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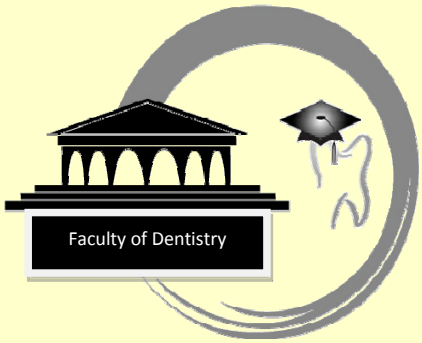
Kerala University of Health Sciences



B.D.S COURSE REGULATIONS/SYLLABUS

Based on BDS course regulations 2007 framed by the Dental Council of India and approved by the Government of India under the Dentist Act,1948- vide Government of India, Ministry of Health & Family Welfare (Dept. of Health) (Gazette notification, Government of India No:182,dt Sept. 10th ,2007)

CONTENTS

SECTION I

Aims and Objectives of BDS Course

Aims:

The dental graduates during training in the institutions should acquire adequate knowledge, necessary skills and such attitudes which are required for carrying out all the activities appropriate to general dental practice involving the prevention, diagnosis and treatment of anomalies and diseases of the teeth, mouth, jaws and associated tissues. The graduate should also understand the concept of community oral health education and be able to participate in the rural health care delivery programmes existing in the country.

Objectives

The objectives are dealt under three headings namely (a) knowledge and understanding (b) skills and (c) attitudes.

(a) ***Knowledge and understanding***

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

1. Adequate knowledge of the scientific foundations on which dentistry is based and good understanding of various relevant scientific methods, principles of biological functions and should be able to evaluate and analyse scientifically various established facts and data.

2. Adequate knowledge of the development, structure and function of the teeth, mouth and jaws and associated tissues both in health and disease and their relationship and effect on general-state of health and also the bearing on physical and social well-being of the patient.

3. Adequate knowledge of clinical disciplines and methods, which provide a coherent picture of anomalies, lesions and diseases of the teeth, mouth and jaws and preventive, diagnostic and therapeutic aspects of dentistry.

4. Adequate clinical experience required for general dental practice.

5. Adequate knowledge of biological function and behaviour of persons in health and sickness as well as the influence of the natural and social environment on the state of health so far as it affects dentistry.

(b) ***Skills***

A graduate should be able to demonstrate the following skills necessary for practice of dentistry:

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

2. Acquire skill to prevent and manage complications if encountered while carrying out various dental surgical and other procedures.

3. Possess skill to carry out required investigative procedures and ability to interpret laboratory findings.

4. Promote oral health and help to prevent oral diseases wherever possible.

5. Competent in control of pain and anxiety during dental treatment.

(c) ***Attitudes***

A graduate should develop during the training period the following attitudes.

1. Willing to apply current knowledge of dentistry in the best interest of the patients and the community.

2. Maintain a high standard of professional ethics and conduct and apply these in all aspects of professional life.

3. Seek to improve awareness and provide possible solutions for oral health problems and needs throughout the community.

4. Willingness to participate in the continuing education programmes to update knowledge and professional skills from time to time.

5. To help and to participate in the implementation of national health programmes.

SECTION II
General Outline of BDS Degree Course

1) The undergraduate course involves organisation of teaching programs year-wise. However, this course, as a whole, should demonstrate integration of the basic sciences, clinical dentistry and practical or the laboratory skills. The course should be designed and integrated in such a way as to permit smooth progression from pre-clinical to clinical phase. Collaboration should be encouraged between teachers of basic sciences, dental sciences and clinical subjects.

2) The undergraduate dental course consists of three main components. The first component consists subjects common to medicine and dentistry like anatomy, physiology, biochemistry and behavioral science, leading to pharmacology, pathology, microbiology and then on to general medicine and general surgery. The second component runs concurrently with the first and deals with special aspects of oral and dental tissues, oral biology and oral pathology. Finally, the third component based on the foundations of the first two, deals with the clinical and technical aspects of dentistry as is required for general dental practice.

3) The first component of the course is intended to provide initially, an appreciation of normal human structure, development, function and behavior, leading to understanding of the diseases, its prevention and treatment. The main objective is to provide the student a broad knowledge of the normal structures and functions of the body, the alterations which take place in disease with particular reference to those conditions in which medical and dental co-operation is essential for proper management. At this stage, the student should also be made aware of the social and psychological aspects of patient care with special reference to the relationship between dentist and patient. The behavioral sciences including both sociology and psychology should be introduced at the initial stages of the training program, much before the students actually deal with the patients.

4) The second component of dental undergraduate program includes instruction in the subjects dealing with dental and oral aspects to ensure a detailed knowledge of the structure and function of the dental and oral tissues. This enables the student to diagnose, prevent and treat the dental and oral diseases and disorders, which were not included in the first component. The subject of oral biology is to be introduced at this level to provide the students a comprehensive knowledge and application of oral physiology, microbiology, biochemistry and oral immunology. Students should be exposed to the basic aspects of forensic Odontology at this stage of the course along with oral biology/oral pathology.

5) The third component of the course comprising the clinical and technical aspects of dentistry actually prepares the student to undertake total oral and dental health care of the patients of all ages. The emphasis at this stage should be on the prevention of the various dental diseases and how to preserve natural teeth with their supporting structures. The importance of the various preventive methods needs to be stressed. The significance of diagnosis of various dental and oral problems needs to be emphasized along with treatment planning before actual treatment procedures are undertaken. In addition to acquiring the knowledge, the students need to gain adequate clinical hands-on-experience in extractions and other minor oral surgical procedures, all aspects of Conservative Dentistry, Endodontics, Crown and Bridge, provision of partial and complete dentures, various periodontal therapeutic procedures and use of removable orthodontic appliances. Familiarity with various radiological techniques, particularly intra-oral methods and proper interpretation of the radiographs, is an essential part of this component of training and has application in clinical diagnosis, forensic identification and age estimation. Towards the final stage of the clinical training, each student should be involved in comprehensive oral health care or holistic approach to enable him or her to plan and treat patients as a whole, instead of piece-meal treatment provided in each specialty. The aim of the undergraduate program should undoubtedly be to produce a graduate, competent in general dental practice.

6) The commitment towards the society as a whole needs to be stressed along with the knowledge and treatment skills gained. Instruction in public health dentistry should emphasise the sociological aspects of health care particularly; oral health care, including the reasons for the variation in oral and dental needs of different sections of the society. It is important to know the influence of the social, behavioral, environmental and economic factors on oral and dental health. Students should be made aware of the National oral health Policy and the importance of being a member of the Health care team delivering medical and oral health care particularly among rural population. Students should also be encouraged to participate in simple research project work

7) The undergraduate curriculum stresses the significance of infection and cross infection control in dental practice. Aspects like sources of infection, measures to be adopted both general and specific for control, particularly the HIV and hepatitis is incorporated in the curriculum so that the graduates are aware of its significance and follow it in their practice.

8) The information technology has touched every aspect of an individual's personal and professional life. The University hence recommends that all undergraduates acquire minimum computer proficiency, which will enable them to enhance their professional knowledge and skills.

SECTION III
BDS Degree - course of study

1) The undergraduate dental training program leading to B.D.S. degree shall be a minimum of five years duration in addition to the six months compulsory rotating internship. During this period, the students shall be required to engage in full time study at a Dental college recognized or approved by the Dental Council of India. During the first five years of undergraduate course, the instruction in clinical subjects should be at least for three years.

2) Basic Medical & Dental Subjects:
   The basic medical and dental sciences comprise Anatomy Gross and Microscopic, Physiology, Biochemistry, Pharmacology, Oral biology and science of Dental Materials. Subjects like behavioral sciences, which would be useful to develop communication skills, should also be introduced in the first year itself and spread over the undergraduate course. An introduction to Public Health Dentistry also will be useful to develop the concept of commitment to community. The laboratory skills like pre-clinical Prosthodontics, Crown and Bridge, Conservative dentistry and Orthodontics is to be developed by the students. Studying dental morphology also is a part of initial training. At the end of this period the student should be in a position to understand and comprehend in general the development, structure and function of the human body in both health and disease.

3) The instruction in basic dental sciences should include theoretical and practical aspects of oral anatomy and physiology, to provide a detailed knowledge of the form and structure of teeth associated tissues and occlusal relationships. The study should also aim at development of a concept regarding physiological and biochemical processes relevant to oral cavity for better understanding of the changes that occur with the onset of disease in the oral cavity. The student should be made aware of the importance of various dental tissues in forensic investigation.

4) Clinical, Medical and Dental subjects:
   The students should be introduced to clinics in the initial stage, preferably in the first year, as an observer to familiarize with clinical set-up and working. The period of instruction in the clinical subjects shall be not less than three years full time. During this, the student shall attend a dental hospital, general hospital, community camps and satellite clinics, in order to obtain instruction and experience in the practice of dentistry. The main objective of training in clinical dental subjects is to produce a graduate able and competent to recognize or diagnose various dental and oral diseases, to undertake general dental treatment, advice on the provision of specialized treatment available and finally advise the patient on prevention. The student should also understand the relationship between oral and systemic diseases.

5) The general medicine and surgery training should provide sufficient knowledge on human disease to enable the student to understand its manifestations as relevant to the practice of dentistry. This requires clinical teaching on patients and shall be carried out in in-patient and outpatient medical departments and specialist clinics. This clinical instruction should enable the student to understand and perhaps diagnose common systemic diseases, which have relevance to dental practice, by adopting a systematic approach of history taking and clinical examination. The student should also realize the significance of various general and special investigations in the diagnosis of diseases. The ability to recognize physical and mental illness, dealing with emergencies, effective communication with patients, and interaction with professional colleagues also become important aspects of this training.

6) All dental students should receive instruction in first-aid and principles of cardio-pulmonary resuscitation. The students should also spend time in an accident and emergency department of a Medical hospital.

7) The purpose of the clinical training is to provide sufficient practical skill in all aspects of clinical dentistry. The instruction should also include patient management skills, treatment of patients of all ages with special reference to children (pediatric), very elderly (geriatric), medically compromised and disabled patients.

8) During the three years of clinical course, the students should receive thorough instruction which involves history taking, diagnosis and treatment planning in all aspects of dentistry and should be competent on graduation to carry out all routine general procedures. In Oral & Maxillofacial Surgery, instruction should include the knowledge of various maxillofacial problems like injuries, infections and deformities of the jaws and associated structures. The clinical experience should include those procedures commonly undertaken in general practice like extraction of teeth, minor oral surgical procedure etc. In Conservative dentistry and Endodontics, Prosthodontics and Crown & Bridge and Periodontology students should be competent on graduation to carry out routine treatments like restorations of various kinds, endodontic procedures, removable Prosthodontics, and finally various kinds of periodontal therapy. In Orthodontics & Dentofacial Orthopaedics, students should carry out simple appliance therapy including myofacial appliances for patients. Students should also be able to appreciate the role of Dentofacial growth in the development and treatment of malocclusion. In addition, students should be aware of their limitations on graduation, need to refer patients for consultant opinion and/or treatment and also the need for postgraduate and continuous education programmes

9) In Paediatric & Preventive Dentistry, the students should concentrate on effective management of the behaviour of the child patient to instill a positive dental attitude, on efficacy of preventive measures and clinical management, efficacy of preventive measures, treatment needs particularly for children

with disabilities. In oral medicine and Radiology, the student should receive instruction in various lesions, occurring in the oral cavity with particular reference to oral cancer. All students should receive instructions and gain practical experience in taking, processing and interpretation of various types of intra and extra oral radiographs. They should be aware of the hazards of radiation and proper protective measures from radiation for the patient, operator and other staff.

10) The successful control and management of pain is an integral part of dental practice. Upon graduation the students should be competent to administer all forms of local anesthesia. The value of behavioral methods of anxiety management should be emphasized. The students should also have the practical experience in the administration of intra-muscular and intra-venous injections. Knowledge of pain mechanisms and strategies to control post-operative pain is essential for practice of dentistry.

11) Instruction should be given in dental jurisprudence, legal and ethical obligations of dental practitioners and the constitution and functions of Dental Council of India.

12) Infection and cross infection control assume significance in dental practice. The students should be made aware of the potential risk of transmission in the dental surgery, various infectious diseases particularly HIV and hepatitis. The students should be aware of their professional responsibility for the protection of the patients, themselves and their staff and the requirements of the health and safety regulations.

13) The subjects of Aesthetic dentistry, Oral Implantology, Behavioral sciences and Forensic Odontology have assumed great significance. Hence, these four specialties are incorporated into the undergraduate curriculum. The instruction and clinical training in aesthetic dentistry shall be carried out by the departments of Prosthodontics and Crown & Bridge and Conservative Dentistry & Endodontics. Similarly, the instruction and clinical training in Oral Implantology shall be done by the departments of Oral & Maxillofacial Surgery, Prosthodontics and Crown & Bridge and Periodontology. The instruction in behavioral sciences should ideally commence before the students come in contact with the patients and shall be carried out by the departments of Public Health Dentistry and Paediatric and Preventive Dentistry. Forensic Odontology will be a part of Oral Pathology & Oral Microbiology and Oral Medicine and Radiology.

14) The medium of Instruction and examinations of BDS course will be in English language.

SECTION IV

Goals of BDS Curriculum

At the completion of the undergraduate training program the graduates shall be competent in the following. –

A. General Skills

- Apply knowledge & skills in day to day practice
- Apply principles of ethics
- Analyze the outcome of treatment
- Evaluate the scientific literature and information to decide the treatment
- Participate and involve in professional bodies
- Self assessment & willingness to update the knowledge & skills from time to time
- Involvement in simple research projects
- Minimum computer proficiency to enhance knowledge and skills
- Refer patients for consultation and specialized treatment
- Basic study of Forensic Odontology and Geriatric dental problems
- Practice Management
- Evaluate practice location, population dynamics & reimbursement mechanism
- Co-ordinate & supervise the activities of allied dental health personnel
- Maintenance of records
- Implement & monitor infection control and environmental safety programs
- Practice within the scope of one's competence Communication & Community Resources
- Assess patient's goals, values and concerns to establish rapport and guide patient care.
- Able to communicate freely, orally and in writing with all concerned.
- Participate in improving the oral health of the individuals through community activities.

B. Patient Care – Diagnosis

- Obtaining patient's history in a methodical way.
- Performing thorough clinical examination.
- Selection and interpretation of clinical, radiological and other diagnostic information.
- Obtaining appropriate consultation.
- Arriving at provisional, differential and final diagnosis.

C. Patient Care - Treatment Planning

- Integrate multiple disciplines into an individual comprehensive sequence treatment plan using diagnostic and prognostic information.
- 1Able to order appropriate investigations.

D. Patient Care – Treatment

- Recognition and initial management of medical emergencies that may occur during Dental treatment.
- Perform basic cardiac life support.
- Management of pain including post operative.
- Administration of all forms of local anesthesia.
- Administration of intra muscular and venous injections.
- Prescription of drugs, pre operative, prophylactic and therapeutic requirements.
- Uncomplicated extraction of teeth.
- Transalveolar extractions and removal of simple impacted teeth.
- Minor oral surgical procedures.
- Management of Oro-facial infections.
- Simple orthodontic appliance therapy.
- Taking, processing and interpretation of various types of intra oral radiographs.
- Various kinds of restorative procedures using different materials available.
- Simple endodontic procedures.
- Removable and fixed Prosthodontics.
- Various kinds of periodontal therapy.

