li>● Heatstroke and hypothermia</li> </ul>	L -1

Learning Objectives	Contents	Teaching Hours
<p>Students should be able to –</p> <ul style="list-style-type: none"> <li>● Diagnose infectious disease from history and physical findings.</li> <li>● Interpret and co-relate physical findings with investigation, e.g. hematology, immunological investigation, x-ray, stool and urine examination and sputum examination.</li> <li>● Manage common infectious disease.</li> <li>● Provide emergency management and proper referral.</li> </ul>	<p><b>Infection</b></p> <ul style="list-style-type: none"> <li>● Prevention of infectious disease.</li> <li>● Hospital acquired infections</li> <li>● Fever of unknown origin</li> <li>● Typhoid and paratyphoid fevers</li> <li>● Leprosy</li> <li>● Acute gastroenteritis &amp; food poisoning</li> <li>● Common exanthemata               <ul style="list-style-type: none"> <li>○ Measles</li> <li>○ Mumps</li> <li>○ Rubella</li> <li>○ Varicella</li> </ul> </li> <li>● Common viral respiratory infections, influenza.</li> <li>● Dengue fever</li> <li>● Sexually transmitted disease.</li> </ul>	L -10
<p>Students should be able to –</p> <ul style="list-style-type: none"> <li>● Evaluate cardiovascular disease from history</li> <li>● Perform proper examination of cardiovascular system</li> <li>● Assess cardiovascular ailments by physical examination</li> <li>● Interpret and co-relate physical findings with investigational report e.g. X-ray chest, hematology and ECG.</li> <li>● Provide initial emergency management and proper referral.</li> </ul>	<p><b>Cardiovascular system</b></p> <ul style="list-style-type: none"> <li>● Major manifestations of cardiovascular disease</li> <li>● Hypertension</li> <li>● Heart failure</li> <li>● Ischaemic heart disease, cardiac arrest.</li> <li>● Disorders of heart rate, rhythm and conduction.</li> <li>● Infective endocarditis.</li> <li>● Rheumatic fever ,valvular heart disease.</li> <li>● Congenital heart disease.</li> </ul>	L -10

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● Evaluate respiratory problem from the history.</li> <li>● Perform examination of respiratory system.</li> <li>● Assess respiratory ailments, by physical examination</li> <li>● Interpret investigation reports e.g. X-ray chest, sputum examination, MT test and hematology.</li> <li>● Provide emergency management and proper referral.</li> </ul>	<b>Respiratory system</b> <ul style="list-style-type: none"> <li>● Major manifestations of lung disease.</li> <li>● Pneumonia.</li> <li>● Bronchial asthma</li> <li>● Chronic obstructive pulmonary disease</li> <li>● Pulmonary tuberculosis</li> <li>● Pneumothorax</li> <li>● Bronchogenic carcinoma</li> </ul>	L -8
<ul style="list-style-type: none"> <li>● Evaluate renal problem from the history.</li> <li>● Perform examination of renal system.</li> <li>● Assess renal ailments, by physical examination.</li> <li>● Interpret and co-relate physical findings with investigation findings e.g. Urine examination and hematology.</li> <li>● Provide emergency management and proper referral.</li> </ul>	<b>Kidney and genitourinary system</b> <ul style="list-style-type: none"> <li>● Major manifestations of renal and urinary tract disease</li> <li>● Acute and chronic renal failure</li> <li>● Infections of the kidney and urinary tract</li> </ul>	L -5
<ul style="list-style-type: none"> <li>● Evaluate G.I.T. problem from the history</li> <li>● Perform examination of G.I. system</li> <li>● Assess G.I.T. ailments, by physical examination</li> <li>● Interpret &amp; Co-relate physical findings with investigation, e.g. Hematology, ultrasonography, stool examination, ascitic fluid study.</li> <li>● Provide emergency management and proper referral.</li> </ul>	<b>Gastrointestinal system</b> <ul style="list-style-type: none"> <li>● Major manifestations of gastrointestinal disease</li> <li>● Diseases of the stomach and duodenum - gastritis, peptic ulcer disease ,non ulcer dyspepsia.</li> <li>● Intestinal tuberculosis</li> <li>● Malabsorption syndrome</li> <li>● G.I. bleeding.</li> <li>● G.I. malignancy.</li> </ul>	L - 5

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● Evaluate liver disease from history</li> <li>● Perform examination of hepatobiliary system</li> <li>● Diagnose common diseases of hepatobiliary system</li> <li>● interpret common investigations findings</li> <li>● Provide initial management of hepatobiliary emergencies with referral</li> </ul>	<b>Endocrinology and Metabolism</b> <ul style="list-style-type: none"> <li>● Diabetes mellitus</li> <li>● Hyperthyroidism</li> <li>● Hypothyroidism</li> <li>● Cushing syndrome.</li> <li>● Adrenal insufficiency</li> <li>● Acromegaly</li> </ul>	L -6
<ul style="list-style-type: none"> <li>● Evaluate endocrine and metabolic problem from the history.</li> <li>● Assess endocrine ailments, by physical examination.</li> <li>● Diagnose common endocrine disease</li> <li>● Interpret endocrine investigation findings , e.g. biochemistry &amp; hormone analysis.</li> <li>● Provide initial management of endocrine emergencies with referral</li> </ul>	<b>Endocrinology and Metabolism</b> <ul style="list-style-type: none"> <li>● Diabetes mellitus</li> <li>● Hyperthyroidism</li> <li>● Hypothyroidism</li> <li>● Cushing syndrome.</li> <li>● Adrenal insufficiency</li> <li>● Acromegaly</li> </ul>	L -7
<ul style="list-style-type: none"> <li>● Evaluate Haemopoetic problem from the history.</li> <li>● Assess Haemopoetic ailments, by physical examination</li> <li>● Interpret and co-relate physical findings with disease</li> <li>● Interpret common hematological investigation findings, e.g. CBC, PBF, bone marrow study</li> </ul>	<b>Hematological disorders</b> <ul style="list-style-type: none"> <li>● Major manifestations of hematological diseases</li> <li>● Anaemia</li> <li>● Thrombocytopenia ,ITP.</li> <li>● Pancytopenia</li> <li>● Haematological malignancies</li> <li>● Lymphoma</li> <li>● Bleeding &amp; coagulation disorder.</li> </ul>	L -7

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● Suspect immune deficiency</li> <li>● Identify hyper sensitivity reaction</li> <li>● Provide emergency management of anaphylactic shock with proper referral</li> </ul>	<b>Disorders of the immune system</b> <ul style="list-style-type: none"> <li>● Introduction to the immune system and autoimmunity</li> <li>● Hyper sensitivity reaction , anaphylaxis</li> <li>● HIV, AIDS and related disorders</li> </ul>	L - 3
<ul style="list-style-type: none"> <li>● Diagnose common skin diseases.</li> <li>● Provide initial management</li> </ul>	<b>Skin diseases</b> <ul style="list-style-type: none"> <li>● Major manifestations of skin disease</li> <li>● Urticaria</li> <li>● Scabies</li> <li>● Fungal infections</li> <li>● Eczema</li> </ul>	L -2
<ul style="list-style-type: none"> <li>● Evaluate neurological problem from the history.</li> <li>● Perform examination of nervous system with interpretation of common physical findings.</li> <li>● Diagnose common neurological disease.</li> <li>● Interpret common investigations findings , e.g. CSF study, CT scan</li> <li>● Provide initial management of neurological emergency.</li> <li>● Refer patient to the proper place.</li> </ul>	<b>Neurological diseases</b> <ul style="list-style-type: none"> <li>● Headache and facial pain</li> <li>● Disease of cranial nerves</li> <li>● Cerebrovascular disease</li> <li>● Meningitis, Encephalitis.</li> <li>● Seizure disorder.</li> <li>● Diseases of spinal cord- cervical spondilitis.</li> <li>● Peripheral neuropathy,GBS.</li> </ul>	L -8
<ul style="list-style-type: none"> <li>● Evaluate connective tissue disorder from the history.</li> <li>● Diagnose common connective tissue disease.</li> <li>● Interpret common investigations findings.</li> </ul>	<b>Connective tissue and joints</b> <ul style="list-style-type: none"> <li>● Rheumatoid arthritis</li> <li>● Ankylosing spondyliti.</li> </ul>	L -3

- **Clinical teaching**
  - **Inpatient department -110 hrs**
  - **Outpatient department -24 hrs**
- **Practical**
  - **10 hrs**

## Inpatient Department

Learning Objectives	Contents	Teaching Hours
History taking procedure	<ul style="list-style-type: none"> <li>● Chief complain and elaboration of symptoms</li> <li>● History of present and past illness</li> <li>● Family history</li> <li>● Personal history</li> <li>● Drug history, etc</li> </ul>	10
Perform general physical examination	<ul style="list-style-type: none"> <li>● Anemia, jaundice, cyanosis, clubbing, koilonychias etc</li> <li>● Blood pressure, pulse, JVP, temperature etc.</li> </ul>	6
Analyze symptoms of GI system	<ul style="list-style-type: none"> <li>● Symptoms of GI system- abdominal pain, vomiting, diarrhea, hematemesis, malena, dyspepsia etc</li> </ul>	10
Perform examination of GI system	<ul style="list-style-type: none"> <li>● Inspection, palpation, percussion and auscultation of abdomen</li> </ul>	8
Analyze symptoms of respiratory system	<ul style="list-style-type: none"> <li>● Cough, SOB, chest pain, haemoptysis, sputum, fever etc</li> </ul>	6
Perform examination of respiratory system	<ul style="list-style-type: none"> <li>● Inspection, palpation, percussion and auscultation of chest</li> </ul>	12
Analyze symptoms of cardiovascular system	<ul style="list-style-type: none"> <li>● Angina, SOB, palpitation, oedema etc</li> </ul>	8
Perform examination of cardiovascular system	<ul style="list-style-type: none"> <li>● Inspection, palpation and auscultation of precordium</li> </ul>	10
Analyze symptoms of nervous system	<ul style="list-style-type: none"> <li>● Headache, unconsciousness, cranial nerve palsy, convulsion, paralysis etc</li> </ul>	8
Perform examination of nervous system	<ul style="list-style-type: none"> <li>● Cranial nerve, motor examination, sensory, cerebellar examination</li> </ul>	10
Analyze symptoms of renal system	<ul style="list-style-type: none"> <li>● Anuria, oliguria, polyuria etc</li> </ul>	6
Perform examination of renal system	<ul style="list-style-type: none"> <li>● Kidney palpation</li> </ul>	4
Analyze symptoms of musculoskeletal system	<ul style="list-style-type: none"> <li>● Arthritis, arthralgia, muscle weakness</li> </ul>	6
Perform examination of musculoskeletal system	<ul style="list-style-type: none"> <li>● Examination of joints</li> </ul>	6

## Outpatient department ----- Teaching time—24 hrs.

- Diagnose common disease
- Practice different physical examinations
- Practice prescription writing
- Practice patient counseling

### Practical

Learning Objectives	Contents	Teaching Hours
Identify common instruments, X- ray, ECG, CT scan,USG report etc and their use	<ul style="list-style-type: none"> <li>● Bone marrow needle</li> <li>● LP needle</li> <li>● Ryle's tube</li> <li>● Folly's catheter</li> <li>● I/V fluid</li> <li>● ESR tube</li> <li>● Syringe</li> <li>● X- ray chest, abdomen</li> <li>● ECG.USG abdomen.</li> <li>● Tongue depressor.</li> </ul>	10

# DENTAL COLLEGE/UNIT

## DEPARTMENT OF MEDICINE

### ITEM CARD

Year	
Session	
Roll No.	
Batch	

Total marks	
Pass marks	

Name of the student				
Period of placement	From :		To :	

Item	Date of beginning	Date of examination	Marks obtained	Remarks and Signature
1. Procedure of History taking and writing				
2. General examination				
3. Examination of the Respiratory system				
4. Examination of the Cardiovascular system				
5. Examination of the Alimentary system				
6. Examination of the Renal & haemopoietic system				
7. Examination of the Nervous system				
8. Examination of locomotor system				
9. Instruments				
10. X-Rays				
11. Data interpretation				

Remarks on card completion examination:-

Signature of  
Head of the Department.

Signature of  
Batch Teacher.

# Surgery

## Departmental Objectives

**At the end of the course, the students should be able to:**

- Develop the ethical approach to patient Care
- Deliver safe dental service to the individual and community

## List of Competencies to acquire :

- Show cordial attitude towards patients, colleagues and stuffs
- History taking & writing
- Proper general , local and systemic examination
- Identify the common surgical problems.
- Consider the differential diagnosis and complications
- Request for cost effective and rational laboratory investigations and imaging
- Interpretation of investigation results of common surgical problem.
- Provide first aid and refer complicated patients to proper center
- Adopt universal precaution against HIV, hepatitis
- Describe knowledge & understanding about personal, staff and patient safety in ward, OT and OPD.
- Apply knowledge & understanding about sterilization, asepsis and infection prevention.

## Distribution of teaching - learning hours

Lecture	Tutorial	Practical	Clinical Teaching	Demonstration	Total Teaching hours	Integrated teaching (Common)	Formative Exam		Summative exam	
							Preparatory leave	Exam time	Preparatory leave	Exam time
97	30	41	22	22	212	10 hrs	10 days	20 days	10 days	25 days

## Teaching - learning methods, teaching aids and evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
Lecture	Bed side teaching, Tutorials PBL (Problem based learning) OPD- teaching Demonstration in Operation theatre Demonstration in wards	assignment, self study	Laptop, Computer & Multimedia OHP, Transparency & Marker White board & Marker, Black board & chalks, Flip Chart, Slide projector Video, Dummy, Ultrasonography report, X-ray plate, View Box Model, Monitor, VCR, Cassette, Specimen, Analysis report. CT Scan and MRI imaging.	<ul style="list-style-type: none"> <li>• Item Examination</li> <li>• Card final</li> <li>• Term Examination</li> <li>• Term final (written, oral+ practical+ clinical)</li> </ul>

Related Equipments: BP instruments, stethoscope, foley's catheter, Plain rubber catheter, Sponge holding forceps, Allis's tissue forceps, Artery forceps, BP blade with handle, Dissecting forceps, Needle holder, Suture materials, infusion set, transfusion set, sinus forceps, other general surgical instruments, and appliances.

## Professional Examination:

Marks distribution of Assessment of surgery

Total marks: 300

Written: 100, (Formative- 10, MCQ- 20, SAQ- 70)

SOE: 100

Practical: 100 (Long case 40, Short Case- 30, OSPE- 30)

## Learning Objectives and Course Contents in Surgery

Learning Objectives	Contents	Teaching Hours
<b>Concept of surgery:</b> Student will be able to - <ul style="list-style-type: none"> <li>● Develop cordial attitude towards patients, teachers, colleagues and stuff</li> <li>● Perform history writing</li> <li>● Perform clinical examination</li> <li>● Describe common symptomatology</li> </ul> Student will be able to - <ul style="list-style-type: none"> <li>● Define and classify wound</li> <li>● Describe process of wound healing and repair of tissue</li> <li>● Mention factors influencing wound healing</li> <li>● Manage wound</li> <li>● Identify Complications wound</li> </ul> <b>Student will able to-</b> Define & mention clinical features, treatment & complications of- <ul style="list-style-type: none"> <li>o Inflammation, Cellulitis, Erysipelas, Bacteremia, Septicemia</li> <li>o Boil, Carbuncle, Ulcer</li> <li>o Fistula, Sinus</li> <li>o Tetanus</li> <li>o Gas gangrene</li> <li>o Tuberculosis, HIV, Hepatitis and Actinomycosis</li> <li>● Describe prevention of infections</li> <li>● Mention hospital acquired infections</li> <li>● Mention surgical site infections</li> <li>● Describe antibiotic prophylaxis</li> </ul>	Evolution of surgery Clinical methods of surgery     Wounds        Infections	2 hours ( lec )  L = 4 T = 2 P = 2 C =1 D =1 = 10 hours     L = 6 T = 2 P = 3 C = 1 D = 1 =13 hours     L = 8 T = 3 P = 5 C =2 D =2 = 20 hours

## Learning Objectives and Course Contents in Surgery

Learning Objectives	Contents	Teaching Hours
<b>Student will be able to</b> <ul style="list-style-type: none"> <li>Define, Classify &amp; mention clinical feature and Pathophysiology of Shock and Hemorrhage</li> <li>Manage different types of Shock</li> <li>Describe basis of fluid and electrolyte balance, Surgical nutrition, Blood transfusion, Indication, complications, and Blood products</li> <li>Explain acid base balance.</li> </ul>	Shock & Haemorrhage Fluid, Electrolytes and Blood transfusion, Acid base balance.	L = 8 T = 3 P = 5 C = 2 D = 2 = 20 hours
<b>Student will be able to -</b> <ul style="list-style-type: none"> <li>Define asepsis, Disinfection, Sterilization</li> <li>Describe pre, per and postoperative care</li> <li>Mention postoperative complications</li> <li>Identify and mention use of Surgical Instrument</li> <li>Describe methods of haemostasis</li> <li>Explain personal and Patient safety</li> <li>Explain informed consent and surgical ethics</li> <li>Describe DVT.</li> </ul>	Principle of surgical operation OT Safety & Patient safety	L = 8 T = 3 P = 5 C = 2 D = 2 = 20 hours
<b>Student will be able to –</b> <ul style="list-style-type: none"> <li>Define &amp; Classify Burn</li> <li>Describe first Aid of Burn</li> <li>Describe basic management protocol of burn</li> <li>Identify Complications of burn</li> </ul>	Burn	L = 6 T = 2 P = 2 C = 1 D = 1 = 12 hours

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<b>Learning Objectives</b>	<b>Contents</b>	<b>Teaching Hours</b>
Student will be able to	Tumor & Cysts	L = 10 T = 2 P = 4 C = 2 D = 2 = 20 hours
<ul style="list-style-type: none"> <li>● Define, Mention, etiology and Classify tumour</li> <li>● Differentiate benign from malignant tumor &amp; describe spread of Cancer</li> <li>● Describe Staging and Basic management of malignant Tumour</li> <li>● Mention important tumors of soft tissue and bony tissue</li> <li>● Define cyst and explain basic concept of cyst.</li> <li>● Diagnose and manage neck swelling</li> <li>● Diagnose thyroid swelling- Common surgical conditions</li> <li>● Manage inflammation, abscess, stones and tumours of salivary glands.</li> <li>● Diagnose and manage of stomatitis, glossitis and oral ulcer</li> <li>● Diagnose cervical lymphadenopathy</li> <li>● Disphagia and its causes.</li> </ul>	Swelling of Head Neck and Thyroid	L = 8 T = 3 P = 5 C = 2 D = 2 = 20 hours
Student will be able to identify and exclude	<ul style="list-style-type: none"> <li>● Diabetes and endocrine diseases</li> <li>● Hypertension. heart disease</li> <li>● Anaemia, Haemophilia and coagulopathy</li> <li>● Jaundice</li> <li>● Cerebral disorder- CVA.</li> </ul>	L = 6 C = 1 D = 1 = 08 hours

Learning Objectives	Contents	Teaching Hours
<b>Student will be able to:</b> <ul style="list-style-type: none"> <li>● Describe metabolic response to trauma</li> <li>● State general principle of management of trauma patient</li> <li>● Define fracture, dislocation, subluxation</li> <li>● Explain principles of management of fractures</li> <li>● Mention complication of fracture</li> <li>● Mention clinical features of osteomyelitis and joint infections</li> <li>● Describe Principal of management of Head and spine injury</li> </ul>	<ul style="list-style-type: none"> <li>● Trauma, Fracture and diseases of bones and joints- General information</li> </ul>	L = 8 T = 3 P = 3 C = 2 D = 2 = 18 hours
<b>Student will be able to</b> <ul style="list-style-type: none"> <li>● Explain basic concept of Local, Locoregional and General anesthesia , complication and management</li> <li>● State Principle of pain management</li> <li>● Performed CPR</li> <li>● Perform airway management</li> <li>● Perform Tracheostomy, Indications and complication.</li> </ul>	Anesthesia, pain management, CPR, and Airway management	L = 6 T = 3 P = 3 C = 2 D = 2 = 16 hours
<b>Student will able to Diagnose the-</b> <ul style="list-style-type: none"> <li>● Peptic Ulcer Diseases and complications</li> <li>● Appendicitis</li> <li>● Surgical Jaundice</li> <li>● Acute abdomen-DU perforation, Intestinal obstruction, acute pancreatitis</li> <li>● Cholecystitis with Cholelithiasis</li> <li>● Peripheral vascular diseases</li> <li>● GI Bleeding</li> <li>● Parasitic Surgical Diseases</li> <li>● Abdominal trauma</li> <li>● Chest injury</li> <li>● Tongue – infections, trauma, ulcer and neoplasm</li> <li>● Urinary retention</li> <li>● Catheterization</li> </ul>	Common Surgical problems	L = 19 T = 4 P = 4 C = 4 D = 4 = 35 hours

# Periodontology & Oral Pathology

## Departmental Objectives (Periodontology)

After completion of Periodontology course, undergraduate dental student will be able to:

- Define periodontology and describe the background and scope of periodontology.
- Define and describe the periodontium and their function.
- Distinguish the features of healthy and inflamed gingiva
- Classify the periodontal diseases according to severity and describe clinical features and describe their treatment plan as per needs.
- Explain the role of local and systemic factors as etiology of gingivitis and periodontitis.
- Describe the systemic disease involvements on periodontal diseases.
- Perform scaling and root planning-curettage with oral hygiene instructions with full aseptic precaution.
- Use the instruments for periodontal therapy and maintenance.
- Explain the prevention of periodontal diseases and prevention of the progress of the diseases.
- Describe basic concepts and periodontal aspects of dental implant and management of periodontal health of implanted person.
- Develop attitude for further learning of the subjects.

## List of Competencies to acquire :

At the end of the course of periodontology the undergraduate students will be able to:

- Diagnose and manage common periodontal diseases.
- Execute the basic principles of periodontal instrument.
- List and identify the basic periodontal instruments.
- Perform scaling and root planning with full aseptic precautions.
- Perform gingival curettage and simple gingivectomy.
- Apply knowledge and understanding of prevention of periodontal diseases.
- Indicate required investigations for periodontal disease diagnosis.
- Perform treatment with full aseptic precaution.
- To refer the patients who require specialist's care.

## Departmental Objectives (Oral Pathology)

After completion of Oral Pathology course undergraduate dental students should be able to:

- Explain basic mechanism of different types of diseases that involve the orofacial tissues.
- Describe the manifestation of common oral diseases, their diagnosis and correlate with systemic, physical signs and laboratory findings.
- Describe the oral manifestation of systemic and metabolic diseases.
- Demonstrate knowledge and understanding about the use of oral histopathology, FNAC, cytological examination, frozen section and immuno-histochemistry.
- Take a history from the patient in the specific manner
- Carry out systemic examination of the patient i.e. general examination, head and neck examination and oral cavity examination
- Diagnose common oral diseases and list differential diagnosis and construct the appropriate treatment plan for the patients.
- Describe different methods of sterilization and select appropriate methods of sterilization in the clinical practice
- Develop attitude for further learning of the subjects.

**List of Competencies to acquire:**

- Writing oral histopathology requisition form.
- Preservation surgical specimen and preparation of fixative for surgical specimens in 10% formalin.
- Preservation of surgical specimens for immunohistochemistry.
- Handling and maintenance of microscope.
- Interpretation of pathological reports and data.
- Writing advice for pathological investigation.
- Diagnose and manage common oral diseases and give proper counseling to patients and relatives.
- Diagnose and manage medical emergencies which may arise in dental practice.
- Demonstrate the awareness of the need to keep abreast to new knowledge and technique in oral pathology and oral medicine.