SECTION V
Competencies expected- Speciality wise

ORAL MEDICINE & RADIOLOGY

At the completion of the undergraduate training programme the graduate should:

- Be able to identify pre cancerous and cancerous lesions of the oral cavity and refer to the concerned specialty for their management.
- Have an adequate knowledge about common laboratory investigations and interpretation of their results.
- Have adequate knowledge about medical complications that can arise while treating systemically compromised patients and take prior precautions/ consent from the concerned medical specialist.
- Have adequate knowledge about radiation health hazards, radiation safety and protection.
- Be competent to take intra-oral radiographs and interpret the radiographic findings
- Gain adequate knowledge of various extra-oral radiographic procedures, TMJ radiography and sialography.
- Be aware of the importance of intra- and extra-oral radiographs in forensic identification and age estimation.
- Be familiar with jurisprudence, ethics and understand the significance of dental records with respect to law.

ORAL & MAXILLOFACIAL SURGERY

At the completion of the undergraduate training programme the graduate should:

- Be able to apply the knowledge gained in the basic medical and clinical subjects in the management of patients with surgical problems.
- Be able to diagnose, manage and treat patients with basic oral surgical problem
- Have a broad knowledge of maxillofacial surgery and oral implantology.
- Be familiar with legal, ethical and moral issues pertaining to the patient care and communication skills.
- Have acquired the skill to examine any patient with an oral surgical problem in an orderly manner.
- Understand and practice the basic principles of asepsis and sterilization.
- Be competent in the extraction of the teeth under both local and general anesthesia.
- Be Competent to carry out certain minor oral surgical procedures under Local Anesthesia like trans-alveolar extraction, frenectomy, Dentoalveolar procedures, simple impaction, biopsy, etc.

- Be Competent to assess, prevent and manage common complications that arise during and after minor oral surgery.
- Able to provide primary care and manage medical emergencies in the dental office.
- Be familiar with the management of major oral surgical problems and principles involved in the in-patient management.

PERIODONTOLOGY

At the completion of the undergraduate training programme the graduate should:

- Be able to diagnose the patient's periodontal problem, plan and perform appropriate periodontal treatment.
- Be Competent to educate and motivate the patient.
- Be Competent to perform thorough oral prophylaxis, subgingival scaling, root planning and minor periodontal surgical procedures.
- Give proper post treatment instructions and do periodic recall and evaluation.
- Be Familiar with concepts of osseointegration and basic surgical aspects of implantology.

CONSERVATIVE DENTISTRY AND ENDODONTICS

At the completion of the undergraduate training programme the graduate should:

- Be Competent to diagnose all carious lesions.
- Be Competent to perform Class I and Class II cavities and their restoration with amalgam.
- Be able to restore class V and Class III cavities with glass ionomer cement.
- Be able to diagnose and appropriately treat pulpally involved teeth (pulp capping procedures).
- Be able to perform RCT for anterior teeth
- Be competent to carry out small composite restorations
- Understand the principles of aesthetic dental procedures

ORTHODONTICS AND DENTOFACIAL ORTHOPAEDICS

At the completion of the undergraduate training programme the graduate should:

- Understand about normal growth and development of facial skeleton and dentition.
- Be able to pinpoint aberrations in growth process both dental and skeletal and plan necessary treatment

- Be able to diagnose the various malocclusion categories
- Be able to motivate and explain to the patient and parent / guardian about the necessity of treatment
- Be able to plan and execute preventive orthodontics (space maintainers or space regainers)
- Be able to plan and execute interceptive orthodontics (habit breaking appliances)
- Be able to manage treatment of simple malocclusion such as anterior spacing using removable appliances
- Be able to handle delivery and activation of removable orthodontic / myofacial appliances.
- Be able to diagnose and appropriately refer patients with complex malocclusion to the specialist

PUBLIC HEALTH DENTISTRY

At the completion of the undergraduate training programme the graduate should:

- Apply the principles of health promotion and disease prevention.
- Have knowledge of the organization and provision of health care in community and in the hospital service
- Have knowledge of the prevalence of common dental conditions in India
- Have knowledge of community based preventive measures
- Have knowledge of the social, cultural and environmental factors, which contribute to health or illness.
- Be able to administer hygiene instructions, topical fluoride therapy and fissure sealing.
- Be able to educate patients concerning the etiology and prevention of oral disease and encourage them to assure responsibility for their oral health.

PROSTHODONTICS AND CROWN & BRIDGE

At the completion of the undergraduate training programme the graduate should:

- Be able to understand and use various dental materials.
- Be competent to carry out treatment of conventional complete and partial removable dentures and full veneer crowns.
- Be able to carry out treatment of routine Prosthodontic procedures.
- Be familiar with the concepts of osseointegration and the value of implant-supported Prosthodontic procedures.
- Be able to diagnose and appropriately refer patients requiring complex treatment procedures to the specialist

PAEDIATRIC AND PREVENTIVE DENTISTRY

At the completion of the undergraduate training programme the graduate should:

- Be able to instill a positive attitude and behaviour in children towards oral health and understand the principles of prevention and preventive dentistry right from birth to adolescence.
- Be able to guide and counsel the parents/guardian in regards to various treatment modalities including different facets of preventive dentistry.
- Be able to treat dental diseases occurring in child patient.
- Be able to manage the physically and mentally challenged / disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.

SECTION VI
REGULATIONS FOR ADMISSION TO THE DEGREE OF BACHELOR OF DENTAL SURGERY

1. ***Eligibility for Admission:***
   A candidate must be an and shall have passed 10+2 examination after a period of 12 years of study conducted by Boards/ Councils/ Intermediate examination established by State Governments/ Central Government and recognised as equivalent to two year Pre University examination by the Association of Indian Universities with English as one of the subjects and Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually also.
   The candidate shall have obtained not less than 50% of the aggregate marks in Physics, Chemistry and Biology taken together at the qualifying examination. Scheduled cast and scheduled tribe students shall be given relaxation of 10% in the aggregate marks required for eligibility. Candidate should have secured minimum of 50% marks in Physics, Chemistry and Biology taken together at the competitive entrance examination where such examinations are held for selection.
2. ***Age requirement:***
   The candidate shall have completed the age of 17 years at the time of admission or will complete the age on or before 31st December of the year in which he/ she seeks admission.
3. ***Duration of the Course:***
   The undergraduate dental training programme leading to BDS degree shall be a minimum of 5 years in addition to the six months compulsory Rotating internship programme. During this period, the student shall be required to have engaged in full time study at a Dental college recognized or approved by the Dental Council of India. A candidate who pass the entire subjects of the course and undergo internship satisfactorily for six months will be eligible for the award of degree during the ensuing convocation.
4. ***Attendance requirement, Progress and Conduct***
   Attendance requirement shall be as follows:
   a) 80% in theory and 80% in Practical/ clinical, in each subject separately in each year. (Candidates should satisfy this attendance requirement by physical presence in all the subjects for which university examination is held for the year of study. Leave even on medical grounds including maternity leave will not be counted for attendance)
   b) In case of subjects in which the instructional programme extend through more than one academic year and when there is no University examination in the subject for a particular year (i.e. non-exam going subjects), the attendance requirement shall not be less than 70% in Lectures and Practical/ Clinical in the non exam year. However, at the time of appearing for the professional examination in the subject the candidate should satisfy the condition specified in (a).
   c) Failed candidates shall put in a minimum of 75% attendance in the subjects of failure to be eligible to appear for the subsequent examination.

d) In case of unaccounted illness or other contingencies if a candidate cannot satisfy the condition specified in (a) and if the attendance % is not less than 70, then he/she can apply for condonation, once during the entire course of study (i.e. 5 years). The Principals of the affiliated colleges in consultation with the college governing council if any are authorised to give condonation after verifying the genuinity of the request and the list of such students stating the reasons for the same should be intimated to the university.

e) The percentage of attendance & cumulative attendance should be reported to the University trimonthly. (i.e. attendance up to the months of December, March & June to be reported by the first week of January, April & July respectively)

5. Subjects of Study:

First Year

a) General Human Anatomy including Embryology and Histology
b) General Human Physiology and Biochemistry, Nutrition and Dietetics
c) Dental Anatomy, Embryology and Oral Histology
d) Dental Materials
e) Preclinical Conservative Dentistry
f) Preclinical Prosthodontics and Crown & Bridge

Second Year

a) General Pathology and Microbiology
b) General and Dental Pharmacology and Therapeutics
c) Dental Materials
d) Pre clinical Conservative Dentistry
e) Preclinical Prosthodontics and Crown & Bridge
f) Pre clinical Orthodontics
g) Oral Pathology & Oral Microbiology

Third Year

a) General Medicine
b) General Surgery
c) Oral Pathology and Oral Microbiology
d) Conservative Dentistry and Endodontics
e) Oral & Maxillofacial Surgery
f) Oral Medicine and Radiology
g) Orthodontics & Dentofacial Orthopaedics
h) Paediatric & Preventive Dentistry
i) Periodontology
j) Prosthodontics and Crown & Bridge

Fourth Year

a) Orthodontics & Dentofacial Orthopaedics
b) Oral Medicine & Radiology
c) Paediatric & Preventive Dentistry
d) Public Health Dentistry
e) Prosthodontics & Crown and Bridge
f) Conservative Dentistry and Endodontics
g) Oral & Maxillofacial Surgery
h) Periodontology

Fifth Year

a) Oral & Maxillofacial Surgery
b) Prosthodontics and Crown & Bridge
c) Conservative Dentistry and Endodontics
d) Public Health Dentistry

Emphasis on Comprehensive Dental Care / Electives/ Research

6. *READMISSION*

A Candidate who discontinues the course is eligible for readmission subject to the following conditions:

a) Provision of readmission is only once during the entire course period.
b) He/she should seek readmission within three years from the date of discontinuation of the course.
c) He/she should obtain no objection for readmission both from the university and concerned college Principal.
d) He/she should pay the prescribed fees for the year for which he/she seeks admission and cannot claim readmission on the strength of the fees paid earlier.
e) If the candidate discontinues after university examination, he/she should reappear for the subjects in which he/she failed before seeking admission to the next higher class by paying examination fee etc.
f) He/she should satisfy the attendance percentage requirements as prescribed earlier in section IV above before appearing for the university examination.

7. *EXAMINATIONS*

a) SCOPE:

These regulations shall be applicable for the B.D.S. Degree examinations

b) PREFACE:

i. Evaluation is a continuous process, which is based upon criteria developed by the concerned authorities with certain objectives to assess the performance of the learner. This also indirectly helps in the measurement of effectiveness and quality of the concerned B.D.S. programme.

ii. Evaluation is achieved by two processes
   1) Formative or internal assessment
   2) Summative or university examinations.

   Formative evaluation is done through a series of tests and examinations conducted periodically by the institution.

   Summative evaluation is done by the university through examination conducted at the end of the specified course.

c) METHODS OF EVALUATION:

Evaluation may be achieved by the following tested methods:

i. Written test
ii. Practical examination
iii. Clinical examination
iv. Viva voce

d) INTERNAL ASSESSMENT EXAMINATION:

The continuing internal assessment examinations in theory and practical/ clinical may be held at least twice in a particular year followed by a model examination in the pattern of university examination to be held at the end of the year of study. Internal assessment marks for a candidate in a subject will be calculated as the average of, the marks obtained in the model examination and the highest among all other internal examinations, in the subject. This average mark will be reported to the University. The Heads of the Department and College Principal should ensure that the class average of internal assessment marks reported to the University in each subject/paper is not more than 75% in both theory and practical/clinical separately. For a student to be eligible to appear for the University examination he/she should have secured at least 40% of the maximum marks in internal assessment for both theory and practical/clinical in all subjects/papers, separately (i.e. minimum 10/25 in theory and 8/20 in practical/clinical). (*For calculating internal assessment mark in papers where subjects are combined viz. General Human Physiology & Biochemistry, General Pathology & Microbiology and Dental Materials, marks obtained in the two subjects will be counted together for reporting to University and for applying all other stipulations mentioned above*)

When a candidate appears for university examination the first time in a particular year he/she should have minimum 80% attendance and 40% of the maximum marks in internal assessment for both theory and practical/clinical in all the subjects in which examination is being held for the year, to be eligible to appear for the University Examination.

e) SCHEME OF EXAMINATION:

The scheme of examination for B.D.S. Course shall be divided into 1st B.D.S. examination at the end of the first, 2nd B.D.S. examination at the end of second, 3rd B.D.S. examination at the end of third, 4th BDS at the end of fourth and final B.D.S at the end of fifth academic years.

The examination shall be open to a candidate who satisfies the requirements of attendance, progress and other rules governing the institution/University. Attendance and application form for examination of only eligible students should be sent to University from the college.

The University examination for a subject shall be conducted twice in a year at an interval of not less than four to six months as notified by the university from time to time. Any candidate who does not clear the I BDS examination completely in five attempts will not be permitted to continue

the course and shall be discharged from the institution. The entire BDS course should be completed within a period of maximum 10 academic years from the date of joining.

f) Distribution of Subjects for University Examination:

I B.D.S. Examination:

i. General Anatomy including Embryology and Histology
ii. General Human Physiology and Biochemistry
iii. Dental Anatomy, Embryology and Oral Histology

II B.D.S. Examination:

Only a candidate who has successfully completed and passed the 1st B.D.S. examination can appear.

i. General Pathology and Microbiology
ii. General and Dental Pharmacology and Therapeutics
iii. Dental Materials
iv. Pre Clinical Conservative Dentistry(Only Practical and Viva)
v. Pre Clinical Prosthodontics and Crown & Bridge (Only Practical and Viva)
vi. Pre Clinical Orthodontics (Only Practical and Viva)

III B.D.S. Examination:

Only a candidate who has successfully completed and passed the 2nd B.D.S. examination can appear.

i. General Medicine
ii. General Surgery
iii. Oral Pathology & Oral Microbiology

IV B.D.S. Examination:

Only a candidate who has successfully completed and passed the 3rd BDS examination can appear.

i. Oral Medicine and Radiology
ii. Paediatric & Preventive Dentistry
iii. Orthodontics & Dentofacial Orthopaedics
iv. Periodontology

V BDS Examination:

Only a candidate who has successfully completed and passed the 4th BDS examination can appear.

i. Prosthodontics & Crown and Bridge
ii. Conservative Dentistry and Endodontics
iii. Oral & Maxillofacial Surgery
iv. Public Health Dentistry

g) Written Examination:

i. The written examination in each subject shall consist of one paper of three hours duration and shall have maximum marks of 100. Type of Questions and Distribution of marks for written examination should be as given in **table I** given below.
ii. In the subject of Physiology & Biochemistry each paper will be divided into two Sections, Section A (Gen. Physiology) and Section B

(Biochemistry) of equal marks. Type of Questions and Distribution of marks for written examination should be as given in **table II** below.

iii. In the subject of Pathology & Microbiology each paper will be divided into two Sections, Section A (Gen. Pathology) and Section B (Microbiology) of equal marks. Type of Questions and Distribution of marks for written examination should be as given in **table III** below.

iv. In the subject of Dental Materials each paper will be divided into two Sections, Section A (Prosthodontics) and Section B (Conservative Dentistry) of equal marks. Type of Questions and Distribution of marks for written examination should be as given in **table IV** below.

v. The question paper should contain different types of questions like essay, short essay and short answer.

vi. The nature of questions should be aimed to evaluate students of different standards ranging from average to excellent.

vii. The questions should cover as broad an area of the content of the course. The essay & short essay questions should be properly structured and the marks specifically allotted.

Table I.

Type of Questions	No. of Questions	Marks of Questions	Total Marks
Long Essay Type	2	10	20
Short Essay Type	10	5	50
Short Answer Type	10	3	30
Grand Total			**100**

Table II.
Physiology and Biochemistry

Subject	Type of Questions	No. of Questions	Marks of Questions	Total Marks
Section A Physiology	Long Essay Type	1	10	10
	Short Essay Type	5	5	25
	Short Answer Type	5	3	15
	Grand Total			**50**

Subject	Type of Questions	No. of Questions	Marks of Questions	Total Marks
Section B Biochemistry	Long Essay Type	1	10	10
	Short Essay Type	5	5	25
	Short Answer Type	5	3	15
	Grand Total			**50**

Table III.
Pathology and Microbiology

Subject	Type of Questions	No. of Questions	Marks of Questions	Total Marks
Section A Pathology	Long Essay Type	1	10	10
	Short Essay Type	5	5	25
	Short Answer Type	5	3	15
	Grand Total			**50**

Subject	Type of Questions	No. of Questions	Marks of Questions	Total Marks
Section B Microbiology	Long Essay Type	1	10	10
	Short Essay Type	5	5	25
	Short Answer Type	5	3	15
	Grand Total			**50**

Table IV.
Dental Materials

Subject	Type of Questions	No. of Questions	Marks of Questions	Total Marks
Section A Prosthodontics	Long Essay Type	1	10	10
	Short Essay Type	5	5	25
	Short Answer Type	5	3	15
	Grand Total			**50**

Subject	Type of Questions	No. of Questions	Marks of Questions	Total Marks
Section B Conservative Dentistry	Long Essay Type	1	10	10
	Short Essay Type	5	5	25
	Short Answer Type	5	3	15
	Grand Total			**50**

h) Practical/Clinical Examination:

i. Objective Structured Clinical Evaluation:
The clinical /practical examination should include different procedures for the candidate to express one's skills. A number of examination stations with specific instructions to be carried out may be provided. This can include clinical procedures, laboratory experiments, spotters etc. Evaluation must be made objective and structured. The method of objective structured clinical examinations should be followed. This will avoid examiner bias because both the examiner and the examinee are given specific instructions on what is to be observed at each station.

ii. Records/ Log Books:
The candidate should be given credit for his records based on the scores obtained in the record. The marks obtained for the record in the first appearance can be carried over to the subsequent appearances if necessary.

iii. Scheme of clinical and practical examinations:
The specific scheme of clinical/ practical examinations, the type of clinical procedures/ experiments to be performed and marks allotted for each are to be discussed and finalized by the Chairman and members of the board of examiners and it is to be published prior to the conduct of the examinations along with the publication of the time table for the practical examination. This scheme should be brought to the notice of the external examiner as and when the examiner reports. The practical/ clinical examinations should be evaluated by two examiners of which one shall be an external examiner appointed from other zones of the university or outside University. Each candidate should be evaluated by each examiner independently and marks computed at the end of the examination.

iv. Viva Voce:
Viva voce is an excellent mode of assessment because it permits a fairly broad coverage and it can assess the problem solving capacity of the student. An assessment related to the affective domain is also possible through viva voce. It is desirable to conduct the viva voce independently by each examiner. In order to avoid vagueness and to maintain uniformity of standard and coverage, questions can be pre-formulated before administering them to each student. Twenty five marks are exclusively allotted for viva voce and that can be divided amongst the two examiners.

i) Distribution of Marks

i. For each paper in which written examination is held:

Theory	
University written examination	*100*
University Viva Voce	*25*
Internal assessment	*25*
Total	***150***
Practical/ clinical	
University Practical/ Clinical examination	*80*
Internal assessment	*20*
Total	***100***
Aggregate marks for each paper	***250***

i. **For Preclinical Examination in Prosthodontics/ Conservative Dentistry & Orthodontics**

University Practical examination	*60*
Viva voce	*20*
Internal assessment Practical	*20*
Total	***100***

Preclinical examination in each subject is to be conducted separately.

Detailed mark distribution of each paper for each subject is given in Table V

Table V. Distribution of marks in University examination and internal assessment for various subjects from first year to fifth year.

Year of Study	Subjects		Theory				Practicals/ Clinicals			Grand Total
			University written	Viva Voce	Internal Assessment	**Total**	University examination	Internal Assessment	**Total**	
I BDS	General Anatomy including Embryology and Histology		100	25	25	**150**	80	20	**100**	**250**
	General Human Physiology and Biochemistry	Section A Physiology	50	10	15	**75**	40	10	**50**	**250**
		Section B Biochemistry	50	15	10	**75**	40	10	**50**	
	Dental Anatomy, Embryology and Oral Histology		100	25	25	**150**	80	20	**100**	**250**
II BDS	General Pathology and Microbiology	Section A Pathology	50	10	15	**75**	40	10	**50**	**250**
		Section B Microbiology	50	15	10	**75**	40	10	**50**	
	General and Dental Pharmacology and Therapeutics		100	25	25	**150**	80	20	**100**	**250**
	Dental Materials	Section A Prosthodontics	50	10	15	**75**	40	10	**50**	**250**
		Section B Conservative dentistry	50	15	10	**75**	40	10	**50**	
	Pre Clinical Conservative Dentistry		-	20	-	**20**	60	20	**80**	**100**
	Pre Clinical Prosthodontics		-	20	-	**20**	60	20	**80**	**100**
	Pre Clinical Orthodontics		-	20	-	**20**	60	20	**80**	**100**
III BDS	General Medicine		100	25	25	**150**	80	20	**100**	**250**
	General Surgery		100	25	25	**150**	80	20	**100**	**250**
	Oral Pathology & Oral Microbiology		100	25	25	**150**	80	20	**100**	**250**
IV BDS	Oral Medicine and Radiology		100	25	25	**150**	80	20	**100**	**250**
	Paediatric & Preventive Dentistry		100	25	25	**150**	80	20	**100**	**250**
	Orthodontics & Dentofacial Orthopaedics		100	25	25	**150**	80	20	**100**	**250**
	Public Health Dentistry		100	25	25	**150**	80	20	**100**	**250**
V BDS	Prosthodontics & Crown and Bridge		100	25	25	**150**	80	20	**100**	**250**
	Conservative Dentistry and Endodontics		100	25	25	**150**	80	20	**100**	**250**
	Periodontology		100	25	25	**150**	80	20	**100**	**250**
	Oral & Maxillofacial Surgery		100	25	25	**150**	80	20	**100**	**250**

j) Criteria for a pass:

For declaration of pass in a subject, a candidate shall fulfill the following criteria:

i. Fifty percent of the total marks in any subject computed as aggregate for a) theory, i.e., written, viva voce and internal assessment and b) practicals including internal assessment (125 marks out of 250).

ii. A candidate shall secure a minimum aggregate of 50% marks in the theory section, which includes University theory examination, viva voce examination and internal assessment (*i.e. a minimum of 75 marks out of 150*). Besides this there should be a separate minimum of 50% for the university theory (i*.e. 50 marks out of 100*).

iii. In the University Practical/ clinical examination, a candidate shall secure 50% of University practical marks and Internal Assessment combined together (i.e. a minimum of 50 out of 100 marks). Besides this there should be a separate minimum of 50% for the University Practical/clinical exam *(i.e. 40 marks out of 80*).

iv. In case of Pre clinical Orthodontics, Pre clinical Prosthodontics and Pre clinical Conservative Dentistry in 2nd BDS examination, where there is no written examination, minimum for pass is 50% of combined total marks of the University Practical, viva voce and the internal assessment (i.e. a minimum of 50 out of 100 marks) for each subject. Besides this there should be a separate minimum of 50% for the University Practical examination *(i.e. 30 marks out of 60*).

v. Successful candidates, who obtain 60 to 74% of grand total marks i.e. total of all subjects, shall be declared to have passed the examination in First class. Other successful candidates who obtain 50 to 59% of grand total marks will be placed in Second Class. A candidate who obtains 75% and above of grand total marks is eligible for Distinction. Only those candidates who pass the whole examination in the first attempt will be eligible for distinction or first class.

k) Ranking:

i. Only candidates who have passed all the subjects of the examination in first attempt with 60% or above marks of aggregate will be considered for ranking.

ii. Marks obtained in supplementary examinations will not be considered for ranking.

iii. Rank will be awarded only after the Final BDS examination.

iv. For ranking in the Final BDS, aggregate marks secured in all the subjects from I to V BDS will be counted.

l) Allowed to Keep Terms (A.T.K.T.):

A candidate who fails in one subject in an examination, except in the second year, is permitted to go to the next higher class. But he/she has to pass that failed subject in order to be eligible to appear for the examination of the next higher class. Since clinical study in the third year involves treatment on patients under the guidance of faculty it is mandatory that the candidate should clear all the subjects of Second year

including preclinical practical examinations before he can be promoted to third year

m) Revaluation:

Since University is conducting double valuation, Revaluation is not permitted. But students can apply for Retotaling as an option if they think there is an error in calculation of their total marks.

i. *Retotalling:*

As per the existing University rules.

n) Grace Marks:

i. Grace Mark may be awarded for examinations limiting to a maximum of five.
ii. Only Candidates who have passed all subjects except one (i.e. failed in one subject only) will be eligible for grace marks to get a whole pass.
iii. Grace Mark may be awarded to either theory or practical or both.

o) Qualification and experience to be eligible for examinership for BDS examination:

i. M.D.S. Degree in the concerned subject from a DCI recognized Institution.
ii. Four years teaching experience in the subject after MDS in the concerned subject in a dental college approved/recognized by the Dental Council of India for BDS.
iii. Should be qualified as per DCI to hold the post of Reader or above in a Dental Institution approved/recognised by the Dental Council of India for B.D.S.
iv. In case of medical subjects the qualification of examiners shall be the same as that prescribed by the Medical Council of India for the concerned subject.

Note:

1) *In case of Public Health Dentistry, as there is acute shortage of teachers, examiners could be from either Public Health Dentistry or Periodontics Department.*
2) *Faculty members with MDS in Periodontics and 4 yr. teaching experience in it will be eligible to be considered as examiners in Public health Dentistry.*

p) **Number and subject of examiners for practical/Clinical and Viva voce examination**

There shall be two examiners for each paper, one internal and one external, from Medical/ Dental Institutions approved/recognised by the Dental Council of India for B.D.S. Course. The internal examiner will be from within the institution. The external examiner can be from a different zone of the University or from outside University. No person shall be an External Examiner to the same college for more than 3 consecutive years. However, if there is a break of one year the person can be reappointed.

Note:

1) *In case of Physiology and Biochemistry if Internal examiner is from Physiology, External examiner should be from Biochemistry and vice versa*

2) *In case of Pathology and Microbiology if Internal examiner is from Pathology, External examiner should be from Microbiology and vice versa*
3) *In case of Dental Materials, if Internal examiner is from Prosthodontics, External examiner should be from Conservative Dentistry and vice versa*

8. MINIMUM WORKING HOURS FOR EACH SUBJECT OF STUDY

Subjects	Lecture (hrs)	Practical (hrs)	Clinical (hrs)	Total (hrs)
General Human Anatomy including Embryology and Histology	100	175		275
General Human Physiology	120	60		180
Biochemistry, Nutrition and Dietetics	70	60		130
Dental Materials	80	240		320
Dental Anatomy, Embryology and Oral histology	105	250		355
General and Dental Pharmacology & Therapeutics	70	20		90
General Pathology	55	55		110
General Microbiology	65	50		115
General Medicine	60		90	150
General Surgery	60		90	150
Oral Pathology & Oral Microbiology	145	130		275
Oral Medicine & Radiology	65		200	265
Paediatric & Preventive Dentistry	65		200	265
Orthodontics & Dentofacial Orthopaedics	50	160	200	410
Periodontology	80		200	280
Oral & Maxillofacial Surgery	70		360	430
Conservative Dentistry & Endodontics	135	200	460	795
Prosthodontics and Crown & Bridge	135	380	460	975
Public Health Dentistry	60		290	350
Total	**1590**	**1780**	**2550**	**5920**

Note:
There should be a minimum of 240 teaching days every academic year consisting of 40 working hours a week including one hour of lunch break each day.

I BDS

SI. No.	Subjects	Lecture (hrs)	Practical (hrs)	Clinical (hrs)	Total (hrs)
1.	General Human Anatomy including Embryology and Histology	100	175	—	275
2.	General Human Physiology	120	60	—	180
3.	Biochemistry, Nutrition and Dietetics	70	60	—	130
4.	Dental Anatomy, Embryology and Oral histology	105	250	—	355
5.	Dental Materials	20	40	—	60
6.	Pre clinical Prosthodontics and Crown & Bridge	—	100	—	100
7.	Pre clinical Conservative Dentistry	—	100	—	100
	Total	**415**	**785**	**—**	**1200**

II B.D.S.

SI. No.	Subjects	Lecture (hrs)	Practical (hrs)	Clinical (hrs)	Total (hrs)
1.	General Pathology	55	55	—	110
2.	General Microbiology	65	50	—	115
3.	General and Dental Pharmacology & Therapeutics	70	20	—	90
4.	Dental Materials	60	200	—	260
5.	Pre clinical Prosthodontics and Crown & Bridge	25	200	—	225
6.	Pre clinical Conservative Dentistry	25	100	—	125
7.	Pre clinical Orthodontics	—	160	—	160
8.	Oral Pathology & Oral Microbiology	25	50	—	75
	Total	**325**	**835**	**—**	**1160**

III B.D.S.

SI. No.	Subjects	Lecture (hrs)	Practical (hrs)	Clinical (hrs)	Total (hrs)
1.	General Medicine	60	—	90	150
2.	General Surgery	60	—	90	150
3.	Oral Pathology and Oral Microbiology	120	80		200
4.	Oral Medicine and Radiology	20	—	70	90
5.	Paediatric and Preventive Dentistry	20	—	70	90
6.	Orthodontics & Dentofacial Orthopaedics	20	—	70	90
7.	Periodontology	30	—	70	100
8.	Oral & Maxillofacial Surgery	20	—	70	90
9.	Conservative Dentistry and Endodontics	30	—	70	100
10.	Prosthodontics and Crown & Bridge	30	80	70	180
	Total	**410**	**160**	**670**	**1240**

IV B.D.S.

SI. No.	Subjects	Lecture (hrs)	Practical (hrs)	Clinical (hrs)	Total (hrs)
1.	Oral Medicine & Radiology	45	—	130	175
2.	Paediatric and Preventive Dentistry	45	--	130	175
3.	Orthodontics & Dentofacial Orthopaedics	30	—	130	160
4.	Periodontology	50	—	130	180
5.	Oral & Maxillofacial Surgery	20	—	90	110
6.	Conservative Dentistry and Endodontics	30		90	120
7.	Prosthodontics and Crown & Bridge	30	—	90	120
8.	Public Health Dentistry	30	—	90	120
	Total	**280**	**—**	**880**	**1160**

V B.D.S.

SI. No.	Subjects	Lecture (hrs)	Practical (hrs)	Clinical (hrs)	Total (hrs)
1.	Oral & Maxillofacial Surgery	30	—	200	230
2.	Conservative Dentistry and Endodontics	50	—	300	350
3.	Prosthodontics and Crown & Bridge	50	—	300	350
4.	Public Health Dentistry	30	—	200	230
	Total	**160**	**—**	**1000**	**1160**

Note:

There should be a minimum of 240 teaching days every academic year consisting of 40 working hours a week including one hour of lunch break each day.