**Distribution of teaching - learning hours**

Lecture	Tutorial	Practical	Clinical Teaching	Total Teaching hours	Integrated Teaching (Common)	Formative Exam		Summative exam	
						Preparatory leave	Exam time	Preparatory leave	Exam time
35hrs(Oral pathology) 16hrs (Oral medicine)  34hrs (Periodontology)	24 hrs, oral path 12 hrs, oral medicine 24hrs.periodontology	26hrs,oral pathology	Dental OPD 5 Weeks(60 hrs) Periodontology, Oral medicine	85hrs, oral path  28hrs, oral medicine  118hrs, periodontology	10 hrs	10 days	20 days	10 days	25 days

**Teaching – Learning Methods, Teaching Aids and Evaluation**

Teaching Methods				Teaching aids	In course evaluation
Large group	Small group	Self learning	Others		
Lecture	Tutorial Practical Clinical Teaching in Dental OPD	Self study & self-assessment	Integrated Teaching	Computer & multimedia , Chalk & Board, White Board Marker, Slide Projector, Models, Surgical Specimens & Tooth Specimens, blood films	Item Examination, Card Final (Written+oral) Term final (Written +oral+ Practical+clinical)

**Related Equipment:**

Periodontology: Periodontal probes, Basic scaler sets, Basic root planning sets, Basic instruments for periodontal surgery, Instrument sharpening tools.

**Oral Pathology**

Teaching Microscope, Microscope with projection system, incubator, balance, water bath, and cell counter, computer, autoclave, haemocytometer

3rd Professional Examination:

Marks distribution of Assessment of Periodontology and Oral Pathology

Total marks – 300

- Written -100 (MCQ- 20+ SAQ- 70+ Formative Assessment 10)
- SOE-100
- Practical- OSPE and Clinical -100

## Learning Objectives and Course Contents in Oral Pathology & Periodontology

### Oral Pathology

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to</p> <ul style="list-style-type: none"> <li>Describe scope and outline of oral pathology</li> <li>Describe oral manifestations of systemic diseases</li> </ul>	<p>1. Introduction</p> <p>Introduction to different Pathological process involve in oral cavity.</p> <p>Outline the oral manifestations of systemic diseases</p>	L – 1hr
<ul style="list-style-type: none"> <li>Describe the importance of developmental disturbances</li> <li>Explain etiology, clinical features, radiology, histopathology of developmental disturbances of teeth</li> <li>Describe common developmental disturbances of jaws</li> <li>Explain common developmental disturbances of oral soft tissue of paraoral tissues</li> </ul>	<p>2. Developmental disturbances of teeth, jaws, soft tissues of oral and paraoral region</p> <ul style="list-style-type: none"> <li>Introduction to developmental disturbances.</li> <li>Developmental disturbances of teeth.</li> <li>Developmental disturbances of jaws</li> <li>Developmental disturbances of oral and paraoral soft tissues</li> </ul>	<p>L-4hrs</p> <p>T-4hrs</p>
<ul style="list-style-type: none"> <li>Define dental caries</li> <li>Explain microbiology of dental caries</li> <li>Describe clinical features of dental caries</li> <li>Describe histopathology of enamel, dentine and cementum</li> <li>Describe prevention of caries</li> </ul>	<p>3. Dental caries</p> <p>Etiopathogenesis, classification, microbiology, clinical features, histopathology, prevention and its sequelae</p>	<p>L – 2hrs</p> <p>T – 2hrs</p> <p>P – 3hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>Students will be able to –</b></p> <ul style="list-style-type: none"> <li>● Classify pulpal diseases</li> <li>● Enumerate common causes of pulpitis</li> <li>● Describe clinical features of pulpitis</li> <li>● Enumerate common periapical diseases and its causes</li> <li>● Describe clinical features of periapical diseases</li> <li>● Classify osteomyelitis of jaws</li> <li>● Enumerate common causes of osteomyelitis of jaws</li> <li>● Describe clinical features and histopathology and radiology of common osteomyelitis of jaws</li> <li>● Explain complication of pulpitis, periapical diseases and osteomyelitis</li> </ul>	<p>4. Pathology of pulp, periapical tissue and Osteomyelitis</p> <p>Diseases of the dental pulp Diseases of the periapical tissues Osteomyelitis of the jaws</p>	<p>L – 3hrs T – 2hrs P – 2 hrs</p>
<ul style="list-style-type: none"> <li>● Describe common bacterial, viral and fungal infections occurring in the oral cavity</li> <li>● Mention oral manifestation of bacterial, viral and fungal diseases</li> <li>● Explain histopathology and laboratory diagnosis of common bacterial, viral and fungal diseases of oral cavity</li> </ul>	<p><b>5. Microbial infections of oral soft tissues</b> Microbiology, defense mechanism including immunological aspect, oral manifestation, histopathology and laboratory diagnosis of common bacterial, viral and fungal infections.</p>	<p>L – 3hrs T – 1hrs P – 2hrs</p>
<ul style="list-style-type: none"> <li>● Classify non inflammatory diseases of the jaws</li> <li>● Describe causes of fibro-osseous lesions of the jaws</li> <li>● Describe clinical features, histopathology and radiology of common fibro-osseous lesions of the jaws</li> <li>● Explain effects of common non-inflammatory diseases in oral cavity</li> </ul>	<p>6. Common non-inflammatory diseases of the jaws Etiopathogenesis, clinical features, radiology, histopathology and laboratory diagnosis of :Fibrous dysplasia, Cherubism, Paget's disease, osteogenesis imperfect, Rickets, Cleidocranial dysplasia, Down's syndrome, Histocytosis X disease</p>	<p>L – 3hrs T – 2hrs P – 2hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to –</p> <ul style="list-style-type: none"> <li>● Define ankylosis and trismus and its causes</li> <li>● List types of arthritis, developmental malformations, traumatic injuries</li> <li>● Explain etiology, clinical features and diagnosis of myofascial pain</li> <li>● dysfunction syndrome</li> </ul>	<p><b>7. Diseases of Temporo mandibular joint</b>  Ankylosis, types of arthritis, developmental malformation, traumatic injuries and myofascial pain dysfunction syndrome</p>	<p>L – 1hrs  T – 1hrs</p>
<ul style="list-style-type: none"> <li>● Define and classify cysts of the jaws and soft tissues</li> <li>● Describe the clinical features, radiology and histopathology of common odontogenic cyst of the jaw,</li> <li>● Describe clinical features, radiology and histopathology of common non-odontogenic cysts of the jaws</li> <li>● Define pseudocyst</li> <li>● Enumerate pseudocyst of the oral cavity</li> <li>● Describe the clinical features and histopathology of common cyst occurring in oral soft tissue.</li> </ul>	<p>8 Cysts of the oral and paraoral region  Classification, etiology, clinical features, histopathology, laboratory and radiological features odontogenic cysts, non-odontogenic cysts and pseudocysts of the jaws and soft tissues</p>	<p>L-4 hrs  T-1hrs  P-3hrs</p>

## Oral Pathology and Periodontology

### Oral Pathology

Learning Objectives	Contents	Teaching Hours
<b>Students will be able to –</b> <ul style="list-style-type: none"> <li>• Classify odontogenic tumors</li> <li>• Describe etiology, clinical features, histopathology, radiological features of common benign and malignant odontogenic tumours of jaws</li> <li>• Classify non-odontogenic tumour of the jaws</li> <li>• Describe etiology, clinical features, histopathology, radiological features of common benign and malignant non-odontogenic tumours of the jaws</li> <li>• Classify tumours of the oral epithelial tissue.</li> <li>• Describe clinical features and histopathology of common benign and malignant tumours of epithelial origin</li> <li>• Classify tumours of oral connective tissue</li> <li>• Describe clinical features, histopathology of common benign and malignant tumours of the oral connective tissue.</li> <li>• Classify salivary gland tumours.</li> <li>• Describe common benign and malignant tumours of the salivary glands.</li> </ul>	<b>9. Tumours of the oral cavity</b> Classification of odontogenic, non-odontogenic and salivary glands tumours Etiopathogenesis, clinical features, histopathology and radiological features and laboratory diagnosis of common odontogenic, non-odontogenic and salivary gland tumours	L-10hrs T-5hrs P-7hrs
<ul style="list-style-type: none"> <li>• Mention injuries to sinus</li> <li>• Describe dental causes and non-dental causes of sinusitis</li> <li>• List common cysts and tumours of maxillary sinus</li> </ul>	<b>10. Diseases of maxillary sinus</b> Traumatic injuries to the sinus Sinusitis Common cysts and tumours	L – 1hrs T – 1hrs P – 2 hrs

Learning Objectives	Contents	Teaching Hours
<b>Students will be able to –</b> <ul style="list-style-type: none"> <li>● Define biopsy</li> <li>● Explain value of biopsy</li> <li>● Describe technique of biopsy</li> <li>● Perform routine staining of biopsy</li> </ul>	<b>11. Biopsy &amp; frozen section in diagnosis of oral diseases</b> biopsy, value of biopsy, technique of biopsy routine staining of biopsy	L – 1hrs T – 1hrs P – 2hrs
<ul style="list-style-type: none"> <li>● Mention oral manifestation of blood dyscrasia</li> <li>● Describe oral aspect of disturbance in mineral metabolism</li> <li>● Explain oral aspect of endocrine dysfunction</li> </ul>	<b>12. Systemic diseases involving oral cavity</b> Oral manifestation, diagnosis and significance of common blood, nutritional, hormonal and metabolic diseases.	L-1 hrs T-1 hrs
<ul style="list-style-type: none"> <li>● Classify common cases of oral pigmentation</li> <li>● Mention causes of discoloration of teeth</li> <li>● Describe clinical features and histopathology of melanin pigmentation</li> </ul>	<b>13. Pigmentation of Oral and paraoral region and Discoloration of Teeth</b> Causes and Clinical manifestation	L-1 hrs T-1 hrs P-2 hrs

## Periodontology and Oral pathology

### Oral Medicine

Learning Objectives	Contents	Teaching Hours
<b>Students will be able to –</b> <ul style="list-style-type: none"> <li>Explain the usefulness of oral medicine</li> </ul>	<b>1. Introduction</b> <ul style="list-style-type: none"> <li>usefulness of oral medicine</li> </ul>	L-1 hr
<ul style="list-style-type: none"> <li>Classify oral ulcers</li> <li>Enumerate common infective and non-infective ulcer occurring in the oral cavity</li> <li>Describe clinical features, histopathology and laboratory investigation for common infective and non-infective ulcers occurring in oral cavity</li> <li>Describe treatment plan and differential diagnosis of common infective and non-infective ulcers of oral cavity</li> </ul>	<b>2. Oral ulceration</b> <ul style="list-style-type: none"> <li>Classification of oral ulcers</li> <li>Common infective and non-infective ulcer occurring in the oral cavity</li> <li>Clinical features, histopathology and laboratory investigation for common infective and non-infective ulcers occurring in oral cavity</li> <li>Treatment plan and differential diagnosis of common infective and non-infective ulcers of oral cavity</li> </ul>	L – 2hrs T –1hrs
<ul style="list-style-type: none"> <li>Classify white lesions of the oral cavity</li> <li>Define premalignant lesions and condition</li> <li>Define and classify leukoplakia</li> <li>Describe pathogenesis, clinical features, histopathology and treatment of white lesions of the oral cavity</li> </ul>	<b>3. Oral white lesions</b> <ul style="list-style-type: none"> <li>Classification of white lesions of the oral cavity</li> <li>Premalignant lesions and condition</li> <li>Classification of leukoplakia</li> <li>Pathogenesis, clinical features, histopathology and treatment of white lesions of the oral cavity</li> </ul>	L – 2hrs T –1hrs
<ul style="list-style-type: none"> <li>Classify oral auto-immune diseases</li> <li>List oral vesiculo-bullous lesions</li> <li>Describe pathogenesis, clinical features and treatment of common auto-immune diseases of oral cavity.</li> <li>Describe pathogenesis, clinical features and treatment of common vesiculo-bullous lesions of the oral mucosa</li> </ul>	<b>4. Auto Immune diseases and vesiculo bullous lesions</b> <ul style="list-style-type: none"> <li>Classification of oral auto-immune diseases</li> <li>Oral vesiculo-bullous lesions</li> <li>Pathogenesis, clinical features and treatment of common auto-immune diseases of oral cavity.</li> <li>Pathogenesis, clinical features and treatment of common vesiculo-bullous lesions of the oral mucosa</li> </ul>	L – 3hrs T –2hrs
<ul style="list-style-type: none"> <li>Describe dental and non-dental pain</li> <li>Describe trigeminal neuralgia and its management</li> <li>Describe facial paralysis and management</li> </ul>	<b>5. Orofacial pain/ Neuralgic pain</b> dental and non-dental pain, trigeminal neuralgia and its management facial paralysis and management	L – 1hrs T –1hrs
<ul style="list-style-type: none"> <li>Describe local and systemic causes of common tongue lesions</li> <li>Mention the effects of systemic diseases on tongue</li> </ul>	<b>6. Disease of Tongue</b> <ul style="list-style-type: none"> <li>local and systemic causes of common tongue lesions</li> <li>effects of systemic diseases on tongue</li> </ul>	L-1hrs T-1hrs

Learning Objectives	Contents	Teaching Hours
<b>Students will be able to –</b> <ul style="list-style-type: none"> <li>Enumerate common traumatic and reactive lesions occurring in oral cavity</li> <li>Describe common regressive lesions of the oral cavity</li> <li>Explain the effects of radiation in oral cavity.</li> <li>Describe healing of oral wound and complication</li> </ul>	<b>7. Traumatic, Reactive and Regressive lesions of oral cavity</b> <ul style="list-style-type: none"> <li>Common traumatic and reactive lesions occurring in oral cavity</li> <li>Common regressive lesions of the oral cavity</li> <li>Effects of radiation in oral cavity.</li> <li>Healing of oral wound and complication</li> </ul>	L –1hrs T –2hrs
<ul style="list-style-type: none"> <li>Classify infective and non-infective diseases of the salivary glands</li> <li>Describe clinical features and treatment of common viral and bacterial diseases of salivary glands</li> <li>Define xerostomia</li> <li>Enumerate common causes of xerostomia</li> <li>Describe complication of xerostomia</li> <li>Classify Sjogren's syndrome</li> <li>Describe clinical features, radiology, laboratory investigation and treatment of Sjogren's syndrome</li> </ul>	<b>8. Non-neoplastic diseases of salivary glands</b> <ul style="list-style-type: none"> <li>Classification of infective and non-infective diseases of the salivary glands</li> <li>Clinical features and treatment of common viral and bacterial diseases of salivary glands</li> <li>Xerostomia, common causes of xerostomia</li> <li>Complication of xerostomia</li> <li>Classification of Sjogren's syndrome, clinical features, radiology, laboratory investigation and treatment of Sjogren's syndrome</li> </ul>	L – 2hrs T –2 hrs
<ul style="list-style-type: none"> <li>Classify red lesions of the oral cavity</li> <li>Define and classify erythroplakia</li> <li>Describe pathogenesis, clinical features, histopathology and treatment of red lesions of the oral cavity</li> </ul>	<b>9. Oral red lesions</b> Classification of red lesions of the oral cavity potentially malignant disorders of the oral mucosa Classification of erythroplakia Pathogenesis, clinical features and treatment of oral red lesions of the oral cavity	L – 1hrs T –1 hrs
<ul style="list-style-type: none"> <li>Classify oral pigmented lesions</li> <li>Describe pathogenesis, clinical features and treatment of common pigmented lesions of the oral mucosa</li> </ul>	<b>10. Pigmented lesions</b> Classification of oral pigmented lesions Pathogenesis, clinical features and treatment of common pigmented lesions of the oral mucosa.	L – 1 T –1
<ul style="list-style-type: none"> <li>Define sterilization, disinfection and antisepsis</li> <li>Describe certain methods of sterilization and disinfection and outline their application</li> <li>Select appropriate method of sterilization in the clinical practice</li> </ul>	<b>11. Sterilization and Disinfection</b> Define, classification and application of sterilization, disinfection and antisepsis Methods of sterilization: detail of autoclaving, hot air oven and chemical methods Sterilization of dental and medical equipment: Critical, Semi-critical and non-critical devices Disinfection body fluid spillage	L – 2 T –2

## Oral pathology and Periodontology

### Periodontology (Theory)

Learning Objectives	Contents	Teaching Hours
Students will be able to - <ul style="list-style-type: none"> <li>Define periodontology and periodontium</li> <li>Describe brief history and advancement of periodontal disease status and treatment</li> </ul>	Introduction <ul style="list-style-type: none"> <li>Definition of periodontology and periodontium</li> <li>Brief history and advancement of periodontal disease status and treatment</li> </ul>	L-1hrs
<ul style="list-style-type: none"> <li>Describe anatomy, histology and physiology of periodontium</li> <li>Describe the types of gingival epithelium in relation to tooth</li> <li>Describe gingival sulcus and its importance</li> <li>Describe oral mucosa and explain aging of periodontium</li> </ul>	Periodontium <ul style="list-style-type: none"> <li>Anatomy, histology and physiology of periodontium</li> <li>Types of gingival epithelium in relation to tooth</li> <li>Gingival sulcus and its importance</li> <li>Oral mucosa and aging of periodontium</li> </ul>	L-3hrs T-1hrs
<ul style="list-style-type: none"> <li>Describe defense mechanism of gingiva</li> <li>Explain the role of saliva and gingival crevicular fluid in oral health</li> </ul>	Oral environment for health <ul style="list-style-type: none"> <li>Defense mechanism of gingiva</li> <li>Role of saliva and gingival crevicular fluid in oral health</li> </ul>	L-1hrs T-1hrs
<ul style="list-style-type: none"> <li>Classify periodontal diseases.</li> <li>Describe periodontal examination methods and Index system</li> <li>Explain risk factors for gingivitis and periodontitis</li> <li>Describe epidemiology of periodontal diseases</li> </ul>	Periodontal disease <ul style="list-style-type: none"> <li>Classification of periodontal diseases.</li> <li>Periodontal examination methods and Index system</li> <li>Risk factors for gingivitis and periodontitis</li> <li>Epidemiology of periodontal diseases</li> </ul>	L - 4hrs T - 3hrs
<ul style="list-style-type: none"> <li>Describe and list the microorganisms involve in periodontal diseases Explain their impacts on periodontium</li> <li>Describe immunological responses by periodontal tissues</li> </ul>	Microbiology of Periodontal diseases	L-2hrs T-2hrs

Learning Objectives	Contents	Teaching Hours
Students will be able to - <ul style="list-style-type: none"> <li>Describe pathogenesis and histopathological changes of periodontal tissues in specific gingival and periodontal diseases</li> </ul>	Periodontal Pathology	L - 2hrs T - 2hrs
<ul style="list-style-type: none"> <li>Explain the role of periodontic-endodontic inter-relationship in periodontal diseases.</li> </ul>	Periodontics – Endodontics continuum	L - 1hrs T - 1hrs
<ul style="list-style-type: none"> <li>Describe chronic and acute gingival conditions (NUG).</li> <li>Describe Gingival abscess</li> <li>Describe desquamatic gingivitis</li> <li>Enumerate the different conditions of gingival enlargement</li> <li>Describe causes and types of gingival recession</li> <li>Describe causes and management of tooth hypersensitivity</li> </ul>	Gingival diseases <ul style="list-style-type: none"> <li>Chronic and acute gingival conditions (NUG).</li> <li>Gingival abscess, desquamatic gingivitis</li> <li>Different conditions of gingival enlargement</li> <li>Causes and types of gingival recession</li> <li>Causes and management of tooth hypersensitivity</li> </ul>	L-3hrs T-2hrs
<ul style="list-style-type: none"> <li>Classify periodontitis</li> <li>Define and classify periodontal pocket.</li> <li>Explain mechanism of formation of pocket</li> <li>Describe minor features of chronic periodontitis</li> <li>Describe aggressive periodontitis</li> <li>Explain refractory and necrotizing periodontitis</li> <li>Describe periodontal abscess</li> </ul>	Periodontal diseases <ul style="list-style-type: none"> <li>Classification of periodontitis</li> <li>Definition and classification of periodontal pocket.</li> <li>Mechanism of formation of pocket</li> <li>Minor features of chronic periodontitis</li> <li>Aggressive periodontitis</li> <li>Refractory and necrotizing periodontitis</li> <li>Periodontal abscess</li> </ul>	L-7hrs T-4hrs

Learning Objectives	Contents	Teaching Hours
Students will be able to - <ul style="list-style-type: none"> <li>List and describe cysts and tumours of the periodontium</li> </ul>	Cysts and tumours of periodontium	L-1hrs T-1hr
<ul style="list-style-type: none"> <li>Explain the effects of external forces on periodontium</li> </ul>	Periodontal response to external forces	L-1hrs T-1hrs
<ul style="list-style-type: none"> <li>Describe basic principles of periodontal instrumentation</li> </ul>	Basic principles of periodontal instrument	L-2hrs T-2hrs
Interpret Non-surgical/Phase I /initial therapy	Phase I periodontal therapy	L-1hrs T-1hrs
<ul style="list-style-type: none"> <li>List periodontal surgical therapy</li> <li>Describe different types of periodontal surgery</li> </ul>	Surgical periodontics	L-2hrs T-1hrs
<ul style="list-style-type: none"> <li>Describe periodontal regenerative technique(GTR ,GBR , bone grafts, connective tissue graft</li> </ul>	Periodontal regenerative technique	L-1hrs T-1hrs
<ul style="list-style-type: none"> <li>Describe the periodontal aspects of dental implants</li> <li>Describe periimplantitis</li> <li>Explain management of periimplantitis</li> </ul>	Dental Implantology	L-1hrs T-1hrs

## Periodontology (Clinical)

Learning Objectives	Contents	Teaching Hours
<p>Students will be able to -</p> <ul style="list-style-type: none"> <li>Describe Symptom, Clinical assessment, Radiographic Analysis and Diagnosis of Gingivitis and Periodontitis and present the case</li> <li>(All data are to be recorded in prescribed form supplied by the dept)</li> </ul>	Patient Examination, diagnosis and case presentation.	1wk
<ul style="list-style-type: none"> <li>Explain the basic principles of periodontal instruments and to perform it.</li> </ul>	Principles of periodontal instruments	1wk
<ul style="list-style-type: none"> <li>Furnish initial treatment plan and treat gingivitis and periodontitis cases.</li> </ul>	Treatment Planning	1wk
<ul style="list-style-type: none"> <li>Provide oral hygiene instruction to the patients</li> <li>Perform Scaling and polishing</li> <li>Perform root planning</li> </ul>	Phase 1 Periodontal Therapy	1wk
<p>Describe General guidelines for periodontal Surgery;</p> <ul style="list-style-type: none"> <li>Resective periodontal surgery to eliminate gingival overgrowth and/or pocket—Gingivectomy and gingivoplasty</li> <li>Periodontal flap surgery: indication and rationality, Techniques of different procedures; ENAP,MWFP,IBIFP etc</li> <li>Occlusal adjustment, osseous recontouring splinting for stabilization of vulnerable mobile but sound tooth,</li> <li>Mucogingival surgery: management of Gingival recession, gingival augmentation procedure, Root coverage procedure(sliding flap and envelop flap), Treatment of furcation-involved tooth(tunneling and/or reposition flap)</li> </ul>	<p>Phase II/ Corrective Periodontal Therapy</p> <p>General guidelines for periodontal Surgery;</p> <ul style="list-style-type: none"> <li>Resective periodontal surgery to eliminate gingival overgrowth and/or pocket—Gingivectomy and gingivoplasty</li> <li>Periodontal flap surgery: indication and rationality, Techniques of different procedures; ENAP,MWFP,IBIFP etc</li> <li>Occlusal adjustment, osseous recontouring splinting for stabilization of vulnerable mobile but sound tooth,</li> <li>Mucogingival surgery: management of Gingival recession, gingival augmentation procedure, Root coverage procedure(sliding flap and envelop flap), Treatment of furcation-involved tooth(tunneling and/or reposition flap)</li> </ul>	1wk
<ul style="list-style-type: none"> <li>Enumerate local and systemic antibacterial drugs used in periodontal therapy.</li> </ul>	Chemo-therapeutic agents in periodontal therapy, Pocket Irrigation Systemic administration	1hr
<ul style="list-style-type: none"> <li>Interpret Supportive Periodontal therapy</li> </ul>	Phase- 3/ Maintenance and recall therapy /SPT Re-examination, Prophylaxis, Monitoring of OHI	1hr
<ul style="list-style-type: none"> <li>Decide cases for referral to specialist</li> </ul>	Interdisciplinary referral system	1hr

# Summative Assessment of Oral Pathology & Periodontology

(3rd Professional Examination)

Assessment System and Mark Distribution

Components	Marks	Total Marks
Formative Assessment	10	10
Written Examination Group-A: Oral Pathology & Oral Medicine : (MCQ+SAQ)  Group-B: Periodontology: (MCQ+SAQ)	(10+35)  (10+35)	90
Practical +Clinical Examination OSPE Clinical Practical Note Book	40 50 10	100
Oral Examination (Structured) 1 Board  Oral Pathology Oral Medicine Periodontology	40 20 40	100

- Pass marks 60% in each of theoretical, oral, practical and clinical
- Oral, Clinical & Practical Examination will be in 2 days
  - One day-OSPE
  - another day-Oral & Clinical

**Department: Oral Pathology and Periodontology**

..... **Dental College/Unit**

Name of the student.....