SECTION VII
RECOMMENDED BOOKS

Subject: ***General Human Anatomy including Embryology and Histology***

1) Clinical Anatomy for Medical Students, Snell (Richard S.),Little Brown & company, Boston.
2) Anatomy, R J Last's - McMinn,
3) Cunningham Manual of Practical Anatomy: Head & Neck & Brain.Vol.III, Romanes (G.J) Oxford Medical publication.
4) Functional Histology, Wheater, Burkitt & Daniels, Churchill Livingstone.
5) Medical Embryology, Sadler, Langman's,
6) Grant's Atlas of Anatomy, James E Anderson, Williams & Wilkins.
7) Gray's Anatomy, Williams, Churchill Livingstone.
8) Medical Genetics, Emery.
9) Essentials of Anatomy for Dentistry Students, D R Singh, Wolters Kluwer.

Subject: **Physiology**

1) Text book of Physiology, Guyton
2) Review of Medical Physiology, Ganong
3) Human physiology, Vander
4) Concise Medical Physiology, Choudhari
5) Human Physiology, Chaterjee
6) Human Physiology for BDS students, A.K. Jain

Reference books;

1) Physiology, Berne & Levey
2) Physiological basis of Medical Practice,West-Best & Taylor's

Experimental Physiology:

1) Practical Physiology, Rannade
2) A text book of practical physiology, Ghai
3) Clinical Methods, Hutchison's

Subject: **Biochemistry**

1) Textbook of Biochemistry for Dental Students, DM Vasudevan, Sreekumari S

2) Text book of Biochemistry-U Satyanarayana

Reference books;

1) Harper's Biochemistry, R.K.Murray et.al.
2) Text book of Biochemistry with clinical correlations T.N. Devlin
3) Basic and applied Dental Biochemistry, R.A.D. Williams & J.C.Elliot
4) Nutritional Biochemistry S. Ramakrishnan and S.V. Rao

Subject: **Dental Anatomy, Embryology and Oral Histology**

1) Orban's Oral Histology & Embryology - S.N.Bhaskar
2) Oral Development & Histology - James & Avery
3) Wheeler's Dental Anatomy, Physiology & Occlusion - Major.M.Ash
4) Dental Anatomy - its relevance to dentistry - Woelfel & Scheid

5) Applied Physiology of the mouth – Lavelle
6) Physiology & Biochemistry of the mouth – Jenkins
7) Oral Histology- 'Development, Structure and Function- A. R. Tencate

Subject: **General Pathology**

1) Robbins - Pathologic Basis of Disease Cotran, Kumar, Robbins
2) Anderson's Pathology Vol 1 & 2 Editors - Ivan Damjanov & James Linder
3) Wintrobe's clinical Haematology Lee, Bithell, Foerster, Athens, Lukens

Subject: **Microbiology**

1) Text book of Microbiology - R.Ananthanarayan & C.K.Jayaram Paniker.
2) Medical Microbiology - David Greenwood et al.

Reference books;

1) Microbiology - Prescott, et al.
2) Microbiology - Bernard D. Davis, et al.
3) Clinical & Pathogenic Microbiology - Barbara J Howard, et al.
4) Mechanisms of Microbial diseases - Moselio Schaechter, et al.
5) Immunology an Introduction – Tizard
6) Immunology - Evan Roitt, et al.

Subject: **Dental Materials**

1) Phillips Science of Dental Materials - Kenneth J. Anusavice
2) Restorative Dental Materials -Robert G.Craig
3) Notes on Dental Materials - E.C. Combe

Reference books:-

1) Introduction to Dental Materials, Van Noort,
2) Applied Dental Materials, McCabe,

Subject: **General and Dental Pharmacology and Therapeutics**

1) Basic and Clinical pharmacology,Bertam G Katzung, Appleton & Lange
2) Clinical Pharmacology, Lauerence DR, Churchill Livingstone
3) Pharmacology and Pharmacotherapeutics Part I & Part II, Satoskar R.S. & Bhandarkar S.D, Popular Prakashan Mumbai.
4) Essentials of Medical Pharmacology, Tripathi K.D, Jaypee Brothers
5) Medical Pharmacology, Udaykumar, CBS publishing

Subject: **General Medicine**

1) Textbook of Medicine Davidson
2) Textbook of Medicine Hutchinson

Subject: **General Surgery**

1) Short practice of Surgery Baily & Love

Subject: **Oral Pathology & Oral Microbiology**

1) A Text Book of Oral Pathology Shafer, Hine & Levy
2) Oral Pathology - Clinical Pathologic correlations Regezi & Sciubba.
3) Oral Pathology Soames & Southam.
4) Oral Pathology in the Tropics Prabhu, Wilson, Johnson & Daftary
5) Synopsis of Oral Pathology, Bhaskar, CBS publishing

Subject: **Public Health Dentistry**

1) Dentistry Dental Practice and Community by David F. Striffler and Brain A. Burt, W. B. Saunders Company
2) Principles of Dental Public Health by James Morse Dunning, Harward University Press.
3) Dental Public Health and Community Dentistry Ed by Anthony Jong Publication by The C. V. Mosby Company
4) Community Oral Health-A system approach by Patricia P. Cormier and Joyce I. Levy published by Apple ton-Century-Crofts/ New York,
5) Community Dentistry-A problem oriented approach by P. C.
6) Dental Hand book series Vol.8 by Stephen L. Silverman and Ames F. Tryon, Series editor-Alvin F. Gardner, PSG Publishing company Inc. Littleton Massachusetts,
7) Dental Public Health- An Introduction to Community Dentistry. Edition by Geoffrey L. Slack and Brain Burt, Published by John Wright and sons Bristol.
8) Oral Health Surveys- Basic Methods, 1997, published by W. H. O Geneva available at the regional office New Delhi.
9) Preventive Medicine and Hygiene-By Maxcy and Rosenau, published by Appleton Century Crofts,
10) Preventive Dentistry-by J. O. Forrest published by John Wright and sons Bristoli,
11) Preventive Dentistry by Murray,.
12) Text Book of Preventive and Social Medicine by Park and park,
13) Community Dentistry by Dr. Soben Peter.
14) Public Health dentistry, Sikri. CBS Publishing

Subject: **Research methodology and Bio-statistics**

1) Introduction to Bio-statistics by B. K. Mahajan
2) Introduction to Statistical Methods by Grewal

Subject: **Paediatric and Preventive Dentistry**

1) Dentistry for the Child and Adolescence - Mc. Donald.
2) Pediatric Dentistry (Infancy through Adolescence) - Pinkham.
3) Pediatric Dentistry : Total Patient Care – Stephen H.Y. Wei
4) Clinical Pedodontics – Sidney B. Finn
5) Fundamentals of Pediatric Dentistry – R.J. Mathewson
6) Handbook of Clinical Pedodontics - Kenneth. D.
7) Text Book of Pedodontics- Shobha Tandon
8) Pediatric Dentistry - Damle S. G.
9) Kennedy's Pediatric Operative Dentistry - Kennedy & Curzon.

10) Handbook of Pediatric Dentistry – Cameron and Widmer
11) Pediatric Dentistry - Richard R. Welbury
12) Pedodontics: A Clinical Approach - Goran Koch
13) Orthodontics and Pediatric Dentistry (Colour Guide) - D Millet & R Welbury
14) Color Atlas of Oral Diseases in Children and Adolescents - George Laskaris
15) Dental Management of the Medically Compromised Patient –J.W. Little
16) Pediatric Dentistry – Scientific Foundations and Clinical Practice – Stewart and Barber.
17) Clinical Use of Fluorides - Stephen H. Wei.
18) Understanding of Dental Caries - Niki Foruk.
19) Essentials of Community & Preventive Dentistry - Soben Peters.
20) Behaviour Management – Wright
21) Traumatic Injuries - Andreason.
22) Occlusal Guidance in Pediatric Dentistry - Stephen H. Wei / Nakata
23) Pediatric Oral & Maxillofacial Surgery - Kaban.
24) Pediatric Medical Emergencies - P. S. Whatt.
25) An Atlas of Glass Ionomer Cements - G. J. Mount..
26) Textbook of Pediatric Dentistry - Braham Morris.
27) Primary Preventive Dentistry - Norman O. Harris.
28) Preventive Dentistry - Forrester.
29) Contemporary Orthodontics - Profitt..
30) Preventive Dentistry - Depaola.
31) Endodontics - Ingle.
32) Pathways of Pulp - Cohen.
33) Management of Traumatized anterior Teeth - Hargreaves.

Subject: **Oral Medicine and Radiology**

Oral Diagnosis, Oral Medicine & Oral Pathology

1) Oral Medicine, Burkit, J.B. Lippincott Company
2) Principles of Oral Diagnosis, Coleman, Mosby Year Book
3) Oral Manifestations of Systemic Diseases, Jones, W.B. Saunders company
4) Oral Diagnosis & Oral Medicine, Mitchell
5) Oral Diagnosis, Kerr
6) Oral Diagnosis & Treatment ,Miller
7) Clinical Methods, Hutchinson
8) Shafers, Oral Pathology
9) Principles and practice of Oral Medicine, Sonis.S.T., Fazio.R.C. and Fang.L

Oral Radiology

1) Oral Radiology White & Goaz, Mosby year Book
2) Dental Radiology, Weahrman,C.V. Mosby Company
3) Oral Roentgenographs Diagnosis,Stafne,W.B.Saunders Co
4) Fundementals of Dental radiology, Sikri, CBS Publishing.

Forensic Odontology

1) Practical Forensic Odontology, Derek H.Clark ,Butterworth-Heinemann
2) Manual of Forensic Odontology, C Michael Bowers, Gary Bell,Forensic

Subject: **Orthodontics and Dentofacial Orthopedics**

1) Contemporary Orthodontics- William R. Proffit
2) Orthodontics For Dental Students- White And Gardiner
3) Handbook Of Orthodontics- Moyers
4) Orthodontics - Principles And Practice- Graber
5) Design, Construction And Use Of Removable Orthodontic Appliances- C. Philip Adams
6) Clinical Orthodontics: Vol 1 & 2- Salzmann

Subject: **Oral and Maxillofacial Surgery**

(1) Impacted teeth, Alling John et al
(2) Principles of Oral&maxillofacial Surgery vol1,2&3 Peterson LJ et al
(3) Text book of Oral&maxillofacial Surgery, Srinivasan B
(4) Hand book of Medical emergencies in the dental office, Melamed SF
(5) Killey's Fracture of the Mandible, Banks
(6) Killey's Fractures of the Middle 3 of the Facial Skeleton; Banks P
(7) The Maxillary Sinus and its Dental Implications; Mc Govanda
(8) Killey and Kays Outline of Oral Surgery - Fart l& 2; Seward GR & et al
(9) Essentials of Safe Dentistry for the Medically Compromised Patients; Mc Carthy FM
(10) Oral & Maxillofacial Surgery, Vol l& 2; Laskin DM
(11) Extraction of Teeth; Howe GL
(12) Minor Oral Surgery; Howe GL
(13) Contemporary Oral & Maxillofacial Surgeiy; Peterson LJ
(14) Text book of Oral & Maxillofacial Surgery , Neelima Anil Malik
(15) Text book of Oral & Maxillofacial Surgery, SM Balaji
(16) Principles of Oral Surgery; Moore J'R
(17) Handbook of Local Anaesthesia:, Malamed
(18) Sedation; Malamed
(19) Text book of Oral & Maxillofacial Surgery; Gustav O Kruger
(20) A Practical guide to Hospital Dentistry, Dr. George Varghese, Jaypee brothers publishing, New Delhi.
(21) A Practical guide to the Management of Impacted Tooth, Dr. George Varghese, Jaypee brothers publishing, New Delhi.
(22) Textbook of Local Anaesthesia; Monheim

Subject: **Prosthodontics, and Crown & Bridge**

1) Syllabus of Complete denture -Charles M.Heartwell Jr. and Arthur O. Rahn
2) Prosthodontic treatment for edentulous patients- Carl.O.Boucher

3) Essentials of complete denture prosthodontics by - Sheldon Winkler.
4) Maxillofacial prosthetics by - Willam R.Laney.
5) McCraken's Removable partial Prosthodontics
6) Removable partial Prosthodontics by - Ernest L. Miller and Joseph E.Grasso.
7) Stewart's Clinical Removable Partial Prosthodontics, Quintessence Publishing Co.
8) Fundementals of Fixed Prosthodontics, Shillingburg, Quintessence Publishing Co.
9) Management of Temporomandibular Disorders and Occlusion, Jeffery.P.Okeson, Mosby Year book,Inc.

Subject: **Periodontology**

1) Glickman's Clinical Periodontology-Carranza

Reference books

1) Essentials of Periodontology and periodontics- Torquil MacPhee
2) Contemporary periodontics- Cohen
3) Periodontal therapy- Goldman
4) Orbans' periodontics- Orban
5) Oral Health Survey- W.H.O.
6) Preventive Periodontics- Young and Stiffler
7) Advanced Periodontal Disease- John Prichard
8) Clinical Periodontology- Jan Lindhe
9) Periodontics- Baer & Morris.

Subject: **Conservative Dentistry and Endodontics**

1) The Art & Science of Operative Dentistry,Sturdivant,Mosby.U.S.A
2) Principle & Practice of Operative Dentistry, Charbeneu,Varghese Publishing, Mumbai.
3) Grossman's Endodontic Practice, B.Suresh Chandra & V.GopiKrishna,Wolters Kluwer

Subject: **Esthetic Dentistry**

1) Esthetic guidelines for restorative dentistry; Scharer & others
2) Esthetics of anterior fixed prosthodontics; Chiche (GJ) & Pinault (Alain)
3) Esthetic & the treatment of facial form, Vol 28; Mc Namara (JA)

Subject: **Forensic Odontology**

1) Practical Forensic Odontology- Derek Clark

Subject: **Behaviourial Science**

1) General Psychology- Hans Raj, Bhatia
2) Behavioural Sciences in Medical Practice- Manju Mehta
3) General psychology — Hans Raj, Bhatia
4) General psychology —Munn
5) Sciences basic to psychiatry -- Basanth Puri & Peter J Tyrer

Subject: **Ethics**

1) Medical Ethics, Francis C M, Jaypee Brothers, New Delhi

Subject: **Implantology**

1) Contemporary Implant Dentistry, Carl. E.Misch,Mosby
2) Osseointegration and Occlusal Rehabilitation, Hobo S., Ichida. E. and Garcia L.T Quintessence Publishing Company,

Note: 1. Book titles will keep on adding in view of the latest advances in the Dental Sciences.

2. Standard books from Indian authors are also recommended

List of Journals

1) Journal of Dentistry
2) British Dental Journal
3) International Dental Journal
4) Dental Abstracts
5) Journal of American Dental Association
6) British Journal of Oral and Maxillofacial Surgery
7) Oral Surgery, Oral Pathology and Oral Medicine
8) Journal of Periodontology
9) Journal of Endodontics
10) American journal of Orthodontics and Dentofacial Orthopedics
11) Journal of Prosthetic Dentistry
12) International Journal of Prosthodontics
13) Journal of Public Health Dentistry
14) Endodontics and Dental Traumatology
15) Journal of Dental Education
16) Dental Update
17) Journal of Dental Material
18) International Journal of Pediatric Dentistry
19) International Journal of Clinical Pediatric dentistry

Note: This is the minimum requirement. More journals both Indian and Foreign are recommended for imparting research oriented education.

SECTION VIII
SYLLABUS OF STUDY

1. GENERAL HUMAN ANOTMY INCLUDING EMBRYOLOGY AND HISTOLOGY

a) GOAL

The students should gain the knowledge and insight into, the functional anatomy of the normal human head and neck, functional histology and an appreciation of the genetic basis of inheritance and disease, and the embryological development of clinically important structures. So that relevant anatomical & scientific foundations are laid down for the clinical years of the BDS course.

b) OBJECTIVES:

i. Knowledge & understanding:

At the end of the 1st year BDS course in Anatomical Sciences the undergraduate student is expected to:

(1) Know the normal disposition of the structures in the body while clinically examining a patient and while conducting clinical procedures.
(2) Know the anatomical basis of disease and injury.
(3) Know the microscopic structure of the various tissues, a pre-requisite for understanding of the disease processes.
(4) Know the nervous system to locate the site of lesions according to the sensory and or motor deficits encountered.
(5) Have an idea about the basis of abnormal development, critical stages of development, effects of teratogens, genetic mutations and environmental hazards.
(6) Know the sectional anatomy of head neck and brain to read the features in radiographs and pictures taken by modern imaging techniques.
(7) Know the anatomy of cardio-pulmonary resuscitation.

ii. Skills

1) To locate various structures of the body and to mark the topography of the living anatomy.
2) To identify various tissues under microscope.
3) To identify the features in radiographs and modern imaging techniques.
4) To detect various congenital abnormalities.

c) INTEGRATION

By emphasizing on the relevant information and avoiding unwanted details, the anatomy taught integrally with other basic sciences & clinical subjects not only keeps the curiosity alive in the learner but also lays down the scientific foundation for making a better doctor, a benefit to the society.

This insight is gained in a variety of ways:

i. Lectures & small group teaching
ii. Demonstrations
iii. Dissection of the human cadaver
iv. Study of dissected specimens
v. Osteology
vi. Surface anatomy on living individual
vii. Study of radiographs & other modern imaging techniques.
viii. Study of Histology slides.
ix. Study of embryology models
x. Audio-visual aids

Throughout the course, particular emphasis is placed on the functional correlation, clinical application & on integration with teaching in other bio dental disciplines.

d) AN OUTLINE OF THE COURSE CONTENT:

General anatomy: Introduction of anatomical terms and brief outline of various systems of the body.

i. Regional anatomy of head & neck with Osteology of bones of head & neck, with emphasis on topics of dental importance.
ii. General disposition of thoracic, abdominal & pelvic organs.
iii. The regional anatomy of the sites of intramuscular & intra vascular injections, & lumbar puncture.
iv. General embryology & systemic embryology with respect to development of head & neck.
v. Histology of basic tissues and of the organs of gastrointestinal, respiratory, Endocrine, excretory systems & gonads.
vi. Medical genetics

***e)* THEORY: 100 HOURS**

	THEORY	
	TOPICS	**HOURS**
1	Introduction to anatomical terms, position, skin, superficial fascia and deep fascia	1
2	Simple epithelium, compound epithelium, Glandular epithelium	1
3	Scalp	1
4	Muscles of facial expression	1
5	Norma verticalis & Norma frontalis	1
6	Norma occiptalis & norma lateralis	1
7	Cervical vertebrae	1
8	Deep cervical fascia	1
9	Development of face	1
10	Brachial plexus	1
11	Classification of joints	1
12	Connective tissue	2
13	Cartilage	1
14	Bone	2
15	Muscle	1
16	Nervous tissue – Neurons, classification, regeneration, optic nerve, sciatic nerve, sensory & autonomic ganglia	2
17	Thyroid gland & development & developmental anomalies	1
18	Lymphatic drainage of head & neck.	1
19	Lacrimal apparatus & eyelid	1
20	Parotid gland & development	1
21	Dural venous sinuses – classification, cavernous sinus in detail	1

22	Pituitary gland and development & anomalies	1
23	Vascular tissue – Large artery, Medium sized artery, Large vein	1
24	Lymphatic tissue	2
25	Skin and its appendages – hair follicle – Sebaceous gland – sweat gland – nail	1
26	Anteriour cranial fossa	1
27	Middle cranial fossa	1
28	Posterior cranial fossa	1
29	Parietal bone	1
30	Occipital bone	1
31	Frontal bone	1
32	Temporal bone	2
33	Norma basalis	2
34	General embryology – oogenesis	1
35	General embryology – spermalogenesis	1
36	General embryology – fertilization	1
37	General embryology – implantation bilminar	1
38	General embryology – bilaminar germ disc	1
39	General embryology - Neural tube formation trilaminar germ disc neural crest Intraembryonic mesoderm & its fate, Notochord	2
40	General embryology - Folding of embryo	1
41	General embryology - Placenta & foetal membranes	2
42	Pharyngeal pouches & cleft	1
43	Bony orbit	1
44	Muscles of mastication	1
45	Temporomandibular joint	1
46	Hyoglossus muscle and its relations	1
47	Mandible	2
48	Maxilla	2
49	Zygomatic & hyoid bones	1
50	Pharynx	2
51	Nasal cavity & its lateral wall	1
52	Larynx	2
53	Tongue and its development & developmental anomalies	1
54	Middle ear & development	1
55	Coats of the eye – uveal tract in detail	1
56	External features of spinal cord	1
57	Leptomeninges	1
58	Blood supply of brain	1
59	Medulla oblongata– external features	1
60	Pons – external features	1
61	Cerebellum	1
62	4th ventricle	1
63	Mid brain – external features	1
64	3rd ventricle	1
65	Cerebrum – Sulci, gyri and functional area	1
66	Lateral ventricle	1
67	Optic pathway	1
68	White matter of cerebrum and internal capsule	2
69	Basal ganglia	1
70	III Cranial Nerve & IV Cranial nerves	1
71	V Cranial nerve & VI cranial nerves	1
72	VII cranial nerve	1
73	VIII, IX cranial nerves	1
74	X, XI, XII cranial nerves	1
75	Gastrointestinal system	2
76	Respiratory system	2
77	Cardiovascular system	2
78	Excretory system	2
79	Reproductive system – male (1 hr), female (1 hr)	2
80	Medical genetics – Mitosis, Meiosis, Chromosomes and anomalies	1
81	Medical Genetics - Gene structure and genetic disorders	1
82	Medical Genetics - Mode of inheritance	1

Sl. No.	SEMINARS
1.	Submandibular gland
2.	Nasal septum
3.	Soft palate
4.	Auditory tube
5.	Otic ganglion
6.	Pterygopalatine ganglion
7.	Submandibular ganglion
8.	Ciliary ganglion
9.	Ansa cervicalis
10.	Internal and external jugular veins
11.	Subclavian artery
12.	Autonomic nervous system
13.	Paranasal air sinuses
14.	Lingual artery
15.	Circle of Willis
16.	Choroid plexuses of the ventricles

f) PRACTICAL: 175 HOURS

Sl. No.	PRACTICALS
	HISTOLOGY
1.	Simple epithelium
2.	Compound epithelium
3.	Glandular epithelium
4.	Connective tissue
5.	Cartilage
6.	Bone
7.	Muscle
8.	Neuron – Optic Nerve - Peripheral Nerve
9.	Ganglia
10.	Blood vessels
11.	Lymphatic tissue – Lymph node, - Spleen, - Thymus, - Tonsil
12.	Skin – Thin skin, Thick skin
13.	Placenta & Umbilical cord
14.	Trachea & lung
15.	Spinal cord, Cerebellum, Cerebrum
16.	Cornea & Retina
17.	Thyroid & Parathyroid gland
18.	Suprarenal & Pituitary glands
19.	Kidney, Ureter, Urinary bladder
20.	Ovary, Corpus luteum, Testis
21.	Tongue – filiform, fungiform, circumvallate papillae
22.	Salivary glands – Mucous – Serious - Mixed
23.	Liver, Pancreas
	DISSECTION
24.	Introduction to dissection
25.	Scalp
26.	Superficial dissection of face – muscles of face
27.	Side of the neck & Posterior triangle
28.	Back of the neck – suboccipital triangle
29.	Anterior triangle
30.	Deep dissection of the neck – Thyroid gland parathyroid gland trachea, oesophagus, Brachiocephalic trunk, Subclavian artery Bracheiocephalic vein Thoracic duct. Cervical pleura Neurovascular bundle of the neck, Sympathetic chain, Scalene muscles; Cervical fascia
31.	Lymph nodes & lymph vessels of head & neck
32.	Prevertebral region – Vertebral artery – Vertebral vein
33.	Deep dissection of face – Facial artery – Other vessels - Nerves
34.	Structures in the cheek & lips
35.	Eyelid & lacrimal apparatus
36.	Parotid region

37.	Cranial cavity –meninges Dural folds, Venous sinuses
38.	Anterior cranial fossa
39.	Middle cranial fossa – Pituitary gland
40.	Posterior cranial fossa
41.	Orbit – structures in the orbit
42.	Temporal and infratemporal regions
43.	Submandibular region
44.	Mouth and pharynx
45.	Soft palate and Auditory tube
46.	Cavity of the nose
47.	Larynx
48.	Tongue
49.	Organs of hearing & equilibrium – External ear – Middle ear – Internal ear
50.	Eye ball
51.	Joints of the neck
52.	Spinal Cord
53.	Introduction to brain
54.	Meninges of brain
55.	Blood vessels of brain
56.	Base of brain
57.	Hind brain –Medulla
58.	Hind brain – Pons
59.	Hind brain – Cerebellum
60.	4th ventricle
61.	Midbrain
62.	Cerebral hemispheres
63.	White matter of cerebrum
64.	3rd ventricle
65.	Lateral ventricle
66.	Thalami – Optic tract
67.	Deep dissection of cerebral hemisphere & Internal capsule
68.	Deep nuclei and connections of thalamus
DEMONSTRATION OF SPECIMENS	
69.	Thoracic wall Chambers of heart Coronary arteries Pericardium
70.	Lungs Pleural cavity Diaphragm
71.	Abdomen – Peritoneal cavity Organs in abdominal & pelvic cavities
CLINICAL PROCEDURES	
72.	Intramuscular injections Deltoid muscle Gluteal region Quadriceps femoris
73.	Intravenous injection Median cubital vein Cephalic vein Basilic vein Long saplenous vein Short saplenous vein
74.	Arterial pulsations Superficial temporal Facial Carotid Brachial Radial Femoral Dorsalis pedis Lumbar puncture

g) SCHEME OF EXAMINATION

Distribution of Topics and Type of Questions for University Written examination:

Contents	Types of Questions and Marks	Marks
Gross Anatomy of Head and Neck – Scalp, Face, Triangles of Neck, Dural folds and Venous sinuses, contents of the Orbit **Cranial nerves -** V, VII, IX and XII Development of Brachial apparatus, Face, Systemic Embryology and Systemic Histology.	Long Essays 2 x 10 marks	20
Questions from any topic included in the theory syllabus Except from the topics from which the long essays have been set	Short Essays 10x 5 marks	50
	Short Answers 10 x 3marks	30
	Total	**100**

i. Theory

University Written **100 Marks**

Internal Assessment **25 Marks**

Viva Voce: Examiner 1-Gross Anatomy-

Examiner 2-Osteology, Surface Marking & embryology **25 Marks**

ii. Practicals:

University Practical Examination: **80 Marks**

Gross Anatomy Spotters (1 mark each)	*1x 15*	*15 Marks*
Discussion on Dissected parts (2 Specimens)	*2x20*	*40 Marks*
Histology –identification of slides (10 slides)	*1x10*	*10 Marks*
Histology record		*5 Marks*
Gross Anatomy Spotters		10 Marks

Internal Assessment: **20 Marks**

Grand Total 250Marks

2. GENERAL HUMAN PHYSIOLOGY

a) GOAL

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

b) OBJECTIVES

i. Knowledge

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

(1) Explain the normal functioning of all the organ systems and their interactions for well co-ordinated total body function.

(2) Assess the relative contribution of each organ system towards the maintenance of the milieu interior.

(3) List the physiological principles underlying the pathogenesis and treatment of disease.

ii. Skills

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

(1) Conduct experiments designed for the study of physiological phenomena.

(2) Interpret experimental and investigative data
(3) Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.

iii. Integration

At the end of the integrated teaching the student shall acquire an integrated knowledge of organ structure and function and its regulatory mechanisms.

c) THEORY: 120 Hours

Must know: Approx. 60% Questions should be from these portions for examinations.	**Desirable to know:** Avoid details. Upto. 40% Questions may be from these portions for examinations.	**Nice to know.** May be discussed in class, but *Avoid questions from this part for examinations*	**Hours**
1. GENERAL PHYSIOLOGY			
Homeostasis: Basic concept, Feedback mechanisms Structure of cell membrane, transport across cell membrane Body fluid Compartments: distribution of total body water, intracellular & extracellular compartments, major anions & cations in intra and extra cellular fluid. Membrane potentials. RMP & Action Potential.	.		**4**
2. BLOOD:			
Composition & functions of blood, Plasma proteins - Types, concentration, functions & variations, Erythrocyte: Morphology, functions & variations. Erythropoiesis & factors affecting erythropoiesis, ESR- factors affecting, variations & significance. Haemoglobin - Normal concentration, method of determination [P] & variation in concentration, funcions Anaemia - Definition, classification, life span of RBC's destruction of RBC's , formation & fate of bile pigments, Jaundice - types. Leucocytes: Classification, number, percentage, distribution morphology, properties, functions & variation. Role of lymphocytes in immunity, life span & fate of leucocytes. [Mention Leukemia] Thromobocytes - Morphology, number, variations, function. Haemostatsis – Role of vasoconstriction, platelet plug formation in haemostasis, coagulation factors, intrinsic & extrinsic pathways of coagulation, clot retraction. Fibrinolytic system. Tests of haemostatic function, platelet count, clotting time, bleeding time, prothrombin time - normal values, method & variations. Anticoagulants - mechanism of action. Bleeding disorders. Blood groups: ABO & Rh system, method of determination, importance, indications & dangers of blood transfusion, blood substitutes.[mention only] Blood volume: Normal values, variations. Tissue fluids & lymph: Formation of tissue fluid, Lymph: Formation, composition, circulation & functions Oedema - causes.	Specific gravity, Packed cell volume, Methods of estimation [in practicals] Blood Indices - MCV, MCH, MCHC - definition, normal values, variation. Leucopoiesis thrombopoiesis	Factors affecting & methods of determination.	**15**