Roll no. ....Session.....

Batch.....

**Class Performance Record Card**

**Oral Pathology**

<b>Sl. No.</b>	<b>Name of item</b>	<b>Full Marks</b>	<b>Marks Obtained</b>	<b>Signature and date</b>
01	Dental Caries	10		
02	Pathology of enamel, dentine and cementum caries	10		
03	Diseases of the pulp	10		
04	Periapical Lesions	10		
05	Severe infection of jaws and oral soft tissue	10		
06	Cyst of the jaws (odontogenic)	10		
07	Cyst of the jaws (Non odontogenic)	10		
08	Odontogenictumours and tumour like lesions of the jaws	10		
09	Non odontogenictumours of the jaws	10		
10	Oral soft tissue neoplasm and mucosal swelling	10		
11	Oral premalignancy	10		
12	Oral Cancer	10		
13	Neoplastic diseases of salivary gland	10		
14	Oral pigmented lesions	10		
15	Injury to teeth, supporting structure and fracture of jaws	10		
16	Developmental disorder of oral tissue	10		
17	Developmental disorder of teeth	10		
18	Diseases of TMJ	10		
19	Biopsy and frozen section in diagnosis of oral diseases	10		
20	Diseases of maxillary sinus	10		

## Department: Oral Pathology and Periodontology

..... Dental College/Unit

Name of the student.....

Roll no. ....Session.....

Batch.....

### Class Performance Record Card Periodontology

Sl. No.	Name of item	Full Marks	Marks Obtained	Signature and date
01	Define periodontology and periodontium. Anatomy and physiology of periodontium	10		
02	Classification of periodontal diseases	10		
03	Formation of dental plaque and calculus and its role in periodontal diseases	10		
04	Plaque induced Chronic gingivitis	10		
05	Pathology of chronic inflammatory periodontal diseases	10		
06	Plaque induced chronic periodontitis	10		
07	Aggressive periodontitis	10		
08	Factors responsible for refractoriness of periodontal diseases	10		
09	Periodontal pocket formation and bone loss	10		
10	Effects of external forces on Periodontium	10		
11	Gingival enlargement	10		
12	Gingival recession	10		
13	Desquamative gingivitis and other types of gingivitis	10		
14	ANUG and Acute primary herpetic gingivostomatitis	10		
15	Gingival abscess and periodontal abscess	10		
16	Epidemiology of periodontal diseases	10		
17	Non-surgical periodontal therapy	10		
18	Surgical periodontal therapy and corrective therapy	10		
19	Regenerative therapy	10		
20	Periodontal aspects of dental implant	10		

**Department: Oral Pathology and Periodontology**

**..... Dental College/Unit**

Name of the student.....

Roll no. ....Session.....

Batch.....

**Class Performance Record Card**  
**Oral Medicine**

<b>Sl. No.</b>	<b>Name of item</b>	<b>Full Marks</b>	<b>Marks Obtained</b>	<b>Signature and date</b>
01	Pain and disorder of sensation	10		
02	Infective diseases of oral mucosa	10		
03	Non Infective diseases of oral mucosa	10		
04	Tongue disorder	10		
05	Ulcerative lesions of oral mucosa	10		
06	Regressive changes in teeth	10		
07	Oral White Lesion	10		
08	Non- Neoplastic Diseases of Salivary Gland	10		
09	Reactive and Regressive Lesions of the oral Mucosa	10		
10	Oral red lesions	10		
11	Sterilization and Disinfection	10		

# Oral & Maxillofacial Surgery

## Departmental objectives:-

At the end of the course students should be able to-

- Demonstrate knowledge about basic concepts in oral & maxillofacial surgery.
- Motivate & counsel the importance of regular oral health screening regarding oral cancer
- Diagnose & manage the disorders of common oral & maxillofacial surgery in prevailing the community.
- Demonstrate the appropriate attitude to practice in oral & maxillofacial surgical field.
- Appropriate decision based on risk benefit of maxillofacial surgery.
- Describe the importance of multidisciplinary approach
- Refer high risk patients appropriately
- Value the ethical issues

## Lists of competencies to acquire-

- History taking & clinical examination of common disorders of oral & maxillofacial surgery
- Describe & apply basic principle of surgery like asepsis & hand scrub, blood procurement note, care of the hospitalized patient etc.
- Perform basic surgical skills of common disorders of oral & maxillofacial surgery
- Emergency management like ATLS, CPR, Tracheostomy technique etc.

## Subject: Oral and Maxillofacial Surgery

### Distribution of Teaching - learning hours

Lecture	Tutorial	Clinical Teaching	Total	Integrated Teaching (Common)	Formative Exam		Summative exam	
					Preparatory leave	Exam time	Preparatory leave	Exam time
150 hrs	65 hrs	125 hrs	340 hrs	10 hrs	10 days	20 days	10 days	35 days

### Teaching - learning methods, teaching aids and evaluation

Teaching Methods			Others	Teaching aids	In course evaluation
Large group	Small group	Self learning			
-Lecture  -video presentation	1. Practical & tutorial:- Demonstration & perform extraction in SOD.  2. Clinical:- Bed side teaching & perform clinical examination	Assignment Self study	Integrated	-Black board & chalk -Whiteboard & Marker -Transparency & marker -Laptop, Multimedia -Flip chart -Slide projector -X-ray plate & viewer -Specimen, Model -Report -Patients -Basic surgical instruments etc.	Item examination (Oral) -Ward final (OSPE/OSCE) (SAQ & MCQ)

## Final professional examination:

### Marks distribution

#### Total Marks-300

- Written -100 (SAQ-70, MCQ-20, FORMATIVE-10)
- OSPE/OSCE -100 (Practical-50 + Clinical-50)
- Oral (SOE) -100

## Learning objective & Course content in Oral & Maxillofacial surgery

Learning Objectives	Contents	Teaching Hours
<p>Student will able to</p> <ul style="list-style-type: none"> <li>● Diagnose through proper history taking, examinations &amp; interpretation of the radiology &amp; histopathology.</li> <li>● Practice Principles of surgery</li> <li>● Manage the co morbid patients</li> <li>● Manage the perioperative complications</li> </ul>	<p><b>Principles of Oral &amp; Maxillofacial surgery-</b></p> <ul style="list-style-type: none"> <li>● Art of Diagnosis (History , clinical examinations &amp; related investigations)</li> <li>● Access.</li> <li>● Asepsis</li> <li>● General surgical principles</li> <li>● Drainage &amp; debridement</li> <li>● Wound closure &amp; suture materials</li> <li>● Coexistence diseases</li> <li>● Post operative complications &amp; management</li> </ul>	<p>Lecture =12 Clinical/practical =3</p> <p>Tutorial=4</p>
<p><b>Student will able to</b></p> <ul style="list-style-type: none"> <li>● Describe &amp; enumerate indications, contraindications, complications &amp; methods of various types of extractions</li> <li>● Perform an ideal extraction &amp; surgical extraction.</li> <li>● Manage complications of extractions.</li> </ul>	<p><b>Exodontics:</b></p> <ul style="list-style-type: none"> <li>● Extraction &amp; related problems</li> <li>● Impacted teeth, their classifications, types &amp; assessment</li> <li>● Surgical extractions.</li> <li>● Extraction of medically compromised patient.</li> <li>● Complications of all types of extractions &amp; their management</li> </ul>	<p>Lecture =6 Clinical/practical =78</p> <p>Tutorial=5</p>

Learning Objectives	Contents	Teaching Hours
<p><b>Student will able to-</b></p> <ul style="list-style-type: none"> <li>● Manage Maxillofacial Trauma and emergency of maxillofacial surgery</li> <li>● Diagnose &amp; outline the principles of management of various forms of maxillofacial soft &amp; hard tissue injuries</li> </ul>	<p><b>Maxillofacial Trauma</b></p> <p>A. Basics of Trauma</p> <ul style="list-style-type: none"> <li>● Trauma management-ATLS</li> <li>● Hemorrhage &amp; Shock</li> <li>● Fluid &amp; Electrolyte balance</li> <li>● Acidosis &amp; Alkalosis</li> <li>● Blood Transfusion &amp; hazards</li> </ul> <p><b>B. Soft tissue injury of orofacial region</b></p> <p><b>C. Dentoalveolar &amp; Jaw fractures</b></p> <ul style="list-style-type: none"> <li>● General consideration of fractures</li> <li>● Management principles of fracture.</li> <li>● Management of specific fractures               <ul style="list-style-type: none"> <li>i. Fracture of the mandible- Classifications, types, management.</li> <li>ii Fracture of the middle 3rd of the face- Classifications, types, management</li> </ul> </li> </ul> <p><b>D. Complications of fractures &amp; their management</b></p>	<p>Lecture =10 Clinical/ practical =04</p> <p>Tutorial=06</p>
<p><b>Student will able to-</b></p> <ul style="list-style-type: none"> <li>● Diagnose the common odontogenic tumours of the orofacial region</li> <li>● Outline the management principles of odontogenic tumours of the orofacial region</li> </ul>	<p><b>Odontogenic Tumors-</b></p> <ul style="list-style-type: none"> <li>● General considerations of odontogenic tumors of the orofacial region</li> <li>● Classifications, types, etiology, management principles &amp; complications of common odontogenic tumors of the orofacial region</li> <li>● Especial emphasis regarding-</li> <li>● Ameloblastoma, Ameloblastic fibroma, Pindborg tumor (CEOT), AOT, Odontogenic myxoma, Cementoblastoma &amp; Odontomes.</li> </ul>	<p>Lecture =8 Clinical/ practical =4</p> <p>Tutorial=05</p>

Learning Objectives	Contents	Teaching Hours
<p>Student will able to-</p> <ul style="list-style-type: none"> <li>● Diagnose the common non-odontogenic tumors &amp; Fibro-osseous lesions of the orofacial region.</li> <li>● Outline the management principles of common non-odontogenic tumors &amp; Fibro-osseous lesions of the orofacial region.</li> </ul>	<p><b>Non-odontogenic tumors (Benign &amp; Malignant) &amp; Fibro-osseous lesions of the jaw</b></p> <ul style="list-style-type: none"> <li>● General considerations of benign &amp; malignant non-odontogenic tumors &amp; Fibro-osseous lesions of the orofacial region.</li> <li>● Classifications, types, etiology, management principles &amp; complications of common benign &amp; malignant non-odontogenic tumors &amp; Fibro-osseous lesions of the orofacial region.</li> <li>● Especial emphasis regarding-Tori, Osteoma, Central giant cell granuloma, Central haemangioma, Osteosarcoma, Ewing's sarcoma, Multiple myeloma, Fibrous dysplasia &amp; Ossifying fibroma.</li> </ul>	<p>Lecture =08 Clinical/practical =03  Tutorial=04</p>
<p><b>Student will able to-</b></p> <ul style="list-style-type: none"> <li>● Diagnose the common odontogenic &amp; non-odontogenic cysts of the Jaw.</li> <li>● Outline the management principles of common odontogenic &amp; non-odontogenic cysts of the Jaw.</li> </ul>	<p><b>Cyst of the Jaw</b></p> <ul style="list-style-type: none"> <li>● General considerations of common odontogenic &amp; non-odontogenic cysts of the Jaw.</li> <li>● Classifications, types, etiology, management principles &amp; complications of common odontogenic &amp; non-odontogenic cysts of the Jaw.</li> <li>● c. Especial emphasis regarding- Radicular &amp; Residual cyst, Dentigerous cyst, Odontogenic keratocyst, Pseudo cysts, Nasolabial cyst, Nasopalatine duct cyst &amp; Globulomaxillary cyst.</li> </ul>	<p>Lecture =6 Clinical/practical =3  Tutorial=5</p>
<p><b>Student will able to-</b></p> <ul style="list-style-type: none"> <li>● Make an early detection &amp; diagnose the common Premalignant disorders of the oral cavity.</li> <li>● Outline the management principles of common Premalignant disorders of the oral cavity.</li> </ul>	<p><b>Premalignant disorders</b></p> <ul style="list-style-type: none"> <li>● General considerations of common Premalignant disorders of the oral cavity</li> <li>● Premalignant lesions &amp; premalignant conditions their common sites &amp; high risk sites, morphological &amp; histological changes.</li> <li>● Classifications, types, etiology, epidemiology management principles &amp; complications of common Premalignant disorders of the oral cavity</li> <li>● Especial emphasis regarding- Leukoplakia, Erythroplasia, Lichen planus &amp; Oral submucous fibrosis.</li> </ul>	<p>Lecture =8 Clinical/practical =2  Tutorial=2</p>

Learning Objectives	Contents	Teaching Hours
<b>Student will able to-</b> <ul style="list-style-type: none"> <li>● Make an early detection &amp; diagnose of oral cancer</li> <li>● Outline the management protocol of Oral cancer</li> </ul>	<b>Oral Cancer</b> <ul style="list-style-type: none"> <li>● General considerations of Oral cancer</li> <li>● Etiology, epidemiology common sites, clinical presentations staging &amp; grading, spread, management principles &amp; complications of oral cancer.</li> <li>● Especial emphasis regarding- TNM classifications. Neck dissection, Management options &amp; protocol.</li> <li>● Role of radiotherapy &amp; Chemotherapy in oral cancer.</li> </ul>	Lecture =10 Clinical/practical =4 Tutorial=6
<b>Student will able to-</b> <ul style="list-style-type: none"> <li>● Diagnose the common TMJ disorders</li> <li>● Outline the management principles of common TMJ disorders</li> </ul>	<b>Temporo Mandibular Joint (TMJ) disorders</b> <ul style="list-style-type: none"> <li>● Applied anatomy of the TMJ</li> <li>● Classifications, types, etiology, management principles &amp; complications of common Temporo Mandibular Joint (TMJ) disorders.</li> <li>● Especial emphasis regarding- Dislocation, Subluxation, Trismus, Ankylosis &amp; MPDS.</li> </ul>	Lecture =10 Clinical/practical =3 Tutorial=4
<b>Student will able to-</b> <ul style="list-style-type: none"> <li>● Diagnose the common Neurological disorders of orofacial region</li> <li>● Outline the management principles of common Neurological disorders of orofacial region.</li> </ul>	<b>Neurological disorders</b> <ul style="list-style-type: none"> <li>● Trigeminal neuralgia-aetiology, C/Fs, methods of management</li> <li>● Bell's palsy- aetiology, C/Fs, methods of management</li> </ul>	Lecture =8 Clinical/practical =2 Tutorial=2
<b>Student will able to-</b> <ul style="list-style-type: none"> <li>● Diagnose the common disorders of maxillary antrum</li> <li>● Outline the management principles of common disorders of maxillary antrum</li> </ul>	<b>Disorders of maxillary antrum</b> <ul style="list-style-type: none"> <li>● Applied anatomy of maxillary antrum</li> <li>● Classification &amp; management of various types of disorders of maxillary antrum</li> <li>● Especial emphasis regarding-Accidental opening of maxillary antrum, Oro-antral fistula, Cald Wel Luc operation &amp; Antral carcinoma.</li> </ul>	Lecture =7 Clinical/practical =2 Tutorial=2

Learning Objectives	Contents	Teaching Hours
<b>Student will able to-</b> <ul style="list-style-type: none"> <li>● Diagnose the common Salivary gland disorders</li> <li>● Outline the management principles of common Salivary gland disorders</li> </ul>	<b>Salivary gland disorders</b> <ul style="list-style-type: none"> <li>● Applied anatomy of major salivary glands</li> <li>● Classifications, types, etiology, management principles &amp; complications of common Salivary gland disorders</li> <li>● Especial emphasis regarding- Sialoadenitis, Sialolithiasis, Mucocele, Ranula, Xerostomia, Ptyalism, Benign &amp; Malignant tumors of the salivary glands.</li> </ul>	Lecture =12 Clinical/practical =3 Tutorial=4
<b>Student will able to-</b> <ul style="list-style-type: none"> <li>● Define various types of reconstruction materials</li> <li>● Mention importance of applications &amp; fate of various types of reconstruction materials</li> </ul>	<b>Reconstruction-</b> <ul style="list-style-type: none"> <li>● Definition &amp; classification of various types of defects and reconstruction materials and procedures.</li> <li>● Indications, contraindications, limitations, types, advantage, disadvantage &amp; fate of graft &amp; flap.</li> <li>● Basic concept of graft &amp; flap</li> <li>● Primary bone graft, skin graft and microvasculer free flap</li> </ul>	Lecture =10 Clinical/practical =2 Tutorial=3
<b>Student will able to-</b> <ul style="list-style-type: none"> <li>● Define, diagnose, outline the treatment principles &amp; manage the complications of Alveolar abscess Osteomyelitis &amp; Osteoradionecrosis of the jaw &amp; orofacial space infections.</li> </ul>	<b>Orofacial infections</b> <ul style="list-style-type: none"> <li>● Introduction &amp; surgical anatomy of common facial spaces</li> <li>● Microbiological &amp; immunological aspects of orofacial</li> <li>● Infections</li> <li>● Dentoalveolar abscess</li> <li>● Osteomyelitis &amp; osteoradionecrosis of the jaw</li> <li>● Cellulites, Space infections &amp; Ludwig's angina</li> <li>● Management &amp; complications of orofacial infections</li> <li>● Methods of abscess drainage</li> </ul>	Lecture =12 Clinical/practical =4 Tutorial=6

Learning Objectives	Contents	Teaching Hours
Student will able to- <ul style="list-style-type: none"> <li>● Classify, apply &amp; manage the complications of local anesthesia.</li> <li>● Mention implication, indications &amp; hazards of General anesthesia</li> </ul>	Anesthesia- <ul style="list-style-type: none"> <li>● General concept, classification, types, use, technique &amp; complications of LA.</li> <li>● LA in Oral &amp; Maxillofacial surgery</li> <li>● General Concept, types of drugs used, indications , technique &amp; complications of GA in Oral &amp; Maxillofacial surgery.</li> <li>● Surgical phases of GA</li> <li>● Preanesthetic preparation &amp; medications</li> <li>● I/ V sedation, CPR &amp; tracheotomy</li> </ul>	Lecture =8 Clinical/practical =3  Tutorial=3
Student will able to- <ul style="list-style-type: none"> <li>● Classify &amp; enumerate the underlying causes</li> <li>● Outline the treatment philosophies of various types of dentofacial deformities.</li> </ul>	Dentofacial deformities <ul style="list-style-type: none"> <li>● Orthognathic surgery</li> <li>● Cleft lip &amp; palate,</li> </ul> * Especial emphasis regarding - Classifications, Types Diagnosis & management principle of the mentioned Dentofacial deformities.	Lecture =8 Clinical/practical =2  Tutorial=2
Student will able to- <ul style="list-style-type: none"> <li>● Classify &amp; enumerate the underlying causes</li> <li>● Outline the treatment philosophies of various types of dentoalveolar surgery</li> </ul>	Dentoalveolar surgery <ul style="list-style-type: none"> <li>● Pre-prosthetic surgery</li> <li>● Dental implant</li> </ul> * Especial emphasis regarding - Classifications, Types Diagnosis & management principle of the mentioned dentoalveolar surgery	Lecture =8 Clinical/practical =3  Tutorial=2

# Conservative Dentistry & Endodontics

## Conservative Dentistry & Endodontics

### Departmental Objective:

1. To teach Clinical topics alongside theory in order to integrate between theory and practice.
2. Introduced of the clinical students to patient care in a carefully controlled environment
3. To learn about and carry out more advanced procedures in restorative dentistry and Endodontics
  4. Final objective of this curriculum is to teach current and new concepts of
    - i. Operative and endodontic care
    - ii. Aesthetic dentistry
    - iii. Dental radiology

By training dental students to be able to practice four-handed dentistry effectively and efficiently.

### List of Competencies to acquire:

This curriculum is designed to acquire following competencies:

1. Communicate properly to obtain a medical and psychosocial history, and will incorporate this information to frame an effective treatment plan for individual patient.
2. Demonstrate diagnostic skills.
3. Provide emergency care and control pain.
4. Demonstrate restorative skill.
5. Demonstrate endodontic skill.
6. Manage patient under conscious sedation.
7. Perform Manual skill and dexterity.
8. Manage patients with complex dental problems by referral or by working under supervision of appropriate dental instructor.
9. Practice Minimally Invasive Dentistry (MID) & Evidence Based Dentistry (EBD) with scientific understanding and thought.
10. Work in a team and shows professionalism.

## Distribution of teaching - learning hours

Lecture	Tutorial	Practical	Clinical Teaching	Total Teaching hours	Integrated teaching (Common)	Assessment exams (Formative)		Professional exam (Summative)	
						Preparatory leave	Exam time	Preparatory leave	Exam time
90 hrs	50 hrs	28 hrs	96 hrs	264 hrs	10 hrs	10 days	20 days	10 days	35 days

## Teaching - learning methods, teaching aids and evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
Lectures	Tutorial, practical and clinical classes	Assignment- based self-directed learning	<ul style="list-style-type: none"> <li>• Text books</li> <li>• Models</li> <li>• Simulators</li> <li>• Patients</li> <li>• Journals</li> <li>• Online library</li> </ul>	<ul style="list-style-type: none"> <li>• Item</li> <li>• Card final</li> <li>• Ward final</li> <li>• Mid-term assessment examination</li> <li>• Final assessment examination</li> </ul>

### Related Equipment:

1. Multimedia
2. Over Head Projector (OHP)
3. Slide Projector
4. Video
5. Microphone with speaker
6. Digital Board
7. White Board
8. Black Board
9. X-Ray Plate with View Box
10. Specimen etc.

## Marks Distribution for Final Professional Examinations of Conservative Dentistry & Endodontics:

Written 100 marks	Formative Assessment	Mid term exam	4 marks
		Final term exam	4 marks
		Attendance	2 marks
	MCQ		20 marks
	SAQ		70 marks
SOE 100 marks	Board I		50 Marks
	Board II		50 Marks
Practical and Clinical 100 marks	OSCE		40 marks
	Log Book		5 marks
	Assignment		5 marks
	Long Case		50 marks

## Learning Objectives and Course Contents in Conservative Dentistry and Endodontics Endodontics

Learning Objectives	Contents	Teaching Hours
<p><b>The students should be able to –</b></p> <ul style="list-style-type: none"> <li>Define endodontium, periodontium and endodontics.</li> <li>Explain the scopes of endodontics.</li> </ul> <ul style="list-style-type: none"> <li>Recognize the recent advancements in instruments, materials and diagnostic procedures of endodontics.</li> </ul>	<p>1. (a) Introduction and scopes of Endodontics</p> <ul style="list-style-type: none"> <li>Endodontium, Periodontium and Endodontics.</li> <li>Scopes of endodontics:</li> <li>Protection of pulp and periradicular tissue.</li> <li>Diagnosis and management of dental pain.</li> <li>Management of dentine hypersensitivity.</li> <li>Tooth infractions</li> <li>Direct and indirect pulp treatments.</li> <li>Restoration of endodontically treated tooth.</li> <li>Management of trauma to tooth and associated structures.</li> <li>Surgical Endodontics.</li> <li>Bleaching</li> <li>Endodontic management of tooth resorption</li> </ul>	L - 1.5 hrs
	<p><b>1. (b) Modern Endodontics</b></p> <ul style="list-style-type: none"> <li>Instruments</li> <li>Materials</li> <li>Diagnostic aids</li> <li>Laser in Dentistry</li> </ul>	T - 1.5 hrs
<p><b>The student should be able to –</b></p> <ul style="list-style-type: none"> <li>Take history of a patient.</li> <li>Perform examinations needed to diagnose a case.</li> <li>Evaluate a case prior to endodontic treatment.</li> <li>Describe the diagnostic aids and identify the suitable method to diagnose a case.</li> </ul>	<p><b>2. Patient assessment and diagnostic procedures for endodontic therapy</b></p> <ul style="list-style-type: none"> <li>Considerations prior to endodontic therapy</li> <li>History</li> <li>Clinical examination</li> <li>Investigations</li> </ul>	<p>L - 3.0 hrs</p> <p>T - 1.5 hrs</p> <p>P +C = 2+3 hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>The students will be able to –</b></p> <ul style="list-style-type: none"> <li>• Outline the sequelae of dental caries</li> <li>• Categorize pulpal and periapical pathosis</li> <li>• Describe and distinguish the clinical and radiological features of different pulpal and periapical pathosis.</li> <li>• Diagnose pulpal and periradicular pathology.</li> <li>• Treat the different pathosis.</li> </ul> <ul style="list-style-type: none"> <li>• Describe the communications and inter-relationships of endodontium and periodontium</li> <li>• Mention the causes, contributing factors, classification, differential diagnosis, management and prognosis of different endo-perio and perio-endo lesions.</li> </ul>	<p><b>3.(a) Pulpal and periradicular pathosis</b></p> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Reversible pulpitis</li> <li>• Irreversible pulpitis</li> <li>• Hyperplastic pulpitis</li> <li>• Apical periodontitis</li> <li>• Periapical abscess</li> <li>• Periapical granuloma</li> <li>• Radicular cyst</li> </ul> <p><b>3.(b) Endodontic-Periodontal interrelationships</b></p> <ul style="list-style-type: none"> <li>• Endodontic-periodontal Communications</li> <li>• Pulpal-periodontal interrelationships,</li> <li>• Periodontal-pulpal interrelationships</li> <li>• Aetiological factors</li> <li>• Contributing factors</li> <li>• Classification</li> <li>• Differential Diagnosis</li> <li>• Management</li> <li>• Prognosis</li> </ul>	<p>L - 3.0 hrs</p> <p>T –1.0 hrs</p>
<p><b>The students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Describe morphology and pulp space anatomy of different teeth.</li> <li>• Illustrate the types of canal configuration and apical anatomy.</li> <li>• Describe the common anomalies of the pulp cavity and root canal system.</li> </ul>	<p><b>4. Pulp space anatomy</b></p> <ul style="list-style-type: none"> <li>• Morphology of teeth and their root canal system</li> <li>• Types of canal configuration</li> <li>• Apical anatomy</li> <li>• Anomalies of pulp cavities</li> </ul>	<p>L - 1.5 hrs</p> <p>T - 1.5 hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>The student should be able to -</b></p> <ul style="list-style-type: none"> <li>• Define RCT.</li> <li>• List the objectives and steps of RCT</li> <li>• Describe the indications and contraindications of RCT</li> <li>• Mention the purpose of single visit RCT.</li> <li>• Describe the initial procedures needed to perform before an endodontic treatment</li> </ul>	<p><b>5.(a) Definition, objectives, indications and contraindications of RCT</b> Definition, objectives, steps, indications and contraindications of RCT</p> <p><b>5.(b) Single visit RCT</b> Advantages, disadvantages, indications and contraindications.</p> <p><b>5.(c) Pre-endodontic preparations</b></p>	<p>L - 1.5 hrs</p> <p>T - 1.5 hrs</p>
<p>Students should be able to –</p> <ul style="list-style-type: none"> <li>• Enlist and classify the endodontic instruments</li> <li>• Identify different endodontic instruments and mention their use.</li> <li>• Mention different types of irrigating solutions with their features</li> <li>• Describe the purpose of irrigation and properties of irrigating solutions</li> <li>• Identify ideal irrigant</li> <li>• Describe the needles and proper methods used to irrigate</li> <li>• Recognize modern irrigating solutions</li> <li>• Mention the types of different chelating agents</li> <li>• Discuss the properties and role of chelating agents</li> <li>• Identify ideal chelating agents</li> <li>• Recognize modern chelating agents</li> <li>• Mention the name of different lubricating agents</li> <li>• Describe the purpose of lubrication</li> <li>• Mention the role and different types of intracanal medicaments</li> <li>• Describe the features of common intracanal medicaments</li> <li>• Identify the ideal intracanal medicament</li> <li>• Recognize recent intracanal medicaments</li> </ul>	<p><b>6.(a) Endodontic instruments and Armamentarium</b></p> <ul style="list-style-type: none"> <li>• Endodontic kit</li> <li>• Burs</li> <li>• ISO specified instruments</li> </ul> <p><b>6.(b) Irrigation</b> Irrigation and irrigating solutions</p> <p><b>6.(c) Chelation</b> Chelation and chelating agents</p> <p><b>6.(d) Lubrication and intracanal medication</b></p> <ul style="list-style-type: none"> <li>• Canal lubrication and lubricating agents</li> <li>• Intracanal medication and medicaments</li> </ul>	<p>L - 3.0 hrs</p> <p>T - 1.5 hrs</p> <p>P+C= 2 +8hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Describe the nerve supply of different teeth.</li> <li>• Describe the types of LA and its composition, mechanism and mode of administration.</li> <li>• Describe the roles of its components and the complications of LA</li> <li>• Describe the routine approach to conventional local anaesthesia: when and how to anaesthetize.</li> <li>• List techniques that are helpful in giving painless injections.</li> <li>• Mention how to obtain anesthesia for different endodontic procedures.</li> </ul>	<p><b>7. Local anaesthesia related to operative dentistry and endodontics</b></p> <ul style="list-style-type: none"> <li>• Nerve supply of teeth</li> <li>• Classification of LA</li> <li>• Composition</li> <li>• Mechanism of action</li> <li>• Techniques</li> <li>• Failure of analgesia</li> <li>• Complications</li> <li>• Mode of administration</li> </ul>	<p>L - 2.0 hrs</p> <p>T-1.5 hrs</p> <p>P+C = 2+8hrs</p>
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Mention the basic principles of an access cavity preparation.</li> <li>• Describe and illustrate the access cavity preparation techniques of different teeth and the possible errors during preparation.</li> </ul>	<p><b>8. Access cavity preparation</b></p> <ul style="list-style-type: none"> <li>• Principles of access cavity preparation</li> <li>• Access cavity preparation of different teeth</li> <li>• Errors</li> </ul>	<p>L – 3.0 hrs</p> <p>P+C = 2+8hrs</p>
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Define CRP, ASI, major diameter, minor diameter, radiographic apex, anatomic apex.</li> <li>• Describe the significance of working length determination.</li> <li>• List the different working length determination procedures.</li> <li>• Describe and determine the working length via the common techniques.</li> </ul>	<p><b>9. Working length determination</b></p> <ul style="list-style-type: none"> <li>• CRP</li> <li>• ASI</li> <li>• Significance</li> <li>• Methods</li> </ul>	<p>L - 1.5 hrs</p> <p>P+C =2 +8hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Define and describe biomechanical (chemomechanical) preparation of root canal and recapitulation.</li> <li>• Describe smear layer produced during canal preparation.</li> <li>• Describe different types of root canal preparation techniques.</li> <li>• Solve problem regarding canal preparation in abnormal situations.</li> </ul>	<p><b>10. Preparation of Root Canal System</b></p> <ul style="list-style-type: none"> <li>• Chemomechanical preparation</li> <li>• Canal preparation through instrumentation</li> </ul>	<p>L - 3.0 hrs</p> <p>T - 1.5 hrs</p> <p>P+C =2 +10hrs</p>
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Recognize the clinical criteria that determine when to obturate.</li> <li>• Define root canal obturation, overextension and overfilling.</li> <li>• Describe the ideal criteria of obturating materials and purpose of obturation.</li> <li>• Classify the different obturating materials and techniques.</li> <li>• Describe the techniques of mixing and placing a sealer.</li> <li>• Describe and differentiate between lateral and vertical condensation technique and suggest where each is indicated.</li> <li>• Describe the clinical and radiographic criteria for evaluating the quality of obturation.</li> </ul>	<p><b>11. Obturating materials and root canal obturation</b></p> <ul style="list-style-type: none"> <li>• Root canal obturation</li> <li>• Readiness for obturation</li> <li>• Sealing and sealers</li> <li>• Filling and fillers</li> <li>• Obturating materials and techniques</li> </ul>	<p>L - 1.5 hrs</p> <p>T - 1.5 hrs</p> <p>P+C = 2 +10hrs</p>
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Define the terms and virulent factor associated with endodontic microbiology</li> <li>• Describe the portals of entry of microorganisms into pulp and periradicular tissues</li> <li>• Describe the microfloras of root canal and microorganisms associated with for endodontic infection.</li> <li>• Classify the commonly used antibiotics, analgesics and antiulcerants with their mechanism of action, dose and duration.</li> <li>• Select the appropriate antibiotics, analgesics and antiulcerants and describe their mechanism, advantages, adverse effects and contraindications.</li> <li>• Describe the purpose and indications of antibiotic prophylaxis.</li> <li>• Name the antibiotics used in antibiotic prophylaxis.</li> <li>• Make adjunctive therapeutic selections when required and write a prescription.</li> </ul>	<p><b>12. Microbiological and pharmacological aspects of endodontics</b></p> <ul style="list-style-type: none"> <li>• Root canal microflora</li> <li>• Portal of entry of microorganisms</li> <li>• Indication of antibiotics in endodontic procedures</li> <li>• Antibiotics, analgesics and anti-ulcerants</li> <li>• Pregnancy and drugs</li> <li>• Antibiotic prophylaxis</li> </ul>	<p>L - 1.5 hrs</p> <p>T - 1.5 hrs</p>

Learning Objectives	Contents	Teaching Hours
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>• Define endodontic mishap.</li> <li>• Describe different types of endodontic mishaps and their management.</li> <li>• Evaluate and estimate prognosis before during and after different endodontic treatment.</li> <li>• Describe the criteria of success or failure of an endodontic treatment.</li> </ul>	<b>13. (a) Endodontic Mishaps,</b> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Types</li> <li>• Management of mishaps</li> </ul> <b>13.(b) Endodontic Retreatment</b>	L - 2.0 hrs  T - 1.5 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>• Define and describe pulp capping, pulpotomy, apexogenesis and apexification.</li> <li>• Describe and differentiate between open and closed apices.</li> <li>• Describe methods of diagnosis and selection of appropriate treatment option.</li> <li>• Recognize the success and failure of treatment of an open apex.</li> <li>• Justify the necessity of root canal obturation after performing apexogenesis or apexification</li> </ul>	<b>14.Pulp capping, Pulpotomy, Apexogenesis, Apexification</b> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Indications</li> <li>• Procedure</li> </ul>	L - 2.0 hrs  T - 1.5 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>• Classify and describe the clinical and radiographic features and management of various types of tooth injury.</li> <li>• Describe the differences in history taking for different injuries.</li> <li>• Describe the diagnostic tests and procedures used in examining different traumatic injuries of tooth.</li> </ul>	<b>15.(a) Traumatic Injury of tooth</b> <ul style="list-style-type: none"> <li>• Classification</li> <li>• Management</li> </ul>	L - 3.0 hrs  T - 1.5 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>• Define and describe the emergencies that require endodontic approach.</li> <li>• Identify the causes of emergencies as they occur before, during and after endodontic treatment.</li> <li>• Describe the immediate treatment of these emergencies.</li> <li>• Outline the treatment options and supportive therapy for these conditions.</li> </ul>	<b>16. Endodontic Emergency</b> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Reversible pulpitis</li> <li>• Acute irreversible pulpitis</li> <li>• Acute periapical periodontitis</li> <li>• Acute periapical abscess</li> <li>• Tooth infractions</li> <li>• Avulsion</li> <li>• Intra treatment pain, Endodontic Flare up</li> </ul>	L -2.0 hrs

Learning Objectives	Contents	Teaching Hours
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>List the different types of restorative options to restore endodontically treated teeth.</li> <li>Outline post-operative risks of unrestored teeth.</li> <li>Describe the role of restoration in longevity of endodontically treated teeth.</li> <li>Describe requirements of an adequate restoration and how it protects and seals coronally.</li> </ul>	<b>17. Restoration of Endodontically Treated Tooth</b> <ul style="list-style-type: none"> <li>Intracoronar restorations</li> <li>Extracoronar restorations</li> </ul>	L - 3.0 hrs  T - 1.5 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Describe the roles of endodontic surgery as compared to non-surgical root canal therapy.</li> <li>Define the terms listed in the content.</li> <li>Classify and describe each procedure listed.</li> <li>List the commonly used root-end filling materials.</li> </ul>	<b>18. Endodontic surgery</b> <ul style="list-style-type: none"> <li>Indications</li> <li>Contraindications</li> <li>Classifications</li> <li>Principles of flap design</li> <li>Classification of surgical flaps</li> <li>Apisectomy/ Root end resection</li> <li>Retrograde obturation</li> <li>Hemisection, Bisection &amp; Radisectomy</li> <li>Reimplantation</li> <li>Intentional reimplantation</li> <li>Transplantation &amp; Trephination</li> </ul>	L - 3.5 hrs  T- 1.5 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Define, classify and manage tooth resorption</li> <li>List the etiology of resorption.</li> </ul>	<b>19. Endodontic management of Tooth Resorption</b> <ul style="list-style-type: none"> <li>Definition</li> <li>Types</li> <li>Management</li> </ul>	L - 1.5 hrs  T - 1.5 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Describe the various causes and mechanism of tooth discoloration with their management.</li> <li>Describe means of preventing coronal discoloration.</li> <li>Describe the bleaching agents with their application procedures and complications.</li> <li>Evaluate the prognosis of bleaching treatments.</li> </ul>	<b>20. Discoloration of teeth and its management</b> <ul style="list-style-type: none"> <li>Definition</li> <li>Cause</li> <li>Bleaching</li> <li>Bleaching agents</li> <li>Mechanism of bleaching</li> <li>Indication and procedures of different bleaching</li> </ul>	L - 2.0 hrs  T - 1.5 hrs

## OPERATIVE DENTISTRY

Learning Objectives	Contents	Teaching Hours
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Define operative dentistry.</li> <li>Describe indications, pre-operative considerations and future of operative dentistry.</li> <li>List the commonly used restorative materials in operative dentistry.</li> <li>Define the direct, indirect, intracoronal, extracoronal, permanent, intermediate and temporary restorations.</li> <li>Define Minimally Invasive Dentistry ( MID),</li> <li>Describe Nano-Dentistry, Evidence Based dentistry (EBD)</li> </ul>	<b>1. Introduction and scopes of operative dentistry</b> <ul style="list-style-type: none"> <li>Operative Dentistry</li> <li>Need for operative dentistry</li> <li>Considerations prior to operative treatment</li> <li>Future of operative dentistry</li> <li>Restorative Dentistry</li> <li>Direct &amp; indirect</li> <li>Intracoronal &amp; extracoronal</li> <li>Permanent, intermediate and temporary restorations</li> <li>Minimally Invasive Dentistry (MID) &amp; Evidence Based Dentistry (EBD)</li> </ul>	L - 2.0 hrs  T - 2.0 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Mention the criteria of patient selection and assessment.</li> <li>Describe the different diagnostic aids related to operative dentistry.</li> <li>Outline the treatment modalities for different conditions.</li> </ul>	<b>2. Patient Assessment and Diagnostic Procedures for operative dentistry,</b> Treatment Planning <ul style="list-style-type: none"> <li>Considerations related to patient selection for treatment</li> <li>History</li> <li>Clinical examination</li> <li>Investigation for diagnosis</li> </ul>	L - 2.0 hrs  T - 2.0 hrs  C - 2 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Explain the necessity of restoring the occlusal and periodontal anatomy.</li> <li>Define the terms listed in the content.</li> <li>Describe the traits and importance of each.</li> </ul>	<b>3. Occlusal and periodontal aspects of restorative dentistry</b> <ul style="list-style-type: none"> <li>Centric relation, centric occlusion, normal occlusion.</li> <li>Biologic width, tooth contour, contact point, embrasure, marginal ridge, restoration margins, surface finishing.</li> </ul>	L - 1.5 hrs T - 1.5 hrs

Learning Objectives	Contents	Teaching Hours
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Define and classify dental caries.</li> <li>• Describe the aetiologic factors of dental caries.</li> <li>• Describe the histopathology of enamel and dentine caries.</li> <li>• Differentiate between infected and affected dentine.</li> <li>• Describe the different types of dental caries.</li> <li>• Describe the diagnostic measures to identify carious lesions.</li> <li>• Describe the treatment options and preventive measures for dental caries.</li> <li>• Illustrate the sequelae of dental caries.</li> </ul>	<p><b>4. Dental Caries</b></p> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Etiology</li> <li>• Pathophysiology</li> <li>• Classification</li> <li>• Histopathology</li> <li>• Diagnosis</li> <li>• Prevention</li> <li>• Treatment</li> <li>• Sequelae</li> </ul>	<p>L - 2.0 hrs</p> <p>T - 2.0 hrs</p>
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Determine the best position for both the patient and the operator during operative treatment.</li> <li>• Control pain and describe the methods available for controlling pain.</li> <li>• Describes the purpose of isolation.</li> <li>• Describe the fields that need to be isolated.</li> <li>• Describe the various methods of isolation.</li> <li>• Describe rubber dam in details.</li> <li>• Describe the ideal criteria of matrix band.</li> <li>• Classify and describe the types, roles and indications of different types of matrix bands, retainers and wedges.</li> <li>• Identify the operative instruments and describe their uses.</li> </ul>	<p><b>5. Preliminary considerations for operative dentistry</b></p> <ul style="list-style-type: none"> <li>• Patient and operator position</li> <li>• Pain control</li> <li>• Isolation of the operating field</li> <li>• Operative instruments</li> </ul>	<p>L - 4.0 hrs</p> <p>T - 4.0 hrs</p> <p>P+C =2 + 3hrs</p>

Learning Objectives	Contents	Teaching Hours
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Define the tooth preparation terminologies.</li> <li>Classify and illustrate cavities.</li> <li>Describe the objectives and factors of tooth preparation.</li> <li>List, define and describe the steps of tooth preparation.</li> <li>Define different types of tooth preparation.</li> </ul>	<b>6. Tooth preparation</b> <ul style="list-style-type: none"> <li>Definition</li> <li>Objectives</li> <li>Factors affecting</li> <li>Tooth preparation terminology</li> <li>Classification of tooth preparation</li> <li>Stages of tooth preparation(Principles of cavity preparation)</li> </ul>	L - 4.0 hrs T - 4.0 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Define class I and II cavities.</li> <li>Describe the armamentarium needed to prepare the cavities.</li> <li>Describe the pre-operative procedures.</li> <li>Describe and illustrate the preparation procedure according to the principles of cavity preparation.</li> <li>Prepare class I and II cavities.</li> </ul>	<b>7. Class I and Class II cavities</b> <ul style="list-style-type: none"> <li>Definitions</li> <li>Armamentarium required</li> <li>Initial clinical procedures</li> <li>Preparation Procedures</li> </ul>	L - 1.5 hrs  P +C= 2 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Define alloy, amalgam and dental amalgam.</li> <li>Describe the composition and setting reaction of silver amalgam along with the role of the components.</li> <li>Describe the types, uses and benefits of different types of silver alloy.</li> <li>Describe the steps of restoration with silver amalgam.</li> <li>Describe the hazards and maintenance of mercury.</li> </ul>	<b>8. Silver amalgam and silver amalgam restoration procedure</b> <ul style="list-style-type: none"> <li>Alloy, amalgam, dental amalgam.</li> <li>Composition and setting reaction of silver amalgam</li> <li>Types of silver amalgam</li> <li>Steps of restoration</li> </ul>	L - 1.5 hrs  P+C =2 + 6hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>Differentiate between sterilization and disinfection.</li> <li>Describe the common methods of sterilization in conservative dentistry.</li> <li>Differentiate between these methods to determine which one is better.</li> <li>Describe the different sterilization methods for different operative and endodontic instruments.</li> <li>List the possible transmissible diseases.</li> <li>Describe the preventive protocol against cross infection.</li> </ul>	<b>9. Sterilization and prevention of cross infection</b> <ul style="list-style-type: none"> <li>Definition of sterilization, disinfection and cross-infection.</li> <li>Methods of sterilization</li> <li>Sterilization of operative and endodontic instruments.</li> <li>Transmissible diseases</li> <li>Prevention of cross infection</li> </ul>	L-3.0 hrs  P+C =2 hrs

Learning Objectives	Contents	Teaching Hours
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Define x-ray, radiograph, ionizing radiation and dosimetry.</li> <li>• Describe the properties of x-ray</li> <li>• Describe the effects of radiation on biologic tissues.</li> <li>• Describe the radiation prone tissues and hazards of radiation.</li> <li>• Describe the preventive measures against radiation.</li> <li>• Describe the types of dosimetry.</li> <li>• Describe radiation hazards and protective measures</li> </ul>	<p><b>10. Radiology related to operative dentistry and endodontics – I</b></p> <ul style="list-style-type: none"> <li>• Introduction to dental radiology &amp; X-ray production properties of X-rays.</li> <li>• Definitions</li> <li>• Effects of radiation on tissues</li> <li>• Hazards of radiation</li> <li>• Dosimetry</li> <li>• Radiation protection</li> <li>• Recent advancement in Dental Radiology</li> </ul>	<p>L- 2.0 hrs T - 2.0 hrs</p>
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Define class III and IV cavities.</li> <li>• Describe the armamentarium needed to prepare the cavities.</li> <li>• Describe the pre-operative procedures.</li> <li>• Describe and illustrate the preparation procedure according to the principles of cavity preparation.</li> <li>• Prepare class III and IV cavities.</li> </ul> <p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Mention the indications of pin retained restoration.</li> <li>• Describe the types of pins for restoration.</li> <li>• Describe the procedure of pin setting.</li> <li>• Describe dentatus screw.</li> </ul>	<p><b>11.(a) Class III and Class IV cavities</b></p> <ul style="list-style-type: none"> <li>• Definitions</li> <li>• Armamentarium required</li> <li>• Initial clinical procedures</li> <li>• Preparation Procedures</li> </ul> <p><b>11.(b) Pins</b></p> <ul style="list-style-type: none"> <li>• Indications</li> <li>• Types and procedure</li> </ul>	<p>L -2.5 hrs P+C =2+4hrs</p>
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• Define class V and VI cavities.</li> <li>• Describe the armamentarium needed to prepare the cavities.</li> <li>• Describe the pre-operative procedures.</li> <li>• Describe and illustrate the preparation procedure according to the principles of cavity preparation.</li> <li>• Prepare class V and VI cavities.</li> </ul>	<p><b>12. Class V and Class VI cavities</b></p> <ul style="list-style-type: none"> <li>• Definitions</li> <li>• Armamentarium required</li> <li>• Initial clinical procedure</li> <li>• Preparation Procedure</li> </ul>	<p>L-1.5 hrs P+C =2+4hrs</p>