Functions of reticulo-endothelial system.			
3.MUSCLE AND NERVE			
Classification of nerves, structure of skeletal muscle - Molecular mechanism of muscle contraction, neuromuscular junction and NM transmission. Properties of skeletal muscle. Structure and properties of cardiac muscle & smooth muscle.	Briefly about drugs affecting NM transmission		**8**
4. DIGESTIVE SYSTEM :			
Introduction to digestion: General structure of G.I. tract, Innervation. Salivary glands: Saliva: composition, regulation of secretion & functions of saliva. Stomach: Composition and functions of gastric juice, mechanism and regulation of gastric secretion. HCl secretion. Physiological basis of Peptic ulcer management [briefly] Exocrine Pancreas - Structure, composition of pancreatic juice, functions of each component, regulation of pancreatic secretion. Liver : structure , composition of bile, functions of bile Gall bladder: structure, functions. Small intestine - Composition, functions Large intestine - Functions. Motor functions of GIT: Mastication, deglutition, gastric filling & emptying, movements of small and large intestine, defecation.	Structure of GIT to be reviewed in Anatomy All tests of function to be dealt in Biochemistry Abnormalities of pancreatic function.	Regulation of secretion.	**10**
5. EXCRETORY SYSTEM :			
Structure & functions of kidney, functional unit of kidney & functions of different parts. Juxta Glomerular apparatus. Special functional features of renal circulation. Formation of Urine: Glomerular filtration rate - definition, normal values, factors influencing G.F.R. Tubular reabsorption - Reabsorption of sodium, glucose, water & other substances. Tubular secretion - secretion of urea, hydrogen and other substances. Countercurrent mechanisms. Micturition: anatomy & innervation of Urinary bladder, mechanism of micturition.	Determination of GFR. Role of kidney in the regulation of pH of the blood. Urinary bladder: abnormalities.	Tubular secretion of other substances.	**8**
6. SKIN AND TEMPERATURE REGULATION [basics only]			**4**
7. ENDOCRINOLOGY			
General endocrinology- endocrine glands & hormones. Second messengers. Endocrine function of hypothalamus. Hormones of anterior pituitary & their actions, Disorders of secretion of anterior pituitary hormones. Posterior pituitary hormones: actions Thyroid: secretion & transport of hormones, actions of hormones, regulation. Adrenal cortex & Medulla- action, Other hormones - Angiotensin, local hormones	Endocrine Disorders to be taught with each gland. Anti-thyroid drugs.	General functions of endocrine system, chemistry, mechanism of secretion, transport, metabolism, regulation of secretion of hormones to be discussed along with individual glands. Thyroid: Synthesis, Thyroid function tests in biochemistry Histology in anatomy	**14**
8. REPRODUCTION			
Physiological anatomy of male and female sex organs, Gonadotrophic hormones. Sex chromatin. Female reproductive system: Menstrual cycle, functions and hormones of ovary. Ovarian and uterine	Tests for ovulation Pregnancy tests Composition of milk, factors	Sex differentiation to be dealt with in anatomy	**6**

changes during menstrual cycle. Actions of oestrogen & Progesterone, control of secretion of ovarian hormones, fertilization, implantation, maternal changes during pregnancy, parturition. Lactation, milk ejection reflex. Male reproductive system, spermatogenesis, hormones-testosterone. Semen. Contraception.	controlling lactation,		
9. CARDIO VASCULAR SYSTEM			**15**
Functional anatomy and innervation of heart. Properties of cardiac muscle. Origin & propagation of cardiac impulse and Pacemaker potential. Action potential. Cardiac cycle - Phases, Pressure changes in atria, ventricles & aorta. Volume changes in ventricles. Heart sounds. Jugular venous pulse Arterial pulse. Electrocardiogram- Basic principles only. Normal electrocardiogram. Heart rate: Normal value, variation. Stroke volume and Cardiac output: definition, normal values, variations, factors affecting. Arterial blood pressure: Definition, normal values, variations, determinants. Regulation of heart rate, stroke volume, blood pressure: integrated concept. Coronary circulation: special features.	Myocardial infarction: ECG Changes. Heart block. Cardiac murmurs Cardiac output: one method of determination Cardio vascular homeostasis in exercise & posture.		
10. RESPIRATORY SYSTEM			**12**
Physiology of Respiration: External & internal respiration. Functional anatomy of respiratory passage & lungs. Respiratory movements: Muscles of respiration, Mechanism of inflation & deflation of lungs. Intra pleural & intra pulmonary pressures & their changes during the phases of respiration. Mechanics of breathing - surfactant, compliance & work of breathing [basics only]. Spirometry: Lung volumes & capacities definition, normal values, significance, factors affecting vital capacity, variations in vital capacity, Pulmonary ventilation- alveolar ventilation & dead space-ventilation. Pulmonary circulation: Functional features. Composition of inspired air, alveolar air and expired air. Exchange of gases: Diffusing capacity, factors affecting it. Transport of Oxygen & carbon dioxide in the blood. Regulation of respiration- neural & chemical. Hypoxia, cyanosis, dyspnoea, periodic breathing. Artificial respiration.	FEV & its variations. Pulmonary function tests Respiratory changes during exercise		
11. CENTRAL NERVOUS SYSTEM			**10**
Organisation of central nervous system Neuronal organisation at spinal cord level, Synapse: functional significance. Receptors, reflexes, sensations and sensory tracts Physiology of pain. Referred pain. Analgesia systems. Functions of thalamus, cerebellum. Vestibular apparatus [basics only] Cerebral cortex: Basics of higher functions. Formation and functions of CSF: clinical significance. Autonomic nervous system			
12. SPECIAL SENSES			**14**
Fundamental knowledge of vision, hearing, taste and smell.	Errors of refraction. Tests of auditory function.		

d) PRACTICALS

The following list of practical is minimum and essential. The entire practical have been categorized as procedures and demonstrations. The procedures are to be performed by the students during practical classes to acquire skills. All the procedures are to be included in the University practical examination. Those categorized as demonstrations are to be shown to the students during practical classes. However these demonstrations would not be included in the University examinations but question based on this would be given in the form of charts, graphs and calculations for interpretation by the students.

Practicals & demonstrarions: 60 hours

Practicals	**Hours**
Study of Microscope and its uses	02
Collection of blood and study of haemocytometer	02
Haemoglobinometry	02
Determination of RBC count	08
Determination of WBC count	04
Determination of blood groups	02
Leishman's staining and differential leucocyte count	10
Calculation of blood indices	02
Determination of bleeding time	01
Determination of clotting time	01
Blood pressure recording	03
Auscultation of Heart sounds	02
Demonstrations	
Determination of Erythrocyte Sedimentation rate (ESR)	02
Determination of packed cell volume (PCV)	02
Determination of specific gravity of blood	02
Fragility test for RBC	02
Clinical examination of Cardiovascular and Respiratory System	03
Determination of vital capacity	02
Artificial respiration	02
Demonstration of deep and superficial reflexes	02
Activity of frog's heart and effects of Acetyl Choline, Atropine and Adrenaline.	02
Electrocardiography: Demonstration of recording of normal Electro cardiogram	02
Total	**60**

e) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for written examination

Contents	**Type of Questions and Marks**	**Marks**
Long Essay Question from Topics listed as Must know only	Long Essays 01 x 10marks	10
Short Essay Questions should Preferably be set from all other topics excluding the one from which a Long Essay Question has been set	Short Essay 5 X 5 marks	25
Short Answer Questions should be set from all the chapters. (Except the chapter on which a Long Essay Question has been set)	Short Answers 05 x 3 marks	15
	Total	**50 marks**

i. ***Theory:***

University written Examination: 50 Marks

University Viva: 10 Marks

Internal Assessment: 10 Marks

ii. ***Practicals:***

Internal Assessment: 10 Marks

University Practicals : 40 Marks

Mark distribution for University practical examination

Major Experiments: 20 Marks

Any one of the Major Experiments: R.B.C. Count, W.B.C. Count, Differential Count, Blood Pressure Recording

Minor Experiment: 15 Marks

Any one of the minor Experiments: Determination of Blood Groups, Determination of Bleeding & Clotting time, Haemoglobin Estimation, Calculation of absolute Haematological Indices – MCH , MCV, MCHC

Practical Work record: 5 Marks

3. BIOCHEMISTRY, NUTRITION AND DIETETICS

a) AIMS AND SCOPE

The major aim is to provide a sound but crisp knowledge on the biochemical basis of the life processes relevant to the human system and to dental/medical practice. The contents should be organized to build on the already existing information available to the students in the pre-university stage and reorienting. A mere rehash should be avoided.

The chemistry portion should strive towards providing information on the functional groups, hydrophobic and hydrophilic moieties and weak valence forces that organise macromolecules. Details on structure need not be emphasised.

Discussion on metabolic processes should put emphasis on the overall change, interdependence and molecular turnover. While details of the steps may be given, the student should not be expected to memorise them. An introduction to biochemical genetics and molecular biology is a must but details should be avoided. The exposure to antivitamins, antimetabolites and enzyme inhibitors at this stage, will provide a basis for the future study of medical subjects. An overview of metabolic regulation is to be taught by covering hormonal action, second messengers and regulation of enzyme activities. Medical aspects of biochemistry should avoid describing innumerable functional tests, most of which are not in vogue. Cataloguing genetic disorders under each head of metabolism is unnecessary. A few examples which correlate genotype change to functional changes should be adequate.

At the end of the course the student would be able to acquire a useful core of information, which can be retained for a long time.

b) THEORY: 70 HOURS

Sl. No.	TOPIC	HOURS ALLOTTED	**Must know:** Approx 60% questions should be from these portions for examinations	**Desirable to know:** Upto 40% questions may be from these portions for examinations
1	**CARBOHYDRATES**	**12 hours**		
	Definition, biological importance and classification. Monosaccharides –Glucose,fructose,Galactose,mannose	1	+	
	Reactions reducing property, oxidation osazone,Molisch test,isomers,anomers,epimers	1		+
	Disaccharides-lactose,maltose,sucrose Glycosidic bond,amino sugars,deoxy sugars	1		+
	Polysaccharides. Structures of starch and glycogen,Mucopolysaccharides Dietary fibres	1		+
	Enzymatic hydrolysis of dietary carbohydrates. Mechanism of uptake of monosaccharides,associated disorders(in brief)	1	+	
	Outlines of glycolysis, fates of pyruvate Gluconeogenesis.	2	+	
	Introduction to glycogenesis, glycogenolysis,,regulation	2	+	
	Significance of pentose phosphate pathway. Formation and importance of glucuronic acid.	1	+	
	Regulation of blood glucose. Diabetes mellitus and related disorders. Evaluation of glycemic status.	2	+	
2	**LIPIDS**	**9 hours**		
	Definition, biological importance and classification. Fats and fatty acids. Essential fatty acids. Introduction to compound lipids. Cholesterol.	2	+	
	Digestion and absorption of lipids	1	+	
	Beta oxidation of fatty acids.	1	+	
	Fatty acid synthesis, (in brief)	1	+	
	Ketone body formation and utilisation	1	+	
	Outlines of cholesterol synthesis and compounds formed from cholesterol	1	+	
	Plasma lipoproteins: Formation, function and turnover. Atherosclerosis.	2	+	
3	**ENZYMES**	**6 hours**		
	Definition, classification, specificity and active site. Cofactors.	1	+	
	Factors affecting enzyme action	2	+	
	Enzyme inhibition	2	+	
	Clinical important enzymes- AST,ALT,ALP,ACP,LDH,CK,ENOLASE,GGT	1	+	
4	**PROTEINS**	**9hours**		
	Aminoacids: Classification. Introduction to peptides.peptide bond Proteins: Classification. Charge properties. Buffer action. Levels of protein organization Denaturation.	2	+	
	Digestion and absorption of proteins. Nitrogen balance. Essential amino acids. Protein quality and requirement (methods for evaluation of protein quality to be excluded). Protein-calorie malnutrition. BMR, Balanced diet.	2	+	
	Ammonia metabolism. Urea formation.	1	+	
	Reactions of amino acids- transamination,transmethylation,transsulfuration	1	+	
	Compounds formed from glycine	1		
	Biologic importance of aromatic amino acids,sulphur containing amino acids, Amino acidurias (in brief)	1	+	
	One carbon metabolism	1		+
5	**INTEGRATION OF METABOLISM**	**2 hours**		**+**

	High energy compounds, Electron transport chain and oxidative phosphorylation.			
6	**VITAMINS**	**5 hours**		
	Fat soluble vitamins A,D,E,K,sources,functions,daily requirements,deficiency,toxicity	2	+	
	Water soluble vitamins B,C,sources,functions,daily requirements,deficiency,toxicity	3	+	
7	**ACID BASE BALANCE** Buffers, respiratory and renal regulation,disorders,analysis	**4 hours**	**+**	
8	**DETOXIFICATION** Typical reactions. Examples of toxic compounds. Oxygen toxicity	**2 hours**		**+**
9	**MINERALS**	**4 hours**		
	Classification, daily requirement. Calcium and phosphorous: sources, uptake, excretion, function. Serum calcium regulation	1	+	
	Iron: sources, uptake and transport. Heme and nonheme iron functions; deficiency	1	+	
	Iodine: Brief introduction to thyroxine synthesis. General functions of thyroxine. Fluoride: function, deficiency and excess	1	+	
	Indications of role of other minerals	1		+
10	**HAEMOGLOBIN**	**3 hours**		
	Structure, synthesis, degradation	1	+	
	Hemoglobinopathies	1		+
	Jaundice	1	+	
11	**PLASMA PROTEINS** Classification and separation. Functions of albumin. A brief account of immunoglobulins. Biochemistry of AIDS.	**2 hours**	**+**	
12	**LIVER FUNCTION TESTS**	**1 hour**	**+**	
13	**KIDNEY FUNCTION TESTS**	**1 hour**		**+**
14	**CONNECTIVE TISSUE.** Collagen and elastin. Bone structure. Structure of membranes	**1 hour**		**+**
15	**MOLECULAR BIOLOGY**	**9 hours**		
	Nucleic acids: Building units. Nucleotides. Outline structure of DNA and RNA.	2	+	
	Formation and degradation of nucleotides. Gout. E*xa*mples of associated genetic disorders	2	+	
	Introduction to replication and transcription Antimetabolites and antibiotics interfering in replication, transcription	2	+	
	Outline of translation process.	2	+	
	Mutation, Introduction to cancer, viruses and oncogenes.tumour markers,apoptosis	2	+	

c) PRACTICALS & DEMONSTRATION: 60 hours

i. Practical: 35 hours

Sl.No.	Procedure	Hours
1.	Identification of non protein nitrogen substance	5
2.	Normal constituents of urine	4
3.	Abnormal constituents of urine	6
4.	Clinical Chemistry	2
5.	Estimation of Blood urea	3
6.	Estimation of Serum albumin	3
7.	Estimation of serum creatinine	3
8.	Blood Glucose estimation	3
9.	Serum Total protein estimation	3
10.	Creatinine clearance estimation	3

ii. Demonstration of charts: 10 hours

Sl. No.	Demonstration	Hours
1	Paper electrophoresis charts/clinical data evaluation	2
2	Glucose tolerance test profiles	2
3	Serum lipid profiles	1
4	Profiles of hypothyrodisim and hyperthyrodisim	1
5	Profiles of hyper and hypoparathyrodism	1
6	Profiles of liver function	1
7	Urea, uric acid creatinine profile in kidney disorders	1
8	Blood gas profile in acidosis/ alkalosis	1

iii. Seminars: 15 hours

d) SCHEME OF EXAMINATION

Distribution of Topics and Type of Questions for written examination

Contents	Type of Questions and Marks	Marks
Long Essay Questions preferably from Chemistry of Carbohydrates, proteins, lipids and Amino acids. Fat soluble and water soluble vitamins. Enzymes. Metabolism of carbohydrates, proteins, lipids and minerals.	Long Essays 01 x 10marks	10
Short Essay Questions Preferably from Chemistry and metabolism of: Carbohydrates, lipids, proteins, nucleic acids, minerals. Fats soluble and water soluble vitamins, Nutrition and dietetics, Liver function tests, pH and its biological importance, Renal function tests, Blood constituents, Biological oxidation.	Short Essay 5 X 5 marks	25
Short Answer Questions should be set from all the chapters. (Except the chapter on which a Long Essay Question has been set)	Short Answers 05 x 3 marks	15
	Total	**50 marks**

i. Theory

University written Examination: 50 Marks
University Viva: 15 Marks
Internal Assessment: 10 Marks

ii. Practicals:

Internal Assessment: 10 Marks
University Practicals : 40 Marks

Mark distribution for University practical examination;

One procedure for quantitative estimation 15 marks
One procedure for qualitative analysis 10 marks
Interpretation of Laboratory results in a given chart 10 marks
Practical Work record: 5 Marks

The following Procedures are suggested for University Practical Examination:

Quantitative Estimation (Any ONE estimation to be done)

Estimation of Blood Glucose – using Folin-*wu* method, using deproteinized blood.
Determination of Creatinine in Urine – using Jaffes's method
Determination of Titrable acidity and Ammonia content of Urine – using Malfatti's Method

Qualitative Analysis (Any ONE analysis to be done)

Identification of Carbohydrates – glucose, fructose, sucrose, lactose, maltose, starch.
Colour Reactions – albumin
Precipitation Reactions – albumin
Identification of Proteins – albumin, gelatin, casein, peptone
Urine Analysis – normal constituents
Urine Analysis – pathological constituents

Chart Interpretation (Interpretation of ONE Clinical chart)

Glucose Tolerance Test

Values of Blood Constituents and their clinical variation: - urea, cholesterol, calcium, phosphorus, bilirubin.