Learning Objectives	Contents	Teaching Hours
<p><b>Students should be able to describe –</b></p> <ul style="list-style-type: none"> <li>Minimally Invasive Dentistry ( MID),</li> <li>Nano-Dentistry, Evidence Based dentistry (EBD)</li> <li>Lip Line</li> <li>Smile Design</li> <li>Face profile</li> <li>Colour of Gingiva</li> <li>Translucency Of the tooth</li> <li>Shade selection</li> <li>Aesthetics, Health &amp; Function of the Tooth</li> </ul>	<p><b>13. Aesthetic Dentistry</b></p> <ul style="list-style-type: none"> <li>Color</li> <li>Translucency</li> <li>Aesthetics and operative dentistry-enameloplasty, bleaching restoration with composite resin, veneers, full coverage crown</li> </ul>	<p>L - 1.5 hrs T - 1.5 hrs</p>
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>Describe the roles of adhesive dentistry.</li> <li>Describe the agents used for adhesion with their roles in enamel and dentine adhesion.</li> <li>Differentiate between the enamel and dentine adhesion.</li> <li>Describe hybrid layer and smear layer.</li> <li>Recent advancements of enamel and dentine adhesion.</li> <li>Mention the causes of debonding along with prevention.</li> <li>Describe the properties, composition, reactive agents, types and uses of composite resin.</li> <li>Describe the restoration procedure.</li> <li>Describe hybrid composite.</li> <li>Describe recent advancements.</li> </ul>	<p><b>14. (a) Enamel and Dentine Adhesion</b></p> <ul style="list-style-type: none"> <li>Scopes of adhesive dentistry</li> <li>Agents used for adhesion</li> <li>Steps of enamel and dentine adhesion Debonding</li> </ul> <p><b>14. (b) Composite resins and their restoration procedures</b></p> <ul style="list-style-type: none"> <li>Properties</li> <li>Composition, reactive components, types, uses</li> <li>Restorative procedure</li> </ul>	<p>L - 3.0 hrs P+C =2+4hrs</p>
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>Describe the composition and setting reaction of GIC.</li> <li>List the different types of GIC with their uses.</li> <li>Describe the restorative procedure.</li> <li>Describe ART and RMGI.</li> <li>Mention role of GI conditioner, GI varnish or petroleum jelly.</li> <li>Describe sandwich technique and determine when it is necessary.</li> </ul>	<p><b>15. Glass ionomer cement and its uses</b></p> <ul style="list-style-type: none"> <li>Composition</li> <li>Types and uses</li> <li>Setting reaction</li> <li>Restorative procedure</li> <li>ART</li> <li>Sandwich technique</li> </ul>	<p>L - 2.0 hrs P+C =2+4hrs</p>

Learning Objectives	Contents	Teaching Hours
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>• Define microleakage.</li> <li>• Describe its clinical effects and causes.</li> <li>• Describe the measures of prevention of microleakage in Ag-amalgam, composite and GIC.</li> </ul>	<b>16. Microleakage</b> <ul style="list-style-type: none"> <li>• Definition, causes, clinical significance of microleakage</li> <li>• Prevention of microleakage in restorations.</li> </ul>	L - 1.5 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>• Define different types of non-carious tooth surface lesions.</li> <li>• Determine the factors responsible for the lesions.</li> <li>• Learn the measures for taking history and diagnosis.</li> <li>• Describe the findings, prevention and treatment options of the lesions.</li> </ul>	<b>17. Non-carious tooth surface loss</b> <ul style="list-style-type: none"> <li>• Definitions, Aetiology, Clinical features, Prevention and Treatment of attrition, abrasion, erosion and abfraction.</li> </ul>	L-2.0 hrs T-2.0 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>• Define dentine hypersensitivity.</li> <li>• Describe the prevalence and causes of dentine hypersensitivity.</li> <li>• Describe the dentine sensitivity theories.</li> <li>• Mention prevention and management options.</li> </ul>	<b>18. Dentine Hypersensitivity and its management</b> <ul style="list-style-type: none"> <li>• Definition</li> <li>• Aetiology</li> <li>• Clinical features</li> <li>• Management</li> </ul>	L- 1.5 hrs
<b>Students should be able to –</b> <ul style="list-style-type: none"> <li>• Describe anatomic and functional relationship between dentine and pulp.</li> <li>• Determine which factors may cause pulp injury during operative procedure and after restoration.</li> <li>• Describe the preventive measures to protect pulp during operative procedure and after restoration.</li> </ul> <b>Students should be able to –</b> <ul style="list-style-type: none"> <li>• Describe the effects of the mentioned restorative materials on pulp.</li> <li>• Define liners, bases and cavity varnish.</li> <li>• Describe different types of liners, bases, cavity varnish and tubule blocking agents with their roles in protecting pulp.</li> <li>• Determine which lining or base or cavity varnish is ideal to use in case of different restorative materials.</li> </ul>	<b>19.(a) Pulp protection</b> <ul style="list-style-type: none"> <li>• Prevention of pulp injury during cavity preparation</li> <li>• Prevention of pulp injury during and after restoration.</li> </ul> <b>19. (b) Pulpal response to restorative materials</b> Pulpal response to Ag-amalgam, composite, GI, Liners, Bases and Cavity Varnish, Tubule blocking agents.	L -2.0 hrs

Learning Objectives	Contents	Teaching Hours
<p><b>Students should be able to –</b></p> <ul style="list-style-type: none"> <li>• List the various intra-oral and extra-oral radiographic techniques.</li> <li>• Enumerate the features seen in a periapical view, bitewing x-ray and OPG.</li> <li>• Describe the indications, advantages and disadvantages of periapical view, bitewing x-ray, OPG and occlusal view.</li> <li>• Differentiate between bisecting and paralleling radiographic technique.</li> <li>• Describe the tube shift principle.</li> <li>• Describe different radioopaque and radiolucent structures.</li> <li>• Identify X-ray films &amp; position of the teeth</li> <li>• Mention the steps of processing an x-ray film.</li> <li>• Describe and identify the radiological features of different pulpal and periradicular lesions.</li> <li>• Identify defects, faults and artifacts of various x-ray films</li> </ul>	<p><b>20. Radiology related to operative dentistry and endodontics - II</b></p> <ul style="list-style-type: none"> <li>• General technical considerations.</li> <li>• Extra oral &amp; Intra oral dental radiology, OPG,</li> <li>• Normal radioopaque and radiolucent structures</li> <li>• Interpretations of differential diagnosis of different X-ray</li> <li>• Identifying of X-ray films</li> <li>• Processing of X-Ray Films</li> <li>• Radiographic defects, faults and artifacts</li> </ul>	<p>L - 4.0 hrs</p> <p>T - 4.0 hrs</p> <p>P+C =2+10hrs</p>

## Department of Conservative Dentistry & Endodontics

### Item Card for Mid Term Examination.

Namet.....

Roll no. ....Session.....

#### Endodontics:

Sl. No.	Date	Name of item	Full Marks	Marks Obtained	Signature of the examiner
01		Introduction and scopes of operative dentistry & endodontics. Modern endodontics.	10		
02		Patient assessment and diagnostic procedures and treatment planning of operative dentistry	10		
03		Pulpal and periradicular pathoses.	10		
04		Pulp space anatomy.	10		
05		Indication and contraindication of RCT. Initial preparation for RCT.	10		
06		Access cavity preparation.	10		
07		Instruments and preparation of RC system	10		
08		Irrigation and intra canal medicaments.	10		
09		Working length determination.	10		
10		Obturation of RC system.	10		

#### Operative dentistry:

Sl. No.	Date	Name of item	Full Marks	Marks Obtained	Signature of the examiner
01		Local anaesthesia related to operative dentistry & endodontics	10		
02		Sterilization and prevention of cross infection.	10		
03		Isolation of the operative field, matricing and tooth separation.	10		
04		Pulp protection and Interim restoration.	10		
05		Principles of cavity preparation , Class I cavity.	10		
06		Class II, III, IV, V and VI cavity.	10		
07		Amalgam restoration.	10		
08		Composite resin restoration.	10		
09		Glass ionomer restoration.	10		
10		Radiology related to conservative dentistry-I.	10		

## Department of Conservative Dentistry & Endodontics

### Item Card for Final Term Examination.

Name.....

Roll no. ....Session.....

### Endodontics:

Sl. No.	Date	Name of item	Full Marks	Marks Obtained	Signature of the examiner
01		Microbiological and Pharmacological aspects of endodontics.	10		
02		Endodontics Emergency	10		
03		Endodontics Mishaps.	10		
04		Apexogenesis and apexification	10		
05		Traumatic Injury of tooth	10		
06		Restoration of Endodontically treated tooth.	10		
07		Endodontic Surgery	10		
08		Endodontic-Periodontal relationship.	10		
09		Resorption of teeth	10		

### Operative dentistry:

Sl. No.	Date	Name of item	Full Marks	Marks Obtained	Signature of the examiner
01		Dental caries.	10		
02		Hypersensitivity of teeth	10		
03		Non-carious tooth surface loss.	10		
04		Microleakage.	10		
05		Occlusion and periodontal aspects of restorative dentistry.	10		
06		Pins in restorative dentistry	10		
07		Discolouration of tooth and its management	10		
08		Bonding system	10		
09		Radiology related to conservative dentistry-II	10		
10		Aesthetic dentistry.	10		

# Prosthodontics

## Departmental Objectives

At the end of the course, the students should be able to:

- Mention the normal relations of the human teeth and jaws in dentulous patients.
- Describe the Anatomy and Physiology of complete or partial edentulous state.
- Describe the articulation and concept of occlusion.
- Explain the procedure of mouth preparation for removable & fixed prosthesis.
- Mention the steps wise Process, finish and deliver of different dental prosthesis.

## List of Competencies to acquire:

- Use various dental materials effectively.
- Competently treat of edentulous, partial edentulous and maxilla - facial defect patient.
- Familiar with the concept of osseointegration and the value of implant-supported Prosthodontic procedures.
- Diagnose and refer patients requiring treatment.

## Distribution of teaching - learning hours

Lecture	Tutorial	Practical	Demonstration +Dissection +Card exam	Clinical Teaching	Total Teaching hours	Integrated teaching(Common)	Formative Exam		Summative exam	
							Preparatory leave	Exam time	Preparatory leave	Exam time
163 hrs	47hrs	71 hrs	6 hrs	47 hrs	334	10hrs	10 days	20 days	10 days	35 days

## Teaching - learning methods, teaching aids and evaluation

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning	Multimedia, OHP, White board, laptop, desktop, slide projector, video, dummy and model, TV, specimen(patient) etc.	Item exam, Card final, Term exam, class performance, Term final(written, oral, practical, clinical)
Lecture Power Point Presentation (video, Presentation)	Tutorial, Demonstration, clinical class	Assignment, group & self study		

**Related Equipment/Instruments/Materials/Miscellaneous:**

**Equipment:** Acrylic curing unit, Casting machine, De-waxing and porcelain furnace, Light curing unit, Light and electron microscope, Electro-polishing unit with Acid solution, Sand Blaster, CAD-CAM machine, EMG-JVA (Bio-tens), Model trimmer, ceramage machine.

**Instrument:** Mirror, Probe, Twiser, Excavator, Perio- Probe, Mould (Partial, Complete, Dentate, Typodont), Slide caliper, Willis gauge, metal-gauge, Fox's plane, Articulators (Non-Anatomical, Semi-adjustable, Anatomical articulator with face-bow transfer, accessories, Half-articulator, Impression tray (Edentulous tray, Stock- tray-Edentulous, Dentulous), Micro-motor, Portable turbine set with Hand pieces, Agar-bath, Duplicating flask, Wax knife, curver, Electric wax knife, Model- saw, Dental Press, Dental Flask, Surgical kit for implant placement, Rubber bowl, Spatula, Different Dental surveyor, Gothic arch, Different Polishing kits.

**Materials:** Impression (Compound- sheet and stick variety, Alginate, Rubber base, Agar-agar, Zinc oxide eugenole), Gypsum products (Ordinary plaster, Hard plaster, Investment Plaster, Impression plaster), Dental waxes (Modeling wax, Different Inlay waxes, Different Sheet casting waxes, Wax-mesh, Impression wax, Impression – Gutta- percha), Metal and Dental alloys- gold alloys, Acrylic resin (Self cure acrylic resin, Heat cure acrylic resin, Light activated AR), Flexible nylon denture base material, Cobalt-chromium alloy, Dental Implants, Die-pin, Gingival retraction cord, Dental Porcelain, Different SS wire, Vaseline, Shade guide (Spectrophotometry, Die spacer, Debublizer, Porcelain Brushes, Laboratory composite and its accessories, Luting agents, Materials used in maxillofacial prosthesis (Acrylic resin, Elastomer), Soft lining materials, Acrylic and Porcelain and teeth, Precision attachments, Polishing materials for resin, metal and alloys, different separating media., ceramage powder and liquid.

**Miscellaneous:** Hand gloves, Face-mask, Hand wash, Soaps, Cotton, Suction tips, Napkins, Chest piece, Gluter-aldehyde solution, Patient apron

**Professional Examination:****Marks distribution of Assessment of Prosthodontics****Total marks : 300**

- Written = 100 (70 on SAQ + 20 on MCQ + 10 on Formative)
- Oral (SOE) = 100
- Practical = 100 (10 spotting, 20 short case, 30 long case, 30 lab work, 10 assignment)

## Learning Objectives and Course Contents in Prosthodontics

### To be taught in 4th phase

#### Pre-Clinical Prosthodontics

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>Describe applied anatomy and physiology related to prosthodontics.</li> </ul>	<ul style="list-style-type: none"> <li>Applied anatomy and physiology related to prosthodontics</li> </ul>	2 hrs lecture 1 hr tutorial 1 hr practical
<ul style="list-style-type: none"> <li>Mention the materials and instruments used in Prosthodontics.</li> </ul>	<ul style="list-style-type: none"> <li>Materials and instruments used in prosthodontics</li> </ul>	3 hrs lecture 2 hrs demonstration
<ul style="list-style-type: none"> <li>Identify the partially edentulous model</li> <li>Perform impression, surveying and designing of partial denture framework.</li> <li>Mention and perform laboratory steps for cast partial denture on partially edentulous cast.</li> </ul>	<ul style="list-style-type: none"> <li>Fabrication of Removable Partial Dentures using partial edentulous model: Impression (Demonstration only), surveying, designing partial denture framework, laboratory steps for cast partial denture on partially edentulous cast</li> </ul>	3 hrs lecture 1 hr tutorial 1 hrs practical 1hrs demonstration
<ul style="list-style-type: none"> <li>Identify the complete edentulous model.</li> <li>Perform preliminary impression taking, cast preparation, special tray preparation, final impression.</li> <li>Prepare master cast preparation by boxing technique, temporary base preparation, occlusal rim preparation, jaw relation recording, transfer jaw relation record on articulator.</li> <li>Select and alline teeth, arrangement of teeth, waxing, carving and laboratory procedures.</li> </ul>	<ul style="list-style-type: none"> <li>Fabrication of complete denture prosthesis using edentulous models (cast):</li> <li>Preliminary impression (Demonstration only)), cast preparation, special tray preparation, final impression, master cast preparation by boxing technique (only Demonstration), temporary base preparation, occlusal rim preparation, jaw relation recording (Demonstration), transfer jaw relation record on articulator, selection of teeth, arrangement of teeth, waxing, carving and laboratory procedures.</li> </ul>	4 hrs lecture 4 hrs tutorial 2 hrs practical 2 hrs demonstration

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>Identify the model for fixed dental prosthesis,</li> <li>Prepare the tooth on model.</li> <li>Prepare impression taking from model.</li> <li>Construct Model and die for laboratory technique.</li> </ul>	<ul style="list-style-type: none"> <li>Fixed Prosthodontics: Tooth preparation on model for crown or fixed partial denture, Impression taking (Demonstration only), model and die preparation, laboratory procedures</li> </ul>	2 hrs lecture 1 hrs practical 1 hrs demonstration
<ul style="list-style-type: none"> <li>Identify the model for maxillofacial prosthesis,</li> <li>Perform the impression taking, model preparation and fabrication of prosthesis.</li> </ul>	<ul style="list-style-type: none"> <li>Maxillofacial prosthesis in model: Impression taking, model preparation and fabrication of prosthesis</li> </ul>	2 hrs lecture 1 hr tutorial 1 hrs practical
<ul style="list-style-type: none"> <li>Identify the model for implant</li> <li>Describe implant procedure and prosthesis preparation.</li> </ul>	<ul style="list-style-type: none"> <li>Implant Dentistry: Implant procedure in model and prosthesis preparation</li> </ul>	2 hrs lecture 1 hr tutorial 1 hrs practical

## Learning Objectives and Course Contents in Prosthodontics

### To be taught in 4th phase

#### Removable Partial Denture Prosthodontics

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>Enumerate the definition &amp; terminology of RPD.</li> <li>Examine and diagnose the cases for RPD.</li> </ul>	<ul style="list-style-type: none"> <li>Introduction, examination and diagnosis</li> </ul>	2 hrs. lecture 1 hr tutorial 1 hr practical
<ul style="list-style-type: none"> <li>Formulate a treatment plan.</li> <li>Perform the mouth preparation to improve the foundation of RPD.</li> </ul>	<ul style="list-style-type: none"> <li>Treatment planning and mouth preparation</li> </ul>	3 hrs lecture 1 hrs practical
<ul style="list-style-type: none"> <li>Identify the landmark of imprints of upper and lower Jaw.</li> <li>Perform model preparation</li> </ul>	<ul style="list-style-type: none"> <li>Impression and model</li> </ul>	2 hrs lecture 1 hr tutorial 1 hr practical
<ul style="list-style-type: none"> <li>Describe the parts of surveyor.</li> <li>Perform the technique of surveying.</li> <li>Prepare a master cast.</li> </ul>	<ul style="list-style-type: none"> <li>Model surveying and preparation of master cast</li> </ul>	3 hrs lecture 1 hrs tutorial 1 hrs practical
<ul style="list-style-type: none"> <li>Describe the classification of RPD.</li> <li>Enumerate component parts of RPD.</li> </ul>	<ul style="list-style-type: none"> <li>Classification and component parts of RPD</li> </ul>	2 hrs lecture 1 hr tutorial 1 hr practical
<ul style="list-style-type: none"> <li>Outline the denture.</li> </ul>	<ul style="list-style-type: none"> <li>Designing partial denture</li> </ul>	1 hr lecture 1 hr tutorial 1 hrs practical
<ul style="list-style-type: none"> <li>Construct of working model.</li> </ul>	<ul style="list-style-type: none"> <li>Duplication</li> </ul>	1 hr lecture 1 hrs practical
<ul style="list-style-type: none"> <li>Perform wax pattern.</li> </ul>	<ul style="list-style-type: none"> <li>Wax pattern for cast partial denture</li> </ul>	2 hrs lecture 1 hr tutorial 1 hr practical
<ul style="list-style-type: none"> <li>Performspruing, investing, burnout and casting</li> <li>Perform finishing and polishing of partial denture frame work.</li> </ul>	Casting procedure	2 hrs lecture 1 hr tutorial 1 hrs practical

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>Enumerate the occlusal rim</li> <li>Perform occlusal rims on record bases for jaw relation</li> </ul>	<ul style="list-style-type: none"> <li>Occlusal rim</li> </ul>	1 hr lecture 1 hr tutorial 1 hrs practical
<ul style="list-style-type: none"> <li>Explain the aesthetic and functional aspect of arranging teeth.</li> <li>Perform alignment of teeth</li> </ul>	<ul style="list-style-type: none"> <li>Arranging teeth</li> </ul>	1 hr lecture 1 hr tutorial 2 hrs practical
<ul style="list-style-type: none"> <li>To check the denture in respect of functional and aesthetic consideration.</li> </ul>	<ul style="list-style-type: none"> <li>Trial</li> </ul>	1 hr lecture 1 hr tutorial 1hr practical
<ul style="list-style-type: none"> <li>Perform acrylic curing procedure.</li> </ul>	<ul style="list-style-type: none"> <li>Processing</li> </ul>	1 hr lecture 1 hr tutorial 1 hrs practical
<ul style="list-style-type: none"> <li>Enumerateselective grinding.</li> <li>Perform selective grinding.</li> </ul>	<ul style="list-style-type: none"> <li>Remounting</li> </ul>	1 hr lecture 1 hrs practical
<ul style="list-style-type: none"> <li>Perform finishing, polishing</li> <li>Determine the presence of any blebs arising from air inclusion.</li> </ul>	<ul style="list-style-type: none"> <li>Finishing and polishing</li> </ul>	1 hr lecture 1 hrs practical
<ul style="list-style-type: none"> <li>Instruct the patient about insertion, removal and maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Insertion into the mouth</li> </ul>	2 hrs lecture 1 hr tutorial 1 hrs practical
<ul style="list-style-type: none"> <li>Identify the discrepancies for correction.</li> </ul>	<ul style="list-style-type: none"> <li>Review stage of treatment</li> </ul>	1 hr lecture 1 hr tutorial 1 hr practical
<ul style="list-style-type: none"> <li>Restore immediate aesthetic and functional rehabilitation.</li> </ul>	<ul style="list-style-type: none"> <li>Immediate removable partial denture</li> </ul>	2 hrs lecture 1 hr tutorial 1 hrs practical

## Learning Objectives and Course Contents in Prosthodontics

### Complete denture Prosthodontics to be taught in 4th phase

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>Define complete denture prosthesis.</li> <li>Enumerate the parts and surfaces of complete denture prosthesis.</li> <li>Describe terminology.</li> </ul>	<ul style="list-style-type: none"> <li>Introduction of complete denture prosthesis</li> </ul>	3 hrs lecture 1 hr tutorial 1 hrs practical
<ul style="list-style-type: none"> <li>Enumerate the different anatomical landmarks</li> <li>Describe the denture bearing areas.</li> </ul>	<ul style="list-style-type: none"> <li>Anatomy and physiology of the tissues in the denture bearing areas and related structures</li> </ul>	3 hrs lecture 1 hrs tutorial
<ul style="list-style-type: none"> <li>Define retention,</li> <li>Describe the retaining and dislodging forces.</li> </ul>	<ul style="list-style-type: none"> <li>Principles of retention</li> </ul>	3 hrs lecture 2 hrs tutorial
<ul style="list-style-type: none"> <li>Perform the history taking and clinical examination</li> <li>Identify the potential problem areas</li> <li>Improve the treatment.</li> </ul>	<ul style="list-style-type: none"> <li>History, clinical examination &amp; diagnosis</li> </ul>	4 hrs lecture 1 hr tutorial 4 hrs clinical
<ul style="list-style-type: none"> <li>Define impression</li> <li>Perform the taking of impression.</li> <li>Identify the common faults in the impression.</li> <li>Correct the problem.</li> </ul>	<ul style="list-style-type: none"> <li>Primary Impression procedure</li> </ul>	4 hrs lecture 1 hr tutorial 6 hrs clinical 1 hrs practical
<ul style="list-style-type: none"> <li>Define mouth preparation</li> <li>Describe correction of tissue discrepancies.</li> <li>Perform the surgical &amp; non surgical correction</li> </ul>	<ul style="list-style-type: none"> <li>Mouth preparation</li> </ul>	2 hrs lecture 3 hrs clinical
<ul style="list-style-type: none"> <li>Define the special tray.</li> <li>Describe the materials use for special tray preparation.</li> <li>Perform the fabrication of special tray</li> </ul>	<ul style="list-style-type: none"> <li>Special tray preparation</li> </ul>	2 hrs lecture 1 hrs practical

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>Describe the materials use for final impression technique &amp; master cast</li> <li>Describe the procedure of final impression&amp;master cast</li> <li>Perform final impression&amp;mastercast making.</li> </ul>	<ul style="list-style-type: none"> <li>Taking final impression and master cast preparation</li> </ul>	2 hrs lecture 1 hrs practical
<ul style="list-style-type: none"> <li>Describe the denture base material &amp; the materials use for construction of occlusal rim.</li> <li>Perform the fabrication of denture base &amp;occlusal rim.</li> </ul>	<ul style="list-style-type: none"> <li>Fabrication of denture base and occlusal rim</li> </ul>	4 hours lecture 2 hrs practical
<ul style="list-style-type: none"> <li>Describe the jaw registration</li> <li>Determining the procedure of vertical height.</li> <li>Describe the effects of discrepancies of vertical height.</li> </ul>	<ul style="list-style-type: none"> <li>Registration of the jaw relationship</li> </ul>	5 hrs lecture 1 hr tutorial 4 hrs clinical 1 hrs practical
<ul style="list-style-type: none"> <li>Define the concept of occlusions.</li> <li>Describe the occlusion.</li> <li>Perform the mounting</li> </ul>	<ul style="list-style-type: none"> <li>Mounting on articulator and concepts of occlusion</li> </ul>	5 hrs lecture 1 hrs tutorial 1 hrs practical
<ul style="list-style-type: none"> <li>Select the teeth for individual mouth.</li> <li>List out the point during selection of teeth.</li> <li>Describe the main guidelines during alignment of teeth.</li> </ul>	<ul style="list-style-type: none"> <li>Selection and alignment of teeth</li> </ul>	4 hrs lecture 2 hrs practical
<ul style="list-style-type: none"> <li>Determine the upper and lower denture for retention, support, stability</li> <li>Check the occlusion</li> <li>Correct it there is any discrepancies.</li> </ul>	<ul style="list-style-type: none"> <li>Trial of complete denture</li> </ul>	4 hrs lecture 1 hrs tutorial 3 hrs clinical 1 hr practical

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>Define remounting</li> <li>Perform remounting on articulator</li> </ul>	<ul style="list-style-type: none"> <li>Remounting on articulator.</li> </ul>	3 hrs lecture 1 hr practical
<ul style="list-style-type: none"> <li>Instruct the patient about the use and care of the denture.</li> </ul>	<ul style="list-style-type: none"> <li>Insertion of finished denture and follow up</li> </ul>	3 hrs lecture 2 hrs clinical
<ul style="list-style-type: none"> <li>Describe the denture induced problems</li> <li>Manage denture induce problems</li> </ul>	<ul style="list-style-type: none"> <li>Complaints of the complete denture</li> </ul>	4 hrs lecture 2 hrs clinical 1 hr practical
<ul style="list-style-type: none"> <li>Define relining, rebasing and repairing.</li> <li>Describe the technique of relining, rebasing and repairing.</li> <li>Perform relining, rebasing and repairing.</li> </ul>	<ul style="list-style-type: none"> <li>Relining, rebasing and repairing</li> </ul>	4 hrs lecture 1 hrs tutorial 2 hr clinical 2 hrs practical
<ul style="list-style-type: none"> <li>Define immediate denture</li> <li>Identify the cases for immediate denture</li> <li>Perform the immediate denture.</li> </ul>	<ul style="list-style-type: none"> <li>Immediate denture</li> </ul>	4 hrs lecture 2 hr tutorial 2 hrs clinical 1 hr practical
<ul style="list-style-type: none"> <li>Define over denture</li> <li>Identify the cases for over denture</li> <li>Diagnose the case, designing of denture, preparation of abutment and fabrication.</li> </ul>	<ul style="list-style-type: none"> <li>Over denture</li> </ul>	4 hrs lecture 2 hr tutorial 1 hr practical 2 hrs clinical

## Learning Objectives and Course Contents in Prosthodontics (Fixed Prosthodontics) To be taught in 4th Phase

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>Define crown, inlay, onlay.</li> <li>Describe the indication, contraindication, advantages, disadvantages of full/partial veneer crown.</li> </ul>	<ul style="list-style-type: none"> <li>Intra-coronal and extra-coronal restoration:</li> <li>Introduction, terminology, indication, contraindication, advantages &amp; disadvantages of crown prosthesis</li> </ul>	5 hrs lecture 1 hr tutorial
<ul style="list-style-type: none"> <li>Describe basic concept TMJ movement, natural and artificial occlusion</li> <li>Examine a patient for crown prosthesis.</li> <li>Enumerate the caries, periodontal status &amp; crown-root ratio for treatment planning.</li> <li>Select a tooth for full/partial veneer crown/post retained crown.</li> </ul>	<ul style="list-style-type: none"> <li>Fundamental of occlusion</li> <li>Examination, diagnosis and treatment planning</li> </ul>	5 hrs lecture 2 hrs clinical 2 hrs practical
<ul style="list-style-type: none"> <li>Describe biological, mechanical and aesthetic consideration during tooth preparation.</li> </ul>	<ul style="list-style-type: none"> <li>Principles of tooth preparation</li> </ul>	3 hrs lecture 2 hrs clinical 2 hrs practical
<ul style="list-style-type: none"> <li>Describe the technique of impression.</li> <li>Prepare of cast</li> </ul>	<ul style="list-style-type: none"> <li>Impression technique, model preparation</li> </ul>	2 hrs lecture 2 hrs clinical 2 hrs practical
	<ul style="list-style-type: none"> <li>Preparation of provisional restoration</li> </ul>	
<ul style="list-style-type: none"> <li>Perform construction of inlay, onlay, partial veneer crown and full veneer crown.</li> </ul>	<ul style="list-style-type: none"> <li>Construction of intra-coronal and extra-coronal restoration</li> </ul>	3 hrs lecture 2 hrs practical
<ul style="list-style-type: none"> <li>Describe the luting agents</li> <li>Innumerate the cementation procedure.</li> </ul>	<ul style="list-style-type: none"> <li>Cementation</li> </ul>	1 hr lecture 1 hr tutorial 2 hrs practical
<ul style="list-style-type: none"> <li>Perform the periodic check up of the patient.</li> </ul>	<ul style="list-style-type: none"> <li>Post operative care</li> </ul>	1 hr lecture 1 hr tutorial 3 hr practical

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Define FPD.</li> <li>Describe the indication, contraindication, advantages &amp; disadvantages of fixed partial denture &amp; Perform FPD</li> </ul>	<ul style="list-style-type: none"> <li>Fixed partial denture:</li> <li>Introduction, terminology, indication, contraindication, advantages and disadvantages of fixed partial denture prosthesis</li> </ul>	6 hrs lecture 2 hrs tutorial 4 hrs clinical
Student should be able to- <ul style="list-style-type: none"> <li>Examine a patient for fixed partial denture prosthesis.</li> <li>Enumerate the caries, periodontal status &amp; crown-root ratio for treatment planning.</li> </ul>	<ul style="list-style-type: none"> <li>Examination, diagnosis and treatment planning</li> </ul>	11 hrs Lecture 1 hrs tutorial
<ul style="list-style-type: none"> <li>Perform wax pattern, casting, soldering, finishing and polishing of FPD.</li> </ul>	<ul style="list-style-type: none"> <li>Laboratory procedures involved in the fabrication of fixed partial denture</li> </ul>	7 hrs lecture 2 hrs tutorial 8 hrs practical
<ul style="list-style-type: none"> <li>Describe cementation procedure.</li> </ul>	<ul style="list-style-type: none"> <li>Cementation</li> </ul>	1 hr lecture 3 hr clinical 2 hr practical
<ul style="list-style-type: none"> <li>Perform the periodic check up of the patient.</li> </ul>	<ul style="list-style-type: none"> <li>Post operative care</li> </ul>	1 hr lecture 2 hr clinical 2 hr practical

## Learning Objectives and Course Contents in Prosthodontics

### To be taught in 4th phase

#### Maxillofacial Prosthodontics

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>● Define maxillofacial prosthesis</li> <li>● Describe the defect areas,</li> <li>● Describe types of maxillofacial prosthesis,</li> <li>● diagnose the cases and treatment planning,</li> <li>● Innumerate the materials used in maxillofacial prosthesis.</li> </ul>	<ul style="list-style-type: none"> <li>● Introduction</li> <li>● Applied Anatomy, physiology and pathology</li> <li>● Speech consideration</li> <li>● Materials used in maxillofacial prosthesis</li> <li>● Various maxillofacial prosthesis: Intraoral and extra-oral prosthesis (obturators, splints, stent and artificial extra-oral prosthesis)</li> <li>●</li> </ul>	3 hrs lecture 3 hrs tutorial  3 hrs practical

## Learning Objectives and Course Contents in Prosthodontics (Implant Dentistry) To be taught in 4th phase

Learning Objectives	Contents	Teaching Hours
Student should be able to- <ul style="list-style-type: none"> <li>● Define implant</li> <li>● Describe terminology related to implant.</li> <li>● Enumerate the different dental implants and their uses.</li> </ul>	<ul style="list-style-type: none"> <li>● Introduction and Scope</li> <li>● Applied anatomy, physiology, pathology, pharmacology</li> </ul>	1 hrs lecture 2 hrs tutorial 2 hrs practical
<ul style="list-style-type: none"> <li>● Diagnose and Identify the cases.</li> <li>● Perform treatment planning and designing.</li> <li>● Describe Osseo-integration</li> </ul>	<ul style="list-style-type: none"> <li>● Examination, diagnosis and treatment planning</li> <li>● Osseo-integration and occlusion scheme</li> </ul>	2 hrs lecture 1 hr tutorial 3 hrs clinical
<ul style="list-style-type: none"> <li>● Fabricate surgical stents in the model..</li> </ul>	<ul style="list-style-type: none"> <li>● Surgical stents</li> </ul>	2 hrs lecture 1 hrs practical
<ul style="list-style-type: none"> <li>● Describe prosthodontic replacement options.</li> </ul>	<ul style="list-style-type: none"> <li>● Prosthodontic rehabilitation.</li> </ul>	2 hrs lecture

# Orthodontics & Dentofacial Orthopedics

## Departmental Objectives

**At the end of the course, the student should be able to:**

1. Identify and diagnose anomalies of the dentition, occlusion, facial structures and abnormal functional conditions (Orthodontic patients)
2. Detect deviations of the development of the dentition, of facial growth, and occurrence of functional abnormalities
3. Identify pernicious oral habits that may lead to mal occlusion.
4. Conduct interceptive orthodontic measures
5. Evaluate need for orthodontic treatment
6. Formulate a treatment plan for simple type of malocclusions and execute
7. Design, plan & fabricate simple universal type of Orthodontic treatment procedures(Hawley type appliances) insert and activate.
8. Design, plan &fabricate functional appliance & insert, learn how to activate.
9. Describe basic concept of fixed orthodontic appliance.
10. Advice & aware the patients to take specialized Orthodontic consultation & refer when necessary.

## List of Competencies:

1. Demonstrate basic knowledge and skill to examine, investigate and diagnose the patient's malocclusion for orthodontic treatment.
2. Manage simple Orthodontic problems of patients at primary health care facilities.
3. Identify complicated Orthodontic problems, able to take initial care to them and able to refer to appropriate site for further management without causing any deterioration of patient's condition.
4. Communicate with the patients regarding preventive, curative & rehabilitative orthodontic care.

## Distribution of teaching - learning hours

Lecture	Demonstration	Practical	Clinical Teaching	Total Teaching hours	Integrated Teaching (Common)	Formative Exam		Summative exam	
						Preparatory leave	Exam time	Preparatory leave	Exam time
180 hrs	30 hrs	50 hrs	80 hrs	340 hrs	10 hrs	10 days	20 days	10 days	35 days

## Marks distribution:

### *Final professional examination:*

## Marks distribution

- Total Marks-300  
Pass Marks 60% in each part
  1. Written -100 (SAQ-70, MCQ-20, FORMATIVE-10)
  2. OSPE/OSCE -100 (Practical-50 + Clinical-50)
  3. SOE-100

## Orthodontics & Dentofacial Orthopedics

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Define Orthodontics &amp; Dentofacial Orthopedics.</li> <li>Describe background of Orthodontics</li> <li>Define normal &amp; abnormal occlusion &amp; related definitions</li> <li>Define ideal occlusion</li> <li>Define &amp; mention Andrews 6 keys to normal occlusion.</li> <li>Mention aims, objectives and scope of Orthodontics</li> </ul>	1. Introduction <ul style="list-style-type: none"> <li>Define Orthodontics &amp; Dentofacial Orthopedics.</li> <li>Background of Orthodontics</li> <li>Define normal &amp; abnormal occlusion &amp; related definitions</li> <li>Ideal occlusion-introduction, definition &amp; Andrews 6 keys to normal occlusion.</li> </ul> Aims, objectives and scope of Orthodontics: Facial Aesthetics, Normal function, Stability.	Lecture: 10
<ul style="list-style-type: none"> <li>Define primary, mixed &amp; permanent dentition.</li> <li>Describe dimensional changes in the dental arches during different dentition period.</li> <li>Describe the normal growth of jaw, teeth &amp; face.</li> <li>Describe changes in face form &amp; profile.</li> <li>Mention psychological &amp; Social impact of abnormal growth &amp; malocclusion</li> <li>To identify normal &amp; abnormal growth pattern of jaws &amp; dentition &amp; their psychological &amp; social impact.</li> </ul>	2. Growth & Development of dentitionjaws, palate & face. <ul style="list-style-type: none"> <li>Define primary, mixed &amp; permanent dentition.</li> <li>Dimensional changes in the dental arches during different dentition period.</li> <li>Describe the normal growth of jaw, teeth &amp; face.</li> <li>Describe changes in face form &amp; profile.</li> </ul> Psychological & Social impact of abnormal growth & malocclusion	Lecture: 12 Demo: 1 clinical: 8
<ul style="list-style-type: none"> <li>Describe epidemiology of malocclusion including incidence &amp; prevalence</li> <li>To find out prevalence of malocclusion &amp; Biostatics.</li> </ul>	3. Epidemiology. <ul style="list-style-type: none"> <li>Describe epidemiology of malocclusion including incidence &amp; prevalence Biostatics</li> </ul>	Lecture: 5
<ul style="list-style-type: none"> <li>Describe-Lip morphology (competent, incompetent, everted, hyperactive) &amp; its influence on occlusion.</li> <li>Explain anatomy &amp; behavior of tongue.</li> <li>Explain swallowing behaviors</li> <li>Describe the effects of Adenoids</li> <li>Explain Breathing and Speech mechanism.</li> <li>Explain Respiratory sleep apnea.</li> <li>To evaluate the soft tissues and swallowing pattern and its impact on malocclusion.</li> </ul>	4. Soft tissue Morphology and behaviors <ul style="list-style-type: none"> <li>Describe-Lip morphology (competent, incompetent, everted, hyperactive)&amp; its influence on occlusion.</li> <li>Explain anatomy &amp; behavior of tongue.</li> <li>Swallowing behaviors</li> <li>Describe the effects of Adenoids</li> <li>Breathing and Speech.</li> <li>Respiratory sleep apnea.</li> </ul>	Lecture: 10 Demo:1 Clinical: 8

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● To illustrate normal occlusion, malocclusion with classification &amp; etiology</li> <li>● Classify Malocclusion (Angles &amp; others)</li> <li>● Describe untoward effect Malocclusion if not treated.</li> <li>● Describe different type of Malposition.</li> <li>● State the etiology of Malocclusion -(General &amp; local factors)</li> </ul>	5. Malocclusion: Classifications & etiology: <ul style="list-style-type: none"> <li>● Classify Malocclusion (Angles&amp; others)</li> <li>● Describe untoward effect</li> <li>● Describe different type of Malposition.</li> </ul> State the Etiology-(General & local factors)	Lecture: 8 Demo:1 Clinical:4 Practical:1
<ul style="list-style-type: none"> <li>● Take comprehensive history</li> <li>● Classify malocclusion</li> <li>● Examine teeth&amp; periodontal structure.</li> <li>● Appraise of soft tissue</li> <li>● Perform functional analysis</li> <li>● Plan the necessary investigation</li> <li>● Maintain appropriate diagnostic record</li> <li>● Analyze &amp; interpret the records.</li> <li>● Outline the management protocol</li> <li>● Communicate with the patient to aware the probable prognosis &amp; financial involvement</li> <li>● To perform intra &amp; extra oral examination, interpretation, &amp; prognosis.</li> </ul>	6. Diagnosis of Malocclusion <ul style="list-style-type: none"> <li>● Obtain comprehensive history</li> <li>● Extraoral &amp; intra-oral examination</li> <li>● Identification of malocclusion</li> <li>● Examination of teeth</li> <li>● Appraisal of soft tissue</li> <li>● Functional analysis</li> <li>● Plan the necessary investigation</li> <li>● Maintain appropriate diagnostic record</li> <li>● Analyze&amp; interpret the records.</li> <li>● Outline the management protocol</li> </ul> Communicate with the patient to aware the probable prognosis & financial involvement	Lecture: 12 Demo:1 Clinical:8 Practical:4
<ul style="list-style-type: none"> <li>● To narrate how to evaluate study model to asses tooth-jaw discrepancy, photograph, different radiograph for orthodontic treatment &amp; its prognosis.</li> <li>● Obtain impression &amp; plaster model.</li> <li>● Describe technical procedure for impression &amp; plaster model</li> <li>● Analyses of the study model to assess tooth-jaw discrepancy: arch perimeter, arch length, arch width etc.</li> <li>● Define &amp; interpret OPG</li> <li>● Define cephalogram●</li> </ul>	7. Diagnostic Techniques <ol style="list-style-type: none"> <li>Impression technique &amp; preparation of study model               <ul style="list-style-type: none"> <li>● Obtain impression &amp; plaster model.</li> <li>● Technical procedure for impression &amp; plaster model</li> <li>● Analysis of the study model to assess tooth-jaw discrepancy: arch perimeter, arch length, arch width etc.</li> </ul> </li> <li>Intraoral &amp; Facial photograph.</li> <li>Intra oral radiograph</li> <li>Extra oral Radiograph</li> </ol>	Lecture: 12 Demo:4 Clinical: 8 Practical:5

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● Define cephalometry</li> <li>● Mention anthropological sources &amp; describe development of cephalometrics</li> <li>● Mention objectives of cephalometric tracings</li> <li>● Identify cephalometric landmarks –Cranial, Maxillary &amp; Mandibular</li> <li>● Perform cephalometric Analysis-Dental, Skeletal, &amp; Skeletal-Dental analysis</li> </ul>	<ul style="list-style-type: none"> <li>● OPG</li> <li>● Cephalogram</li> <li>✎ Define cephalometry</li> <li>✎ Anthropological sources &amp; development of cephalometrics</li> <li>✎ Objectives of cephalometric tracings</li> <li>✎ Cephalometric landmarks –Cranial, Maxillary &amp; Mandibular</li> <li>✎ Cephalometric Analysis-Dental, Skeletal &amp; Skeletal-Dental analysis</li> <li>✎ Tracing of self cephalogram to compare with Bangladeshi norms (Stainer analysis)</li> <li>a. CBCT(Cone-beam Computed tomography )</li> </ul>	
<ul style="list-style-type: none"> <li>● Summarize a general concept about orthodontic tooth movement.</li> <li>● Describe different Tissue change</li> <li>● Differentiate physiologic movement from orthodontic movement.</li> <li>● Describe Patho-physiological change of tissues.</li> <li>● Describe Histopathological changes at the pressure &amp; tension area.</li> <li>● Mention types of tooth movement.</li> <li>● Describe theory of tooth movement.</li> <li>● Explain effect of normal and excessive force</li> <li>● Explain the tissue changes with different type of appliance</li> <li>● Explain Biological basis of Orthodontics Therapy.</li> <li>● State favorable and unfavorable incidence of tooth movement.</li> </ul>	<p>8. Tissue Changes &amp; Tooth movement</p> <ul style="list-style-type: none"> <li>● Describe different Tissue change</li> <li>● Difference between physiologic movement and orthodontic movement.</li> <li>● Describe Patho-physiological change of tissues.</li> <li>● Histopathological changes at the pressure &amp; tension area.</li> <li>● Types of tooth movement.</li> <li>● Theory of tooth movement.</li> <li>● Explain effect of normal and excessive force</li> <li>● Explain the tissue changes with different type of appliance</li> <li>● Explain Biological basis of Orthodontics Therapy.</li> </ul> <p>State favorable and unfavorable incidence of tooth movement.</p>	<p>Lecture: 9 Demo:2 Practical:2</p>

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● Explain preventive Orthodontics &amp; Methods.</li> <li>● Describe interceptive Orthodontics &amp; Methods.</li> <li>● Explain serial extraction, space maintainer tongue guard &amp; habit breaking appliances.</li> <li>● Narrate Growth regulatory appliances.</li> </ul>	9. Preventive & Interceptive Orthodontics <ul style="list-style-type: none"> <li>● Explain preventive Orthodontics &amp; Methods.</li> <li>● Describe interceptive Orthodontics &amp; Methods.</li> <li>● Explain serial extraction, space maintainer tongue guard &amp; habit breaking appliances.</li> </ul> Narrate Growth regulatory appliances.	Lecture: 8 Demo:1 Clinical: 4 Practical:2
<ul style="list-style-type: none"> <li>● Select the patient according to orthodontic treatment need.</li> </ul>	10.Consideration of Orthodontic Treatment needsaccording IOTN & other orthodontic indexes.	Lecture: 5 Clinical: 4 Practical :2
<ul style="list-style-type: none"> <li>● Describe force &amp; mechanics in relation to orthodontics.</li> <li>● Describe Force, stress, strain, translation, centre of resistance &amp; centre of rotation.</li> <li>● Describe principles of Orthodontic force control.</li> </ul>	11.Bio- Mechanics of tooth movement. <ul style="list-style-type: none"> <li>● Force,stress, strain, translation, center of resistance &amp; centre of rotation.</li> </ul> Describe principles of Orthodontic force control.	Lecture: 9 Demo:1 Practical:1
<ul style="list-style-type: none"> <li>● Mention different materials &amp; instruments used in orthodontics.</li> <li>● Describe Impression &amp; model materials.</li> <li>● List different type of resin.</li> <li>● Mention different orthodontic bonding &amp; cementing materials.</li> <li>● Describe properties of S.S, Ni-Ti wire &amp; recently developed wires.</li> <li>● Define soldering</li> <li>● Describe composition &amp; properties of silver Solder &amp; Fluxes.</li> <li>● Describe soldering method &amp; procedure.</li> <li>● Define welding</li> <li>● Describe Principle &amp; mechanism of spot welding.</li> <li>● Describe heat treatment procedure.</li> <li>● To evaluate about orthodontics materials &amp; instrument.</li> </ul>	12.Materials, instruments used in orthodontics. <ul style="list-style-type: none"> <li>● Specify different materials &amp; instruments used in orthodontics.</li> <li>● Impression &amp; model materials.</li> <li>● Different type of resin.</li> <li>● Different orthodontic bonding&amp; cementing materials.</li> <li>● Properties of S.S, Ni-Ti wire &amp; recently developed wires.</li> <li>● Soldering- Introduction, definition Composition &amp; properties of silver Solder &amp; Fluxes.</li> <li>● Soldering method &amp; procedure.</li> <li>● Welding-Definition, Principle &amp; mechanism of spot welding.</li> <li>● Heat treatment procedure.</li> </ul>	Lecture: 8 Demo:3 Practical:7