4) DENTAL ANATOMY, EMBRYOLOGY AND ORAL HISTOLOGY.

a) INTRODUCTION:

The course includes instructions in the subject of Dental Morphology, Oral Embryology, Oral Histology and Oral Physiology. A composite of basic Dental Sciences & their clinical applications.

b) SKILLS

The student should acquire basic skills in:

i. Carving of crowns of permanent teeth in wax.
ii. Microscopic study of Oral tissues.
iii. Identification of Deciduous & Permanent teeth
iv. Age estimation by patterns of teeth eruption from plaster casts of different age groups.

c) OBJECTIVES

After a course on Oral Biology,

i. The student is expected to appreciate the normal development, morphology, structure & functions of oral tissues & variations in different pathological/non-pathological states.
ii. The student should understand the histological basis of various dental treatment procedures and physiologic ageing process in the dental tissues.
iii. The students must know the basic knowledge of various research methodologies

d) COURSE CONTENT

i. Theory: 105 hours

DENTAL ANATOMY	HOURS
1. Introduction, Dental Anthropology & Comparative Dental Anatomy	3
2. Function of teeth.	
3. Nomenclature.	
4. Tooth numbering systems (Different system)(Dental formula).	
5. Chronology of deciduous and permanent teeth. (First evidence of calcification, crown completion, eruption and root completion).	2
6. Deciduous teeth - a) Nomenclature. b) Importance of deciduous teeth. c) Form & function, comparative dental anatomy, fundamental curvature	4
7. Gross morphology of deciduous teeth.	5
8. General differences between deciduous and permanent teeth.	1
9. Morphology of permanent teeth. Chronology, measurements, description of individual surface and variations of each tooth.	12
10. Morphological differences between incisors, premolars and molars of same arch.	1
11. Morphological differences between maxillary and mandibular. incisors, canines, premolars and molars of the opposite arch	1
12. Internal Anatomy of Pulp.	1
13. Occlusion: a. Development of occlusion. b. Dental arch form. c. Compensating curves of dental arches. d. Angulations of individual teeth in relation to various planes. e. Functional form of the teeth at their incisal and occlusal thirds. f. Facial relations of each tooth in one arch to its antagonist or antagonists in the opposing arch in centric occlusion. g. Occlusal contact and interscusp relations of all the teeth of one arch with those in the opposing arch in centric occlusion. h. Occlusal contact and intercusp relations of all the teeth during the various functional mandibular	8

movements. i. Neurobehavioural aspect of occlusion	
14. Tempero Mandibular Joint (T.M.J.): Gross Anatomy and articulation. Muscles (Muscles of mastication). Mandibular position and movements. Histology. Clinical considerations with special emphasis on Myofacial Pain Dysfunction Syndrome (MPDS) - (Desirable to Know)	**2**
ORAL PHYSIOLOGY	
1. Theories of calcification	**1**
2. Mastication and deglutition	**1**
Oral Embryology, Anatomy and Histology:	
1. Development and growth of face and jaws.	**1**
2. Development of tooth.	**3**
3. Cranial nerves with more emphasis on V.VII and IX.	**1**
4. Blood supply, nerve supply and lymphatic drainage of teeth and surrounding structures	**1**
5. Cell - structure and function	**1**
6. Maxillary sinus - Structure, Variations, Histology function and clinical considerations	**2**
7. Salivary Glands - Classification, structure, function, Histology, Clinical Considerations and age changes.	**4**
8. Oral Mucous membrane: Definitions, General consideration. Functions and classifications. Structure and microscopic appearance of gingiva, palate, lips, alveolar mucosa, tongue, floor of mouth. Gingival sulcus and dento gingival junction. Clinical considerations and age changes.	**8**
9.ENAMEL: Physical characteristics, chemical properties structure. Development - Life cycle of ameloblasts Amelogenesis and Mineralisation. Clinical considerations. Age changes.	**8**
10.DENTIN: Physical characteristics, chemical properties, structure. Types of dentin. Dentin innervation and hypersensitivity. Development - Dentinogenesis and mineralisation. Clinical considerations. Age Changes.	**6**
11.PULP: Anatomy, structural features, functions, pulp organs. Developments. Clinical consideration Age changes.	**6**
12.CEMENIUM: Physical characteristics, chemical properties, structure. Cementogenesis. Clinical consideration Age changes.	**4**
13.PERIODONTAL LIGAMENT: Cells and fibers Functions Development Clinical Considerations. Age Changes	**5**
14.ALVEOLAR BONE: Physical characteristics, chemical properties structure. Structure Development. Internal reconstruction. Clinical consideration.	**5**
HISTOCHEMISTRY OF ORAL TISSUES. (Tissue processing)	**4**
THEORIES OF ERUPTION AND SHEDDING. (Physiological tooth movement)	**4**

ii. Practical: 250 Hours

DENTAL ANATOMY:
Carving on wax blocks:-
a. Cube, rectangle, cone and cylinder
b. Individual tooth - Only permanent teeth of both arches.
- Central, Incisors, Lateral, Canines, Premolars and 1st molar

HISTOLOGY:
List of Histology slides:

Development of tooth:
01. Bud stage of tooth development.
02. Cap stage of tooth development.
03. Early bell stage of tooth development.
04. Late Bell stage of tooth development.
05. Root formation.

ENAMEL:
01. Enamel rod.
02. Hunter-Schreger Bands
03. Tufts, Lamellae, Spindles.
04. Incremental lines of Retzius.
05. Neonatal line.
06. Gnarled Enamel.

DENTIN:
01. Dentino - Enamel junction.
02. Dentinal Tubules.
03. Incremental lines of Von Ebner.
04. Contour lines of owen.
05. Neonatel line.
06. Tomes granular layer.
07. Interglobular Dentin.
08. Secondary Dentin.
09. Intratubular Dentin.
10. Intertubular Dentin.

CEMENTUM:
01. Cellular cementum.
02. Acellular cementum.
03. Cemento enamel junction
- Type 1 - 60% type - Overlapping.
- Type 2 - 30% type - Butt
- Type 3 - 10% type - Cementum & Enamel do not meet.
04. Sharpey's fibers.
05. Hypercemntosis.

PULP:
01. Zones of Pulp.
02. Pulp stones.

PERIODONTAL LIGAMENT:
01. Principle fibers of Periodontal ligament
- Apical, Horizontal, Oblique, Aveolar crest, Interradicular, Transeptal

ALVEOLAR BONE:
01. Haversian system.
02. Trabeculated bone.
03. Mature and immature bone.

SALIVARY GLANDS:
01. Mucous gland.
02. Serous gland.
03. Mixed gland.

MAXILLARY SINUS:
Sinus lining (Pseudostratified ciliated columnar)
(Desirable to know)

ORAL MUCOUS MEMBRAIN:
01. Parakeratinised epithelium.
02. Orthokeratinised epithelium.
03. Palate - Anterolateral zone.
04. Palate - Posterolateral zone.
05. Alveolar mucosa.
06. Vermilion border of lip.

07. Tongue - Circumvallate Papillae.
- Fungiform Papillae
- Filiform Papillae

Preparation of Ground sections, haematoxylin & Eosin sections & decalcified section - (Desirable to know)

iii. Lecture demonstration:

Identification of Individual teeth

(1) Deciduous
(2) Permanent
(3) Mixed dentition using study models
(4) Demonstration of preparation of ground section, Decalcification, Paraffin section and H & E Staining.

e) SCHEME OF EXAMINATION

Distribution of Topics and Type of Questions for University written examination

Contents	Type of Questions and Marks	Marks
A. Dental anatomy - one question - 15 marks Detailed morphology of Permanent teeth, Differences between Primary & Permanent teeth, Occlusion and Arrangement of teeth. **B. Oral histology - one question - 15 marks** Development of tooth, Enamel-structure & development, Dentin-structure& development, Dental pulp-structure & histology, Periodontal ligament, Alveolar bone-structure & histology, Oral mucosa-structure & histology, Eruption of teeth	Long Essays 2 x 10 marks	20
A. Oral histology - six questions - 30 marks B. Dental anatomy - three questions - 15 marks C. Oral physiology - one question - 05 marks	Short Essays 10x 5 marks	50
A. Oral histology - five questions - 10 marks B. Dental anatomy - three question - 06 marks C. Oral physiology - one question - 02 marks D. Oral embryology - one question - 02 marks	Short Answers 10 x 3marks	30
	Total	**100**

i. Theory

University written Examination: 100 Marks
University Viva: 25 Marks
Internal Assessment: 25 Marks

ii. Practicals:

Internal Assessment: 20 Marks
University Practicals: 80 Marks
Grand Total 250 Marks

Mark Distribution for University Practical Examination:

Tooth Carving:	(Time allotted 75 Minutes)	30 Marks
Spotters:	(20X 2 marks)	40 Marks
Practical work Record:		10 marks

Type of Spotters:

13 Histology and Ground Section slides
4 Tooth Identification
3 Casts for identification of teeth, numbering system and age assessment

5. GENERAL PATHOLOGY

a) AIM:

At the end of the course the student should be competent to: Apply the scientific study of disease processes, which result in morphological and functional alterations in cells, tissues and organs to the study of pathology and the practice of dentistry.

b) OBJECTIVES:

Enabling the student

i. To demonstrate and analyze pathological changes macroscopically explain their observations in terms of disease processes.
ii. To integrate knowledge from the basic sciences, clinical medicine and dentistry in the study of Pathology.
iii. To demonstrate understanding of the capabilities and limitations of morphological Pathology in its contribution to medicine, dentistry and biological research.
iv. To demonstrate ability to consult resource materials outside lectures, laboratory and tutorial classes.

c) COURSE CONTENT:

i. Theory: 55Hours

Sl. No.	TOPIC	HOURS ALLOTTED
1	Introduction , Terminologies, The cell in health, The normal cell structure, The cellular functions	1
2	Etiology and Pathogenesis of disease, Cell Injury Types - congenital, Acquired Mainly Acquired causes (Hypoxic injury, chemical injury, physical injury, immunological injury) Cell death& Necrosis Apoptosis, definition, causes, features and types of necrosis Gangrene - Dry, wet, gas Pathological Calcifications (Dystrophic and metastatic)	3
3	Degenerations, Amyloidosis, Fattychange, Cloudy swelling, Hyaline change, mucoid degeneration	2
4	Inflammation, Definition, causes types, and features, Acute inflammation, The vascular response, The cellular response, Chemical mediators, The inflammatory cells Fate, Chronic inflammation, Granulomatous inflammation	3
5	Healing Regeneration, Repair Mechanisms, Healing by primary intention, Healing by secondary intention, Fracture healing, Factors influencing healing process, Complications	3
6	Immunological mechanisms in disease Humoral & cellular immunity Hypersensitivity & autoimmunity	2
7	Infections & infestations (1) Syphilis: Epidemiology, Types and stages of syphilis, Pathological, features, Diagnostic criteria, Oral lesions (2) Typhoid, Epidemiology, Pathogenesis, Pathological features, Diagnostic criteria, Thrombosis (3) Tuberculosis, Epidemiology, Pathogenesis, (Formation of tubercle), Pathological, features of Primary and secondary TB, Complications and Fate (4) AIDS& Hepatitis (5) Actinomycosis (6) Candidiasis (7) Mucormycosis (8) Pyogenic infections	6
8	(1) Disorders of circulation, Hyperemia, Shock (2) Definition, Pathophysiology, Formation, complications & Fate of a thrombus (3) Embolism, Definition, Types, Effects (4) Ischemia and Infarction, Definition, etiology, types, Infraction of various organs (5) Derangements of body fluids, Oedema - Pathogenesis, Different types	4
9	Nutritional Disorders, starvation, obesity, malnutrition, pathogenesis of deficiency	3

	diseases with special reference to disorders of vitamins & minerals	
10	Diabetes Mellitus, Definition, Classification, Pathogenesis, Pathology in different organs	2
11	Hypertension, Definition, classification, Pathophysiology, Effects in various organs	2
12	Brief introduction to growth & differentiation Adaptive disorders of growth, Atrophy & Hypertrophy, Hyperplasia, Metaplasia and Dysplasia	1
13	General Aspects of neoplasia, Definition, terminology, classification, Differences between benign and malignant neoplasms, The neoplastic cell, Metastasis, Etiology and pathogenesis of neoplasia, Carcinogenesis, Tumour biology, Oncogene and anti-oncogenes, Diagnosis, Precancerous lesions, Common specific tumours, Sq papilloma & Ca, Basal cell Ca, Adenoma & Adenocarcinoma, Fibroma & Fibrosarcoma, Lipoma and liposarcoma	4
14	Common diseases of Bones, Osteomyelitis, Metabolic bone diseases, Bone Tumours, Osteosarcoma, Osteocalstoma, Giant cell Tumour, Ewing's sarcoma, Fibrous dysplasia, Aneurysmal bone cyst	3
15	Diseases of oral cavity, Lichen planus, Stomatitis, Leukoplakia, Squamous cell Ca,Dental caries, Dentigerious cyst, Ameloblastoma Diseases of salivary glands, Normal structure, Sialadenitis & Tumours	4
16	Diseases of Cardiovascular system Cardiac failuare,Congenital heart disease ASD, VSD, PDA, Fallot'sTetrology, InfectiveEndocarditis, Atherosclerosis, Ischaemic heart Disease	2
17	Introduction to haematology , haemopoiesis, bone marrow aspiration & biopsy,Anaemias, classification, Iron Deficiency anaemia, Megaloblastic anaemia,hemolytic anaemeas and their lab investigations, Polycythemea.	3
18	Haemorrhagic Disorders, Coagulation cascade Coagulation disorders Platelet function,Platelet disorders	3
19	Diseases of WBC's pathologic variations in white blood cell counts and leukemoid reactions,Leukaemias, Acute and chronic leukaemias, Diagnosis and clinical features Diseases of Lymph nodes, Hodgkin's disease, Non Hodgkins lymphoma, Metastatic carcinoma	4

ii. Practicals and lecture demonstrations: 50 hours

(1) Lecture demonstrations: 10 Hours

a) Anti coagulants, Blood indices
b) PCV & ESR
c) Instruments & their uses:
    (i) Neubauer's Counting chamber
    (ii) Haemoglobinometer
    (iii) W.b.C Pippette
    (iv) Wintrobe Tube
    (v) Urinometer
d) Cytologic Techniques- Fnac and buccal smear
e) Study of anaemias-Microcytic, Macrocytic and Dimorphic blood picture
f) Study of Acute leukemias- Any one type
g) Study of Chronic Leukemias- Any one type

(2) Histopathology Slides & Specimens: 20 Hours

a) Tissue Processing, Staining
b) Histopathology slides
    (i) Acute appendicitis,
    (ii) Granulation tissue,
    (iii) fatty liver
    (iv) CVC lung, CVC liver,CVC spleen
    (v) Kidney amyloidosis
    (vi) Tuberculosis,

(vii) Actionomycosis,
(viii) Rhinosporidiosis
(ix) Squamous cell papilloma,
(x) transitional cell papilloma,
(xi) pleomorphic adenoma
(xii) Basal cell Ca,
(xiii) Sq cell Ca
(xiv) Osteosarcoma,
(xv) osteoclastoma,
(xvi) fibrosarcoma
(xvii) Malignant melanoma,
(xviii) Ameloblastoma,
(xix) Adenocarcinoma
(xx) Pleamorphic adenoma
(xxi) metatsatic carcinoma in lymph node
(xxii) Capillary and cavernous haemangioma
(xxiii) Fibroma
(xxiv) Neurofibroma
(xxv) Lipoma
(xxvi) Osteoma,chondroma

c) Specimens
(i) Acute Appendicitis.
(ii) Tuberculosis Lymph node.
(iii) Fatty liver.
(iv) Infarction spleen.
(v) Chronic Venous Congestion (C.V.C.) Liver
(vi) Squamous papilloma
(vii) Basal cell carcinoma
(viii) Lipoma
(ix) Squamous cell carcinoma
(x) Malignant Melanoma
(xi) Adenocarcinoma
(xii) Osteosarcoma
(xiii) Osteoclastoma.
(xiv) Gangrene.