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Describe different types of anchorage.</li> <li>Describe preparation and assessment of anchorage planning.</li> <li>Describe anchorage planning according to need-Mild, Moderate &amp; Maximum</li> <li>Mention uses of headgear, Chin cap &amp; other Extra-oral /Intra-oral anchorage.</li> <li>Describe temporary anchorage device (TAD)</li> <li>Summarize the need, type &amp; value of anchorage.</li> </ul>	<b>13.Ancorage</b> <ul style="list-style-type: none"> <li>State types.</li> <li>Preparation and assessment of anchorage planning.</li> <li>Anchorage planning according to need-Mild, Moderate &amp; Maximum</li> <li>Increase anchorage value- Uses of headgear, Chin cap &amp; other Extra-oral /Intra-oral anchorage.</li> </ul> Temporary anchorage device (TAD)	Lecture: 9 Demo:1 Clinical: 4
<ul style="list-style-type: none"> <li>Diagnose of simple &amp; complex malocclusion.</li> <li>Describe procedure of planning of extraction &amp; non-extraction</li> <li>Describe treatment of class I, II &amp; III malocclusion with certain aims &amp; objectives.</li> <li>Identify malocclusion &amp; their management</li> </ul>	<b>14.Management of different Malocclusion with different appliance system:</b> <ul style="list-style-type: none"> <li>Diagnosis: Diagnosis of simple &amp; complex malocclusion.</li> <li>Planning: Planning of extraction &amp; non-extraction</li> <li>Treatment: Treatment of class I, II &amp; III malocclusion with certain aims &amp; objectives.</li> </ul>	Lecture: 9 Demo:1 Clinical: 4 Practical:2
<ul style="list-style-type: none"> <li>Define removable appliance</li> <li>Mention basic requirement for a removable orthodontic appliance.</li> <li>Perform General wire bending exercise</li> <li>List components of removable appliance</li> <li>Design &amp; construct different springs &amp; clasps.</li> <li>Describe general principle of design and fabrication of removable appliance.</li> <li>Mention types of appliance for different tooth movement, eg. labiolingual, expansion &amp; contraction of arches</li> <li>Construction of Hawley, Begg's retainer &amp; Bite planes</li> <li>Perform Trimming &amp; polishing.</li> <li>Provide Insertion advice &amp; interaction for patients.</li> <li>Follow up &amp; adjust</li> </ul>	<b>15.Removable appliance- Technique &amp; training.</b> <ul style="list-style-type: none"> <li>Definition.</li> <li>Basic requirement for a removable orthodontic appliance.</li> <li>General wire bending exercise</li> <li>Component of removable appliance</li> <li>Design &amp; construction of different springs &amp; clasps.</li> <li>Describe general principle of design and fabrication of removable appliance.</li> <li>State type of appliance for different tooth movement, eg. labiolingual, expansion &amp; contraction of arches</li> <li>Construction of Hawley, Begg's retainer &amp; Bite planes</li> <li>Trimming &amp; polishing.</li> <li>Insertion advice &amp; interaction for patients.</li> <li>Follow up &amp; adjustments</li> </ul>	Lecture: 10 Demo:4 Clinical: 4 Practical:9

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● To evaluate about functional &amp; Orthopedics appliance</li> <li>● Describe Orthopedic force &amp; its Principles</li> <li>● Narrate myo-functional appliance &amp; describe its indication &amp; contraindication</li> <li>● Describe technique &amp; training for construction of Myo-functional appliance</li> <li>● Describe clinical &amp; laboratory steps in construction of Class-II &amp; Class-III activator (Anderson /Mono block type)</li> <li>● Adjust of activator after insertion in the oral cavity</li> </ul>	<p><b>16.Functional appliance &amp; dento-facial orthopedics</b></p> <ul style="list-style-type: none"> <li>● Describe Orthopedic force &amp; its Principles</li> <li>● Narrate myo-functional appliance &amp; describe its indication &amp; contraindication</li> <li>● Technique &amp; training for construction of Myo-functional appliance</li> <li>● Clinical &amp; laboratory steps in construction of Class-II &amp; Class-III activator (Anderson /Mono block type)</li> <li>● Adjustment of activator after insertion in the oral cavity</li> </ul>	<p>Lecture: 11 Demo:3 Clinical: 4 Practical:6</p>
<ul style="list-style-type: none"> <li>● Describe Principles, identify parts and appliance system currently used.</li> <li>● List the advantages and disadvantages of Fixed Appliance</li> <li>● Describe Technique &amp; training of fixed appliance.</li> <li>● Perform General wire bending exercise</li> <li>● Mention uses of multiple loops used in fixed appliance.</li> <li>● Describe upper &amp; Lower ideal arch formation</li> <li>● Describe Offset &amp; inset bend, 1st,2nd&amp; 3rd order bend ,Toe in &amp; Tip back bend etc.</li> <li>● Describe process of Molar Band formation &amp; welding of molar tube in the band in ideal position.</li> <li>● Able to perform Cementing of the band.</li> <li>● Describe Weldable bracket positioning</li> <li>● Describe direct bonding technique of mesh bracket.</li> <li>● Adjust of arch wire.</li> </ul>	<p><b>17.Fixed Appliance- Technique &amp; training Elementary knowledge</b></p> <ul style="list-style-type: none"> <li>● Describe Principles, identify parts and appliance system currently used.</li> <li>● List the advantages and disadvantages.</li> <li>● Technique &amp; training of fixed appliance.</li> <li>● General wire bending exercise</li> <li>● Use of multiple loops used in fixed appliance.</li> <li>● Upper &amp; Lower ideal arch formation</li> <li>● Offset &amp; inset bend, 1st,2nd&amp; 3rd order bend, Toe in &amp; Tip back bend etc.</li> <li>● Molar Band formation &amp; welding of molar tube in the band with ideal position.</li> <li>● Cementing of the band.</li> <li>● Weldable bracket positioning</li> <li>● Direct bonding technique of mesh bracket.</li> <li>● Adjustment of arch wire.</li> </ul>	<p>Lecture: 6 Demo:2 Clinical: 4 Practical:5</p>

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Differentiate the sequence of fixed appliance</li> </ul>	<b>18.Fixed Appliance- Technique &amp; training Elementary knowledge.</b> <ul style="list-style-type: none"> <li>Stages of treatment progression by fixed appliance: Anchorage planning, Leveling, Canine retraction, Arch / Anterior</li> </ul>	Lecture: 8 Demo:1 Clinical: 4
<ul style="list-style-type: none"> <li>Identify retention &amp; relapse &amp; overcome procedure</li> <li>Describe retention &amp; relapse</li> <li>Evaluate relapse after Orthodontic treatment.</li> <li>State different type of retainer.</li> </ul>	<b>19.Retention and relapse</b> <ul style="list-style-type: none"> <li>Retention &amp; relapse</li> <li>Relapse after Orthodontic treatment.</li> <li>Different type of retainer.</li> </ul>	Lecture: 9 Demo:1 Clinical: 4
<ul style="list-style-type: none"> <li>Evaluate Multi-disciplinary approach in treating CLP, other endodontic &amp; restorative procedure.</li> </ul>	<b>20.Orthodontic: Multi-disciplinary approach</b> <ul style="list-style-type: none"> <li>Multi-disciplinary treatment procedures.</li> <li>Cleft Palate management</li> <li>Pre-surgical Oral-orthopedic &amp; Orthodontic procedure, Post-surgical Orthodontic procedure.</li> <li>Pre-restorative Orthodontics procedure.</li> <li>Orthodontics in relation to periodontal disease.</li> </ul>	Lecture: 5 Demo:1 Clinical: 4 Practical:2
<ul style="list-style-type: none"> <li>Illustrate different appliance technique in adult</li> <li>Describe adult orthodontics.</li> <li>State appliance and Technique for adult orthodontics: lingual orthodontics, invisalign orthodontics.</li> </ul>	<b>21.Adult Orthodontics</b> <ul style="list-style-type: none"> <li>Describe adult orthodontics.</li> <li>State appliance and Technique for adult orthodontics: lingual orthodontics, invisalign orthodontics.</li> <li>Surgical orthodontics.</li> </ul>	Lecture: 5 Demo:1 Clinical: 4 Practical:2

Teaching methods				Teaching aids	In course evaluation
Large group	Small group	Self learning	Others		
-Lecture -video presentation	1. Practical & tutorial:- Demonstration & preparation of different orthodontic appliance in OPD. 2. Clinical:- chair side teaching & performing clinical examination (Problem based learning)	Assignment Self Model study Wire bending Appliance fabrication Appliance design Etc,	Integrated	-Black board & chalk -Whiteboard & Marker -Transparency & marker -computer -CD -Laptop, Multimedia -Flip chart -Slide projector -X-ray plate & viewer -Tracer -Specimen -Analyze report -Model etc.	-Item examinations: SOE -4 Card final examinations: (SOE) -2 Assessment Examinations: Written, SOE, Clinical/practical final (OSPE/OSCE) -Final Examination Written, SOE, Clinical/practical final (OSPE/OSCE)

# Pedodontics and Dental Public Health

## Departmental Objectives (Pedodontics):

At the end of the course, the students should be able to:

- Diagnose and manage dental diseases of pediatric patients
- Treat oral diseases for infants and children through adolescence, including those of all ages with special care needs (e.g. handicapped).
- Motivate and treat psychologically challenged pediatric dental patients
- Manage the disabled children effectively and efficiently to the needs of individual requirement and conditions
- Assess and refer pediatric patients to different specialties appropriately
- Resuscitate pediatric patients and manage emergencies
- Promote infants' and children's healthy feeding practice
- Describe the impact of socio-economic and cultural background on initiation and progression of dental diseases in children
- Rehabilitate the patient with a healthy permanent dentition
- Counsel and motivate children and parents about oral hygiene, encourage to have a healthy oral cavity
- Instill a positive attitude and behavior to maintain a good oral health
- Utilize the basic concept of children dentistry with its preventive aspect in dental practice

## List of Competencies to acquire (Pedodontics):

- Washing hands
- Wearing of gloves and glasses
- Identify primary and permanent dentition
- Identify dental and surgical instruments, materials
- History taking and clinical examination in the dental chair
- Diagnose and manage gingival and periodontal diseases, acute viral infections
- Diagnose and manage soft tissue lesions
- Diagnose and refer pre-malignant and malignant lesions
- CLI-VII cavity preparation
- Anterior strip and stainless steel crowning
- Diagnose and manage patients with developmental, hereditary and chromosomal disorders
- Diagnose and manage expression of nutritional deficiencies in dentitions
- Diagnose, manage and refer patients with communicative disorders
- Oro-facial pain and infection control with the help of local anaesthesia, relative anaesthesia, antibiotics and other drugs
- Manage types of pulpal pathologies
- Interpret radiographs used in pediatric dentistry
- Manage traumatized anterior segment of dentition
- Apply fissure sealants and fluorides
- Reshape fissures and perform prophylactic odontology
- Apply local anesthesia
- Demonstrate knowledge of relative analgesia

- Extract primary and permanent teeth of children
- Describe the techniques of frenectomy, operculectomy in children
- Describe surgical techniques of removing ranula, epulis and small cysts
- Perform Hand scaling
- Describe the concept of kiddy partial denture
- Describe the concept of fixed and removable space maintainer
- Teach the pediatric patients about brushing techniques and oral hygiene

#### **Departmental Objectives (Dental Public Health):**

At the end of the course, the students should be able to:

- Demonstrate a complete understanding about the concepts of Public health and primary health care and their delivery system in the community .
- Describe different preventive measures to address the prevailing oral and dental problems in the community in each and every level.
- Describe the concept and methods of epidemiology to design simple research in dental background
- Apply concept of behavioural science to organize oral health education program to motivate children , parents, special care group & help them to have a healthy oral cavity
- Describe the concept of dental jurisprudence and address the legal issues in dentistry

#### **List of Competencies to acquire (Dental Public Health):**

- Plan & conduct field survey properly
- Provide instruction about—Brushing, Flossing, Inter-dental cleansing aid, Mouthwash
- Produce & promote oral health promotional materials such as poster, festoon, leaflet, hand bill, banner etc.
- Interact with the community people about oral health status.
- Rehabilitate the peoples with a healthy permanent dentition by delivering appropriate knowledge of prevention.
- Act as a social worker regarding establishing a good oral health status among the community people.
- Instruction about proper oral hygiene practice.
- Act as a oral health educator.
- Interpret research findings from published journals and articles.
- Students competent to work in primary health care settings
- Practice professional life ethically and according to the legal framework of the country.
- Demonstrates the knowledge understanding of social and psychological pattern of
- Diseases causation and its management accordingly.

## Distribution of teaching-learning hours of Pedodontics and Dental Public Health:

Lecture	Tutorial	Practical+ Clinic Demonstrative works/Field visit	Total Teaching hours (including clinical rotation)	Integrated teaching (Common)	Study tour	Formative Exam		Summative exam	
						Preparatory leave	Exam time	Preparatory leave	Exam time
84 hrs	37	150hrs	271hrs	10 hrs	10 days	10 days	20 days	10 days	35 days
53 hrs	107 hrs	7hrs 5hrs (Field visit)	172 hrs						
137hrs	144hrs	162 hrs	443hrs						

### Group-A

#### Teaching - learning methods, teaching aids and evaluation (Pedodontics)

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
Lecture (video, Presentation)	Chair-side teaching (OPD), Tutorials, O.T. demonstration. O.H. clinic	Assignment, group & self study	Multimedia, OHP, White board, laptop, desktop, slide projector, video, dummy, pathology report, X-ray plate, view box, model, TV, specimen etc	Item exam, Card final, Term exam, class performance, Term final (written, oral, practical, clinical)

### Group-B

#### Teaching/learning methods, teaching aids and evaluation (Dental Public Health)

Teaching Methods			Teaching aids	In course evaluation
Large group	Small group	Self learning		
Lecture, Integrated teaching	Tutorial Practical/Field visit	Assignment, self assessment & self study.	Computer & Multimedia Chalk & board White board & markers OHP Slide projector Flip Chart Models Specimens projector Study guide & Hand out	Item examination (oral) Practical item examination(Oral & practical) Card completion Examination (Written) Term final Examination(Written, oral & practical)

#### Professional Examination:

#### Marks Distribution of assessment of Professional Examination

##### Total Marks: 300

- Written 100 : Group A : Pedodontics 50 + Group B: Dental Public Health 50) (SAQ=35+35) + (MCQ=10+10)+ (Formative assessment mark = 5+5)
- SOE 100 : Board A: Pedodontics 50 + Board B: Dental Public Health 50)
- OSPE/Practical : Pedodontics 50 + Dental Public Health 50

## Learning Objectives and Course Contents in Pedodontics

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Students will be able to</li> <li>Describe the concept of paediatric dentistry</li> <li>State the importance to save the primary and permanent dentition</li> <li>Take history of paediatric dental patient</li> <li>Differentiate between infants, toddler, child, teenage and adolescent</li> </ul>	<b>1. Introduction to children dentistry &amp; different branches of paediatric dentistry</b> <ul style="list-style-type: none"> <li>Definition</li> <li>Scope</li> <li>Aims and Objectives</li> <li>Importance</li> <li>History &amp; Notation</li> </ul>	L-3hrs T-1hrs
<ul style="list-style-type: none"> <li>Describe facial development</li> <li>Identify primary &amp; permanent teeth,</li> <li>State the chronology of teeth (shedding, eruption and calcification)</li> <li>Differences between deciduous and permanent teeth.</li> <li>Know the Development of dentition from birth to adolescence.</li> </ul>	<b>2. Dento-facial development, chronology &amp; morphology of primary and permanent dentition</b> <ul style="list-style-type: none"> <li>Definitions of growth &amp; development</li> <li>Importance</li> <li>Dento-facial development (Maxilla and Mandible) and age related changes</li> <li>Chronology &amp; morphology of primary &amp; permanent teeth</li> </ul>	L-5, P+C+D-2, T-2hrs
<ul style="list-style-type: none"> <li>State the principles of history taking, examination and investigation</li> <li>Perform clinical examination, diagnosis and treatment planning</li> </ul>	<b>3. History, diagnosis &amp; treatment planning for paediatric patients in the dental chair</b> <ul style="list-style-type: none"> <li>Case history recording</li> <li>Diagnosis</li> <li>Treatment planning</li> </ul>	L-4, P+C+D-5, T-1hrs
<ul style="list-style-type: none"> <li>State etiology, pathology, classify &amp; manage different periodontal &amp; gingival diseases in primary and permanent dentition</li> <li>Perform hand scaling</li> <li>Prevent gingival &amp; periodontal diseases</li> </ul>	<b>4. Gingival &amp; periodontal diseases in children</b> <ul style="list-style-type: none"> <li>Features and periodontal condition Features of normal gingiva and periodontium in children</li> <li>Definition, classification, Etiology, Pathogenesis and management of gingival seen in children and adolescents</li> <li>Normal periodontium in children</li> <li>Gingival diseases in children</li> <li>Periodontal diseases in children</li> </ul>	L-5, P+C+D-10, T-2hrs

Learning Objectives	Contents	Teaching Hours
<p>Students will able to</p> <ul style="list-style-type: none"> <li>● Define, classify and manage different soft tissue lesions diseases including rashes, ulcers and acute and chronic viral manifestation in the oral cavity and face</li> </ul>	<p><b>5. Diseases of oral mucous membrane, soft tissues &amp; other supporting structure</b></p> <ul style="list-style-type: none"> <li>● Aetiological factors and differential diagnosis</li> <li>● Investigations</li> <li>● Relationship to systemic disease</li> <li>● Relevant pharmacology and therapeutics</li> <li>● Clinical features of the disease</li> </ul>	<p>L-5, P+C+D-5, T-1hrs</p>
<ul style="list-style-type: none"> <li>● Diagnose, classify, know the choice of treatments and refer to the respective departments</li> </ul>	<p><b>6. Pre-cancerous &amp; cancerous lesions commonly found in children</b></p> <ul style="list-style-type: none"> <li>● Aetiological factors and differential diagnosis</li> <li>● Investigations</li> <li>● Relationship to systemic disease</li> <li>● Relevant pharmacology and therapeutics</li> <li>● Clinical features of the disease</li> </ul>	<p>L-3, P+C+D- 2hrs</p>
<ul style="list-style-type: none"> <li>● Describe the factors causing the disorders</li> <li>● Define and manage different developmental, hereditary and chromosomal anomalies found in dental tissues</li> <li>● Mention the clinical features , management and the treatment plan of the patients with anomalies in dental tissues</li> </ul>	<p><b>7. Congenital abnormalities in children</b></p> <ul style="list-style-type: none"> <li>● Definition,</li> <li>● Classification</li> <li>● Developmental, hereditary &amp; chromosomal disorders in children</li> </ul>	<p>L-3, P+C+D- 5, T-2hrs</p>
<ul style="list-style-type: none"> <li>● Classify and manage different pathological conditions found in children due to vitamin nutritional deficiencies &amp; hormonal imbalance</li> <li>● Diagnose &amp; treat the diseases</li> </ul>	<p><b>8. Nutritional and hormonal factors in dentistry</b></p> <ul style="list-style-type: none"> <li>● Age and sex and race, Cause, Type</li> <li>● Factors (local and systemic or genetic )</li> <li>● Endocrine Disorder</li> </ul>	<p>L-3, T-2hrs</p>

Learning Objectives	Contents	Teaching Hours
<p>Students will able to</p> <ul style="list-style-type: none"> <li>● Apply Psychology principles in management of child patients in the dental office</li> <li>● Describe psychological development from birth through teenage</li> <li>● Manage Dental fear, anxiety</li> <li>● Provide non- Pharmacologic and Pharmacologic management of behavior</li> </ul>	<p><b>9. Behavioral management, child psychology</b></p> <ul style="list-style-type: none"> <li>● Definition</li> <li>● Classification and types of behavior</li> <li>● Factors influencing child behavior</li> <li>● Importance of understanding Child Psychology in Pedodontics</li> <li>● Child abuse and neglect</li> </ul>	L-4, P+C+D-5, T- 1hrs
<ul style="list-style-type: none"> <li>● Mention classifications and compositions of local anaesthesia, different techniques and application of L.A., side effects and complications of L.A.</li> <li>● Mention R.A. &amp; G.A.</li> <li>● Mention classification, pharmacology, doses and administrations of antibiotics and other common drugs</li> <li>● Describe analgesics, anti-inflammatory and antibiotics commonly prescribed for children</li> <li>● Describe conscious sedation including nitrous oxide- oxygen inhalational anaesthesia</li> </ul>	<p><b>10.Pain and infection management in paediatric dentistry</b></p> <ul style="list-style-type: none"> <li>● Local anaesthesia</li> <li>● Relative analgesia</li> <li>● General anaesthesia</li> <li>● Antibiotics and other essential drugs</li> <li>● Pharmacological principles in Pediatric Dentistry- drug dosage formulae</li> </ul>	L-6, P+C+D- 10, T- 4hrs
<ul style="list-style-type: none"> <li>● State the Causes, perform examinations, diagnosis and provide preventive measures to avoid trauma to the A.S.,</li> <li>● Provide Immediate management , intermediate &amp; final treatment of traumatized, avulsed and fractured teeth, in deciduous dentition and young permanent teeth</li> <li>● State Sequelae and reaction of teeth to trauma following primary teeth</li> <li>● Bleaching non vital teeth</li> </ul>	<p><b>11.Traumatic injuries of teeth &amp; their Management(The care of injuries to the anterior segment of teeth)</b></p> <ul style="list-style-type: none"> <li>● Definition, classification, etiology</li> <li>● Treatment &amp; management</li> <li>● Prevention of trauma: mouth protectors</li> </ul>	L-5, P+C+D- 13, T- 4hrs

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● State Principles &amp; Diagnosis</li> <li>● Manage pulpal involved primary, young permanent and permanent teeth including materials used and techniques followed:               <ul style="list-style-type: none"> <li>○ Pulp capping– direct &amp; indirect.</li> <li>○ Pulpotomy</li> <li>○ Pulpectomy</li> <li>○ Apexogenesis</li> <li>○ Apexification</li> </ul> </li> <li>● Describe obturation Techniques &amp; material used for primary, young permanent &amp; Permanent teeth</li> <li>● Describe operative procedures</li> <li>● Perform manipulations and restorations of decayed primary, young permanent and permanent teeth in children using various restorative materials like Glass Ionomer, Composites &amp; Silver Amalgam.</li> <li>● Preform Stainless steel, Polycarbonate &amp; Resin Crowns</li> <li>● Diagnose and prepare CL. I-VII cavities &amp; aesthetic restorations</li> <li>● Various Isolation Techniques</li> </ul>	<b>12. Pediatric Endodontics and Operative Dentistry</b> <ul style="list-style-type: none"> <li>● Principles of Pediatric Endodontics and Operative Dentistry</li> <li>● Classification of Pulpal Pathology in primary, young permanent &amp; permanent teeth.</li> <li>● Properties of Restorative materials &amp; techniques</li> <li>● Modifications required for cavity preparation in primary and young permanent teeth.</li> <li>● Techniques of Isolation</li> <li>● Atraumatic / Alternative Restorative Technique (ART)</li> <li>● Crowns: Stainless steel, polycarbonate and anterior strip crowns</li> </ul>	L-8, P+C+ D-20, T-4hrs
<ul style="list-style-type: none"> <li>● Perform drainage of infective lesions</li> <li>● Extract primary, permanent, supernumerary and buried teeth, surgical exposor of maxillary cuspid</li> <li>● Perform all the minor oral surgeries</li> <li>● Manage infections</li> </ul>	<b>13. Oral surgery in children</b> <ul style="list-style-type: none"> <li>● Indications &amp; contraindications of extractions of primary and permanent teeth in children</li> <li>● Extraction techniques in children</li> <li>● Minor oral surgical procedures in children</li> <li>● Infections control</li> <li>● Operculectomy, frenectomy, Surgical removal of ranula, epulis and small cysts</li> </ul>	L-4, P+C+ D- 20, T-2hrs

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Describe the procedure of making removable kiddy partial denture</li> </ul>	<b>14. Paediatric prosthodontics</b>	L-2, P+C+D-5, T-2hrs
<ul style="list-style-type: none"> <li>Describe the problems encountered during primary and mixed dentition phases &amp; provide their management</li> <li>Construct removable &amp; fixed space maintainers, correct of oral bad habits, narrow upper jaw &amp; crossbites, demonstrate techniques of serial extractions</li> <li>Mention Clinical features of deleterious oral habits including non- nutritive sucking, mouth breathing, non-functional grinding, masochistic and occupational habits</li> <li>Manage of oral habits in children</li> </ul>	<b>15. Preventive &amp; Interceptive Orthodontics</b> <ul style="list-style-type: none"> <li>Oral Habits in children</li> <li>Definitions, classification and etiology of all habits</li> <li>Preventive measures</li> <li>Developing occlusion &amp; its management</li> <li>Space regainers</li> <li>Serial extractions.</li> <li>Space management.</li> <li>Space maintainers: definition, classification, indications and contra indications, advantages and disadvantages including construction of fixed space maintainers</li> </ul>	L-2, P+C+D-5, T-2hrs
<ul style="list-style-type: none"> <li>Describe intraoral radiographic techniques</li> <li>Describe extra oral/specialized radiographic techniques</li> <li>Describe modification in radiographic techniques in children</li> <li>Describe radiographic survey in children</li> <li>Interpret of radiographs used for children,</li> <li>Mention radiation hazards &amp; protections</li> </ul>	<b>I6. Radiology in children</b> <ul style="list-style-type: none"> <li>Definition,</li> <li>Types of radiographs</li> <li>Various techniques of radiograph</li> </ul>	L-2, P+C+D-5, T-2 hrs
<ul style="list-style-type: none"> <li>Mention factors responsible (etiology) for caries initiation, and state classifications, pathology and epidemiology with socio-economic factors</li> <li>Manage early childhood caries including nursing bottle caries</li> <li>Manage rampant caries</li> <li>Explain role of food in dental caries and aware parents to apply the knowledge</li> <li>Apply prophylactic &amp; operative techniques in dental caries prevention by fissure sealants, prophylactic odontomy, reshaping of fissures, application of fluorides</li> <li>Provide primary care &amp; oral hygiene education in childhood</li> </ul>	<b>17. Dental caries:</b> <ul style="list-style-type: none"> <li>Definition, Theories and Etio pathogenesis</li> <li>Epidemiology</li> <li>Early childhood caries including Nursing bottle caries - definition, classification, etiology, pathogenesis, clinical features, complications and management</li> <li>Rampant caries -definition, classification, etiology, pathogenesis, clinical features, complications and management</li> <li>Diet &amp; Dental caries including diet counseling, diet and modifications</li> <li>Caries activity, caries prediction and caries susceptibility &amp; heir clinical application</li> </ul>	L-10, P+C+D-25, T-2hrs

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Recognize &amp; manage medical emergencies initially that may occur during dental procedures</li> </ul>	<b>18. Medical and Dental emergencies in children and their management</b>	L-5 P+C+D-5hrs
<ul style="list-style-type: none"> <li>Manage the patients with mental retardation</li> <li>Manage the patients with Down's syndrome, cerebral palsy, epilepsy etc.</li> <li>Manage the patient with learning disability such as deafness, blindness etc.</li> <li>Treat the dental diseases of medically compromised children</li> <li>Manage behaviourally challenged and handicapped children with dental diseases</li> </ul>	<b>19. Dental care of children with special needs</b> <ul style="list-style-type: none"> <li>Definition, etiology, clinical features of <ul style="list-style-type: none"> <li>Physically and Mentally Handicapped Children</li> <li>Medically compromised children</li> <li>Different genetic disorders found in children</li> </ul> </li> <li>Management of handicapped children in the dental chair with special consideration of communicative disorders(A.S.D)</li> <li>Parents' counseling</li> </ul>	L-5, P+C+D-8, T-3hrs

## Department of Pedodontics

Name of Student.....

Batch.....Roll.....Group.....

Father's Name.....

Mothers Name.....

Contact Address and Phone no. ....

Local Guardians Name.....

Contact no. ....

Term 1	Total Items	Complete/Incomplete	Remarks
Card 1			
Card 2			
Term 2	Total terms		
Card 3			
Card 4			

**Overall Remarks:** Eligible/ineligible for Professional Exam

**Remarks by Supervisor/s:** Complete/Incomplete/Pending

Signature of Head of Dept. ....

## CARD 1

Name of topic	Number of item in Each topic	Total marks/ Marks obtained	Remarks
1. Scope and Importance of Pedodontics			
2. Development of	a. Face		
	b. Teeth		
3. Chronology and Morphology	a. Deciduous teeth		
	b. Permanent teeth		
4. History, Diagnosis and Treatment plan			
5. Development	Primary and Permanent teeth Occlusion, anomalies and Rx		
6. Dental caries			

## CARD 2

Name of topic	Number of item in Each topic	Total marks/ Marks obtained	Remarks
1. Pediatric Operative Dentistry	a. Classification of Cavity and Cavity preparation 1-5		
	b. Restorative Materials		
	c. Bleaching of teeth		
2. Pediatric Endodontics	a. Diagnosis of pulp Pathology		
	b. Pulpotomy		
	c. Pulpectomy		
	d. Pulp capping		
	e. Apexification and Apexogenesis		
	a. Primary teeth		
	b. Permanent teeth		
4. Radiology children			

### CARD 3

Name of topic	Number of item in Each topic	Total marks/ Marks obtained	Remarks
1. Periodontal Disease in children			
2. Diseases of Oral mucous membrane			
3. Developmental Anomalies of Teeth			
4. Child Psychology management			
5. Hereditary, Nutritional , Hormonal , Communicative Disorder			

### CARD 4

Name of topic	Number of item in Each topic	Total marks/ Marks obtained	Remarks
Habits and Rx			
2. Removable partial Denture			
3. Management of Handicapped Children			
4. Oral surgery for children	a. Local Anesthesia		
	b. Extraction of teeth		
	c. Minor oral surgery		
5. Level of Prevention	a. Levels of Dental caries prevention		
	b. ART technique		

## Learning Objectives and Course Contents in Dental Public Health

Learning Objectives	Contents	Teaching Hours
<p>Student will be able</p> <ul style="list-style-type: none"> <li>● Define health</li> <li>● Describe history of public health</li> <li>● Describe history of dental public health</li> <li>● Explain iceberg of disease</li> <li>● Describe history of disease</li> <li>● Explain epidemiological triad</li> <li>● Describe phase of disease and illness and mention factors affecting these states</li> <li>● Mention indicator of health</li> <li>● Describe determinates of health</li> <li>● Explain dimensions of health</li> </ul>	<p>Fundamentals of dental public health</p> <p>Concept of</p> <ul style="list-style-type: none"> <li>● Health &amp; Disease</li> <li>● Determinates of health</li> <li>● Different dimensions of health</li> <li>● Public Health and in relating to dentistry</li> </ul>	<p>L= 2 T= 4</p>
<ul style="list-style-type: none"> <li>● Define epidemiology</li> <li>● Mention the aim and objectives of epidemiology</li> <li>● Define quarantine, Epidemic, Endemic &amp; Pandemic, Sporadic</li> <li>● Describe epidemiological study design</li> <li>● Define screening</li> <li>● Define &amp; Explain <ul style="list-style-type: none"> <li>○ Incidence</li> <li>○ Prevalence</li> <li>○ Rate</li> <li>○ Ratio</li> <li>○ Proportion</li> </ul> </li> <li>● Epidemiology of dental diseases</li> </ul>	<ul style="list-style-type: none"> <li>● General &amp; Dental Epidemiology</li> </ul>	<p>L=3 T=6</p>

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>● Define and Classify of research</li> <li>● Mention characteristics of research question</li> <li>● Explain ethics in Research</li> <li>● Steps of research</li> <li>● Bias</li> <li>● Blinding</li> </ul>	<ul style="list-style-type: none"> <li>● Research Methodology</li> </ul>	L=2 T=3
<ul style="list-style-type: none"> <li>● Define Biostatistics</li> <li>● Explain Concept of Data</li> <li>● Define &amp; Classify variables</li> <li>● Describe data collection, compilation, organization analysis, interpretation &amp; presentation of data</li> <li>● State measures of central tendency</li> <li>● State measure of dispersion</li> <li>● Describe normal Distribution curve</li> </ul>	<ul style="list-style-type: none"> <li>● Biostatics</li> <li>● Data management</li> </ul>	L=2 T=6 P=1
<ul style="list-style-type: none"> <li>● Define sample and population</li> <li>● Mention types of sampling</li> <li>● Explain sampling technique</li> </ul>	<ul style="list-style-type: none"> <li>● Sampling methods</li> </ul>	L=2 T=4
<ul style="list-style-type: none"> <li>● Define &amp; mention types of Index</li> <li>● State importance of Index</li> <li>● Mention properties of Index</li> <li>● Use of Index</li> <li>● Scoring of DMFT (demonstration )</li> </ul>	<ul style="list-style-type: none"> <li>● Index</li> </ul>	L=2 T=3
<ul style="list-style-type: none"> <li>● Define dental ancillary</li> <li>● Classify ancillary</li> <li>● State function of ancillary</li> <li>● Explain rationale of dental ancillary</li> </ul>	<ul style="list-style-type: none"> <li>● Dental Manpower and ancillary</li> </ul>	L=1 T=3

## Learning Objectives and Course Contents in Dental Public Health & Community Dentistry

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>State Alma Ata declaration</li> <li>Define Primary Health Care (PHC)</li> <li>Explain principles of PHC</li> <li>Mention core activities of PHC</li> </ul>	<ul style="list-style-type: none"> <li>Primary Health Care</li> </ul>	L=2 T=4
<ul style="list-style-type: none"> <li>Define planning and its stages in Health Care, Purposes of planning</li> <li>Evaluation in health care</li> <li>Mention health care organizations and resources</li> </ul>	<ul style="list-style-type: none"> <li>Planning and evaluation of health care in dentistry</li> </ul>	L=2 T=5
<ul style="list-style-type: none"> <li>Explain importance &amp; objectives of School dental Health education</li> <li>A School dental health education program</li> <li>Planning a school health education program</li> <li>Describe preventive dietary program</li> <li>Describe pit and fissure sealant program</li> <li>Conduct classroom tooth brushing program</li> <li>Demonstration of fluoride application</li> </ul>	<ul style="list-style-type: none"> <li>School dental health program</li> </ul>	L=2 T=4
<ul style="list-style-type: none"> <li>Define health promotion &amp; mention its fundamental principles</li> <li>Define health education and its objectives &amp; principles</li> <li>Describe different media/levels used in dental health education</li> </ul>	<ul style="list-style-type: none"> <li>Oral health promotion</li> <li>Dental Health education</li> </ul>	L=1 T=3 P=1
<ul style="list-style-type: none"> <li>Application of computers in dental health care .</li> </ul>	<ul style="list-style-type: none"> <li>Computer application in dentistry</li> </ul>	L=1 T=1

## Learning Objectives and Course Contents in Preventive Dentistry

Learning Objectives	Contents	Teaching Hours
<b>Student will be able</b> <ul style="list-style-type: none"> <li>Define Prevention</li> <li>Describe levels of prevention</li> <li>Describe measures of prevention in relation to dental disease</li> </ul>	<ul style="list-style-type: none"> <li>Concept of Prevention in dentistry</li> </ul>	L=1 T=2
<ul style="list-style-type: none"> <li>Define dental caries</li> <li>Classify Dental caries</li> <li>Epidemiology of caries</li> <li>List etiological factors of dental caries</li> <li>Describe theory of dental caries development</li> <li>Describe prevention &amp; measures in dental caries</li> <li>Mention uses of Fluoride</li> <li>Define diet &amp; dietary counseling</li> <li>ART (Definition, Principle, advantage, disadvantage &amp; technique)</li> </ul>	<ul style="list-style-type: none"> <li>Prevention &amp; Control of Dental Caries</li> </ul>	L=3 T=6 P=3
<ul style="list-style-type: none"> <li>Define Periodontal disease</li> <li>Classify periodontal disease</li> <li>Epidemiology of Periodontal disease</li> <li>Describe preventive measures</li> <li>Describe control of periodontal diseases by mechanical, chemotherapeutic &amp; others.</li> <li>Nutritional effect on periodontal disease</li> </ul>	<ul style="list-style-type: none"> <li>Prevention &amp; Control of Periodontal Disease</li> </ul>	L=2 T=4 P=2

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Define dental trauma</li> <li>Classify dental trauma</li> <li>Describe prevention measures of dental trauma</li> <li>Explain primary, Secondary &amp; Tertiary prevention</li> <li>Explain mouth guard</li> </ul>	<ul style="list-style-type: none"> <li>Prevention of Dental Trauma</li> </ul>	L=2 T=3
<ul style="list-style-type: none"> <li>Define Handicap &amp; dental handicap</li> <li>Classify Handicap</li> <li>Mention causative factors of physical , mental, social handicap</li> <li>Describe management of handicap patient</li> <li>Explain maintenance of oral hygiene in case of handicap patients</li> </ul>	<ul style="list-style-type: none"> <li>Dental management of Handicap</li> </ul>	L=1 T=2
<ul style="list-style-type: none"> <li>Define Dental Management of Geriatric People</li> <li>Classify Dental Management of Geriatric People</li> <li>Describe preventive measures of oral problem in geriatric population</li> <li>List influencing factors for using dental care by geriatric people</li> </ul>	<ul style="list-style-type: none"> <li>Dental Management of Geriatric People</li> </ul>	L=1 T=2
<ul style="list-style-type: none"> <li>Define oral cancer</li> <li>Types</li> <li>Common sites</li> <li>Name pre malignant lesion</li> <li>Epidemiology of Oral cancer</li> <li>State etiological factors &amp; preventive measures</li> <li>Screening technique in diagnosis of oral cancer</li> </ul>	<ul style="list-style-type: none"> <li>Prevention of Oral Cancer &amp; management of Risk factors</li> </ul>	L=2 T=3

## Learning Objectives and Course Contents in Preventive Dentistry

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Define malocclusion</li> <li>Classify Malocclusion</li> <li>Mention causes of Malocclusion</li> <li>Describe prevention &amp; interceptive orthodontics measures</li> <li>Identify abnormal oral habits &amp; managements</li> </ul>	<ul style="list-style-type: none"> <li>Prevention of Malocclusion</li> </ul>	L=2 T=4
<ul style="list-style-type: none"> <li>Define sterilization</li> <li>Classify sterilization</li> <li>Describe Preventive of occupational hazards in dentistry</li> <li>Define occupational hazard</li> <li>List occupational hazards in dentistry</li> <li>Control of HIV AIDS, Hepatitis B C &amp; others Bacterial and fungal infection</li> <li>Waste management in dentistry</li> </ul>	Infection control in dental practice and occupational hazards <ul style="list-style-type: none"> <li>Communicable &amp; Non-communicable Disease in related to dentistry</li> <li>Sterilization</li> <li>Safety measure in dental practice</li> </ul>	L=2 T=5

## Learning Objectives and Course Contents in Dental Jurisprudence

Learning Objectives	Contents	Teaching Hours
<p>Student will be able to</p> <p>Define ethics</p> <p>Principles of ethics</p> <p>Geneva declaration</p> <p>Demonstrate the knowledge and understanding of</p> <ul style="list-style-type: none"> <li>● Civil Law</li> <li>● Criminal Law</li> <li>● Legal process</li> <li>● Define and classify negligence</li> <li>● Define and classify assault</li> <li>● Define and classify consent</li> <li>● Define and classify defammation</li> <li>● Res ipsa loquitor</li> </ul>	<p>Law &amp; Ethics in dentistry</p>	<p>L=2</p> <p>T=4</p>

Learning Objectives	Contents	Teaching Hours
<ul style="list-style-type: none"> <li>Describe ordinance &amp; regulations relating to medical &amp; dental practice.</li> <li>State legal rights &amp; protection</li> </ul>	<ul style="list-style-type: none"> <li>The acts and ordinance relating to Medical &amp; Dental practice and Drug regulation</li> <li>Legal rights &amp; protection</li> </ul>	L=1 T=2
<ul style="list-style-type: none"> <li>Define record keeping.</li> <li>Rules of record keeping</li> <li>Importance and Use of record keeping</li> </ul>	Dental record keeping	L=1 T=2
<ul style="list-style-type: none"> <li>Mention the organizer &amp; functions National Health Services, BMDC&amp; National Dental Organization. WHO, FDI, BDS , etc.</li> </ul>	Organizations. National & International Health Organization	L=2 T=4
<ul style="list-style-type: none"> <li>Define forensic odontology</li> <li>Explain the scope of Forensic Odontology</li> <li>Importance of Forensic Odontology.</li> <li>Describe Process of person identification</li> <li>Age determination</li> <li>Sex determination</li> <li>Bite Mark registration</li> <li>Function of forensic odontologist</li> </ul>	Forensic odontology	L=2 T=4

## Learning Objectives and Course Contents in Behavioral Science

Learning Objectives	Contents	Teaching Hours
Student will be able to <ul style="list-style-type: none"> <li>● Define behavioral science &amp; mention its components; explain its scope &amp; uses in dental health care.</li> <li>● State types of behavior</li> <li>● Define cognition</li> <li>● Explain personality</li> <li>● Define motivation</li> <li>● Manage stress ,fear and anxiety in dentistry</li> </ul>	Concept of Behavioral Science	L=2 T=4
<ul style="list-style-type: none"> <li>● Define Society, Culture</li> <li>● Enumerate components of culture</li> <li>● Identify various social &amp; culture factors which influences health</li> </ul>	Social, Cultural and psychological factors in health and illness	L=1 T=2
<ul style="list-style-type: none"> <li>● Define interpersonal relationship</li> <li>● Mention factors influencing interpersonal relationship &amp; doctor-patient relationship &amp; the technique to improve such relationship.</li> <li>● Types of doctor patient relation</li> </ul>	Interpersonal relationship Doctor – patient relationship Doctor- nurse relationship	L=1 T=2

Learning Objectives	Contents	Teaching Hours
<b>Student will be able to</b> <ul style="list-style-type: none"> <li>● Define Family</li> <li>● Mention types of Family</li> <li>● Family cycle</li> <li>● Basic need of family</li> <li>● Describe role of family in health &amp; illness</li> </ul>	Concept of Family	L=1 T=2
<ul style="list-style-type: none"> <li>● Describe Illness behavior &amp; management</li> </ul>	Illness behavior and its management	L=1 T=2
<ul style="list-style-type: none"> <li>● Define communication</li> <li>● Mention components of communication</li> <li>● Classify types of communication</li> <li>● Classify types of media</li> <li>● Mention barriers in communication</li> <li>● Describe behavior changing process</li> <li>● Describe steps of Behaviour change communication</li> </ul>	Behavioral Change Communication (BCC)	L=1 T=3

## ITEM CARD

### CARD-1

#### Topic: Preventive Dentistry

Sl. No.	Name of item	Marks allocated	Marks obtained	Signature
1.	Concept of Prevention in dentistry	10		
2.	Prevention & Control of Dental Caries	10		
3.	Prevention & Control of Periodontal Disease	10		
4.	Prevention of Dental Trauma	10		
5.	Dental management of Handicap	10		
6.	Dental Management of Geriatric People	10		
7.	Prevention of Oral Cancer & management of Risk factors	10		
8.	Infection control in dental practice	10		
9.	occupational hazards	10		
10.	Waste management in dentistry	10		

## CARD-2

### Topic : Dental Public Health & Community Dentistry

Sl. No.	Name of Item	Marks allocated	Marks obtained	Signature
1.	Fundamentals of dental public health Concept of <ul style="list-style-type: none"> <li>● Health &amp; Disease</li> <li>● Determinates of health</li> <li>● Different dimensions of health</li> <li>● Public Health and in relating to dentistry</li> </ul>	10		
2.	General & Dental Epidemiology	10		
3.	Research Methodology	10		
4.	Biostatistics & Data management	10		
5.	Sampling methods	10		
6.	Survey procedure	10		
7.	Index	10		
8.	Primary Health care	10		
9.	Dental manpower & ancillary	10		
10.	Planning and evaluation of health care in dentistry	10		
11.	School dental health program	10		
12.	Oral health promotion	10		
13.	Dental Health education	10		
14.	Computer application in dentistry	10		

### CARD-3

#### Topic : Dental jurisprudence and forensic Dentistry

Sl. No.	Name of Item	Marks allocated	Marks obtained	Signature
1.	<ul style="list-style-type: none"><li>• Law &amp; Ethics in Dentistry</li><li>• Professional ethics related to practitioner &amp; staffs</li></ul>	10		
2.	<ul style="list-style-type: none"><li>• The acts and ordinance relating to Medical &amp; Dental practice and Drug regulation</li><li>• Legal rights &amp; protection</li></ul>	10		
3.	Dental record keeping	10		
4.	Organizations. National & International Health Organization	10		
5.	Forensic Odontology	10		

## CARD-4

### Topic: Behaviour Science

Sl. No.	Name of Item	Marks allocated	Marks obtained	Signature
1.	Concept of Behavioral Science	10		
2.	Social, Cultural and psychological factors in health and illness	10		
3.	Social change in health & illness	10		
4.	Interpersonal relationship	10		
5.	Concept of Family	10		
6.	Illness behavior and its management	10		
7.	Behavioral Change Communication (BCC)	10		

## Outline of a Prescription

Registration No:.....

Name of Doctor  
BM&DC approved Degree(s), (Specialty)  
Address of Chamber  
Telephone No:

Name of Patient:.....

Age : .....

Sex : .....

Address of Patient : .....

Chief complaints :

- 
- 
- 

*R<sub>x</sub>*

1.

2.

Examination findings :

- Pulse.... /min
- 
- 

3.

Investigation :

- 
- 
- 

Provisional diagnosis :

.....

Diagnosis :

.....

Advise :

- 
- 
- 

Signature of Doctor

Date: .....

Reg. No.: .....

**Outline of Medical & Fitness Certificate**

Signature of the applicant .....

After careful examination of the case hereby I certify that Mr./Ms. .... whose signature is given above, is suffering from ..... I consider that a period of absence from duty / study / job for .....days with effect from .....to .....is absolutely necessary for the restoration of his / her health.

Place : (Signature of Doctor)

Date : Name of the Doctor

Registration No:

**CERTIFICATE OF MEDICAL FITNESS**

Signature of Applicant : .....

After careful examination of the case hereby I certify that Mr./Ms. ....whose signature is given above is now fit to resume duty / study / job from ..... . I also certify that before arriving at my decision I have examined the original medical certificate(s) and statement(s) of the case (or the certified copies thereof) on which leave was granted or extending and have taken these in consideration in arriving at my decision.

Place : (Signature of Doctor)

Date : Name of the Doctor

Registration No:

## List of Contributors in the year 2016

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**N:B:**

- i) Heads of the departments of all the subjects of nearly all of the govt. & non govt. dental colleges contributed at the subject wise national meeting for reviewing & updating BDS curriculum.
- ii) Members of the academic councils, teachers of different subjects, interns doctors, students of nearly all the dental colleges contributed during the need assessment study for reviewing & updating BDS curriculum.



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