(3) **Practicals that must be done by the students:**
(i) Determination of Haemoglobin percentage
(ii) Blood grouping.
(iii) Total Leukocyte count
(iv) Bleeding time , Clotting time
(v) Peripheral blood smear staining and study
(vi) Differential leukocyte count.
(vii) Urine examination - for sugar, ketone bodies, protein, blood, bile pigments and bile salts- any one standard test

d) Scheme of examination

i. Theory:

Distribution of Topics and Type of Questions for written examination

Contents	Types of Questions and Marks	Marks
Question from General Pathology Inflammation, Healing and Repair, Tuberculosis, Leprosy, Syphilis, Thrombosis, Diabetes Mellitus, Neoplasia,Diseases of bone,Cell injury, metabolic disturbances,Circulatory disturbances, Hypertension,diseases of oral cavity	Long Essays 1 x 10 marks	10
Two questions from General Pathology Intracellular accumulations, Necrosis, Gangrene, Apoptosis, Amyloidosis, Pathologic calcification, hypersensitivity reactions, Infections, Shock, Oedema, Infarction, Congestion, Hypertension, Diabetes Mellitus, Premalignant Conditions, Neoplasia, Osteomyelitis, Anaemias, Neoplastic Proliferation of WBCs – Leukaemias and Lymphomas, Haemorrhagic disorders, Erythrocyte Sedimentations Rate (ESR), Urine sediment. Two from Haematology One from Clinical Pathology	Short Essays 5x 5 marks + Short Answers 5 x 3 marks	25 15
	Total	**50**

(1) **University written Examination: 50 Marks**

(2) **University Viva: 10 Marks**

(3) **Internal Assessment: 15 Marks**

iii. Practicals:

(1) **Internal Assessment: 10 Marks**

(2) **University Practicals : 40 Marks**

Mark distribution for University practical examination

Spotters

Haematology slide	2x 2marks
Histopathology slides	5x2marks
Specimens	2x2marks
Instruments	1x2marks
To examine given sample of urine for abnormal constituents	5marks
To do differential count on the given peripheral blood smear	5marks
To estimate haemoglobin percentage in the given sample of blood	5marks
or	
To determine blood groups (ABO and Rh) in the given sample of blood	
Practical work record	5marks

TOTAL 40 Marks

Grand Total 125Marks

6. GENERAL MICROBIOLOGY

a) AIMS:

To introduce the students to the exciting world of microbes. To make the students aware of various branches of microbiology, importance, significance and contribution of each branch to mankind and other fields of medicine. The objectives of teaching microbiology can be achieved by various teaching techniques such as:

Lectures
Lecture Demonstrations
Practical exercises
Audio visual aids

Small group discussions with regular feedback from the students.

b) OBJECTIVES:

i. Knowledge and Understanding

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

(1) Understand the basics of various branches of microbiology and able to apply the knowledge relevantly.
(2) Apply the knowledge gained in related medical subjects like General Medicine and General Surgery and Dental subjects like Oral Pathology, Public Health Dentistry, Periodontics, Oral Surgery, Pedodontics, Conservative Dentistry and Oral medicine in higher classes.
(3) Understand and practice various methods of Sterilisation and disinfection in dental clinics.
(4) Have a sound understanding of various infectious diseases and lesions in the oral cavity.

ii. Skills

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

c) COURSE CONTENT:

A brief syllabus of Microbiology is given as follows:

i. General microbiology:

(1) History, Introduction, Scope, Aims and Objectives.
(2) Morphology and Physiology of bacteria.
(3) Detail account of Sterlisation and Disinfection.
(4) Brief account of Culture media and Culture techniques.
(5) Basic knowledge of selection, collection, transport, processing of clinical specimens and identification of bacteria.
(6) Bacterial Genetics and Drug Resistance in bacteria.

ii. Immunology:

(1) Infection - Definition, Classification, Source, Mode of transmission and types of Infectious disease.
(2) Immunity

(3) Structure and functions of Immune system
(4) The Complement System
(5) Antigen
(6) Immunoglobulins - Antibodies - General structure and the role played in defense mechanism of the body.
(7) Immune response
(8) Antigen - Antibody reactions - with reference to clinical utility.
(9) Immuno deficiency disorders - a brief knowledge of various types of immuno deficiency disorders - A sound knowledge of immuno deficiency disorders relevant to dentistry.
(10) Hypersensitivity reactions
(11) Autoimmune disorders - Basic knowledge of various types - sound knowledge of autoimmune disorders of oral cavity and related structures.
(12) Immunology of Transplantation and Malignancy
(13) Immune haematology

iii. Systematic bacteriology:

(1) Pyogenic cocci - Staphylococcus, Streptococcus, Pneumococcus, Gonococc Meningococcus - brief account of each coccus - detailed account of mode of spread laboratory diagnosis, Chemo therapy and prevention.
(2) Detailed account of Cariogenic Streptococci
(3) Corynebacterium diphtheriae - mode of spread, important clinical feature, Laboratory diagnosis, Chemotherapy and Active immunisation.
(4) Mycobacteria - Tuberculosis and Leprosy
(5) Clostridium - Gas gangrene, food poisoning and tetanus.
(6) Non-sporing Anaerobes - in brief about classification and morphology, in detail about dental pathogens - mechanism of disease production and prevention.
(7) Spirochaetes - Treponema pallidum - detailed account of Oral Lesions of syphilis, Borrelia vincentii.Actinomycetes.

iv. Virology:

(1) Introduction
(2) General properties, cultivation, host - virus interaction with special reference to Interferon.
(3) Brief account of Laboratory diagnosis, Chemotherapy and immuno prophylaxis in general.
(4) A few viruses of relevance to dentistry.
   a) Herpes Virus
   b) Hepatitis B Virus - brief about other types
   c) Human Immunodeficiency Virus (HIV)
   d) Mumps Virus
   e) Brief- Measles and Rubella Virus
(5) Bacteriophage - structure and Significance

v. Mycology:

(1) Brief Introduction
(2) Candidosis - in detail
(3) Briefly on oral lesions of systemic mycoses.

vi. Parasitology:

(1) Brief introduction - protozoans and helminths

(2) Brief knowledge about the mode of transmission and prevention of commonly seen parasitic infection in the region.

***f)* Theory: 65 Hours**

Topics		Hours
I. GENERAL BACTERIOLOGY		
1.	Introduction, History and classification.	02
2.	Morphology, Physiology of Bacterial cell.	02
3.	Bacterial Genetics	02
4.	Infection	02
II. IMMUNOLOGY		
1.	Immunity	02
2.	Antigen	01
3.	Antibodies	01
4.	Structures and functions of Immune system	01
5.	Immune response	01
6.	Antigen and antigen reactions & compliment	04
7.	Hypersensitivity	02
8.	Auto immunity	01
9.	Immunology of transplantation	01
III. SYSTEMATIC BACTERIOLOGY		
1.	Staphylococci	01
2.	Streptococci (Dental Caries)	02
3.	Pneumococci	01
4.	Meningococci & Gonococci	01
5.	Coryne bacterium diphtheriae	02
6.	Bacillus	01
7.	Clostridia	02
8.	Non sporing Anaerobes	02
9.	Mycobacteria	03
10.	Spirochaetes (Treponema, leptospira and Borrelia)	03
11.	Normal bacterial flora of the Oral Cavity	01
IV. VIROLOGY		
1.	General properties of viruses	03
2.	Herpes viruses	02
3.	Measles and Mumps	01
4.	Rabies virus.	01
5.	Hepatitis viruses	02
6.	Human Immuno deficiency Virus (HIV)	01
7.	Adeno oncogenic viruses & Poliomyelitis	02
V. PARASITOLOGY		
1.	Introduction to parasitic diseases	01
2.	Entamoeba histolytica, Malaria, Leishmania	03
VI. MYCOLOGY		
1.	Candidiasis (in detail)	02
2.	Rhinosporidiosis	02
VII. APPLIED MICROBIOLOGY		
1.	Immunisation schedule, Collection of materials, Experimental animals & hospital infections – in brief	02

vii. Practicals/Demonstrations: 50 Hours

(1) Demonstrations:

a) Morphological forms of microbes
b) Different morphological forms of bacteria, viruses, fungi, parasites.
c) Sterilization Methods – Specified techniques – their uses.
d) Culture Media – transport media
e) Special staining techniques, stained preparations – dark ground microscopy.
f) Demonstration of bacteria in stained clinical material.
g) Demonstration of viruses – Permanent preparations morphology, inclusion bodies.
h) Demonstration of parasite – in blood smear – in stool – in urine.
i) Demonstration of common fungi – candida – Dermatophytes.

(2) Practicals:

a) Simple staining of bacteria
b) Gram's staining – isolated bacteria – Clinical materials.
c) Ziehl-Neelsen staining – prepared and fixed smears.
d) Collection of materials for culture – pus, blood.

(3) List of practical materials slides f*or demonstration :*

a) Staphylococcus
b) Streptococcus
c) Gonococcus
d) Pneumococcus
e) M tuberculosis
f) M leprae
g) Anthrax
h) Cl. tetani
i) Spirochaetes
j) Gram Negative Bacilli
k) Candida
l) Actinomyces

(4) **Slides for practical exercises:**

a) Grams stains
  (i) Staphylococci
  (ii) Gram negative bacilli
  (iii) Mixture of any two organisms
  (iv) Gram stain of the oral cavity

b) Alberts stain – Kleb's Loffeler's Bacilli (KLB) culture slide

c) Ziehl-Neelson's stain- Sputum positive for AFB

(5) **Media for demonstration:**

i. Uninoculated media:
  (i) Nutrient agar plate
  (ii) Blood agar plate
  (iii) Chocolate agar plate
  (iv) Macconkey agar plate
  (v) Glucose citrate broth (Blood culture bottle)
  (vi) Lowenstein Johnson's Media slope

(vii) Loefflers serum slope
(viii) Sabourauds slope
(ix) Milk agar plate
(x) Robert Cooked Meat broth

ii. Inoculated media:
(i) Nutrient agar with staphylococci
(ii) Blood Agar with Alpha Haemolytic Streptococci
(iii) Blood Agar with Beta Haemolytic Streptococci
(iv) Potassium Tealurite with growth of C.diphtheriae
(v) Milk agar with staphylococci
(vi) Antibiotics sensitivity plate

iii. Animals:
(i) Guinea pig
(ii) Rabbit
(iii) Mice

iv. Instruments:
(i) VDRL slide
(ii) Tuberculin syringe
(iii) Sterile swab
(iv) Seitz filter
(v) Macintosh filds jar
(vi) Widal rack with tubes
(vii) Microtitre plate
(viii) Disposable syringe
(ix) Surgical gloves

d) Scheme of Examination

i. Theory

Distribution of Topics and Type of Questions for University written examination:

Contents	Type of Questions and Marks	Marks
One Long Essay question from Systematic Bacteriology	Long Essays 1 x 10 marks	10
One question from General bacteriology One question from Immunology One question from Mycology One question from Parasitology / Oral Microbiology One question from Systematic Bacteriology	Short Essays 5x 5 marks	25
One question from General bacteriology One question from Immunology One question from Systematic Bacteriology Two questions from Virology	Short Answers 5 x 3marks	15
	Total	**50**

(1) **University written Examination: 50 Marks**
(2) **University Viva: 15 Marks**
(3) **Internal Assessment: 10 Marks**

iv. **Practicals:**
(1) **Internal Assessment: 10 Marks**
(2) **University Practicals : 40 Marks**

Grand Total 125Marks

Mark distribution for University practical examination

Spotters

slides	5x 2 Marks
Media	3x2 Marks
Instruments	2x2 Marks
Gram's Stain	7 Marks
Ziehl - Neelsen's Stain	8 Marks
Practical work record	5 Marks

7. DENTAL MATERIALS

a) INTRODUCTION:

The science of Dental Material has undergone tremendous changes over the years. Continued research has led to new material systems and changing concepts in the dental field. Interlinked with various specialized branches of chemistry, practically all engineering applied sciences and biological characteristics, the science of dental material emerged as basic sciences in itself with its own values and principles.

b) AIMS:

Aim of the course is to present basic chemical and physical properties of Dental materials as they are related to its manipulation to give a sound educational background so that the practice of the dentistry emerged from art to empirical status of science as more information through further research becomes available. It is also the aim of the course of Dental materials to provide with certain criteria of selection and which will enable to discriminate between facts and propaganda with regards to claims of manufactures.

c) OBJECTIVES:

To understand the evolution and development of science of dental material. To explain purpose of course in dental materials to personnel's concerned with the profession of the dentistry. Knowledge of physical and chemical properties. Knowledge of biomechanical requirements of particular restorative procedure. An intelligent compromise of the conflicting as well as co-coordinating factors into the desired Ernest. Laying down standards or specifications of various materials to guide to manufacturers as well as to help professionals. Search for newer and better materials which may answer our requirements with greater satisfaction. To understand and evaluate the claims made by manufactures of dental materials.

At the end of the course the student should have the knowledge about the composition, properties, manipulative techniques and their various commercial names. The student should also acquire skills to select and use the materials appropriately for laboratory and clinical use.

d) NEED FOR THE COURSE:

The profession has to raise from an art to a science, the need for the dentist to possess adequate knowledge of materials to exercises his best through knowledge of properties of different types of materials. There is growing concern of health hazards due to mercury toxicity, inhalation of certain

vapours or dust materials, irritations and allergic reaction to skin due to contact of materials. The Dentist need to acquire wider knowledge of physical, chemical and biological properties of the various materials used in the mouth because they may cause irritation of oral tissues. pH of some of the restorative materials cause inflammation and necrosis of pulp which is a concern and the patient should be protected from these. Certain criteria of selection are provided that will enable the dentist to discriminate between facts and propaganda, which will make a material biologically acceptable.

e) SCOPE:

Dental materials are employed in mechanical procedures including restorative dentistry such as Prosthodontics, Endodontics, Periodontics and Orthodontics. There is scarcely a dental procedure that does not make use of dental materials in one form or another and therefore the application of dental material is not limited to any one branch of dentistry. Branches such as minor surgery and Periodontics require less use of materials but the physical and chemical characters of materials are important in these fields. The toxic and tissue reaction of dental materials and their durability in the oral cavity where the temperature is between 32 & 37 degree centigrade, and the ingestion of hot or cold food ranges from 0-70 degree centigrade. The acid an alkalinity of fluids shown pH varies from 4 to 8.5. The load on 1 sq. mm of tooth or restorative materials can reach to a level as high as many kilograms. Thus the biological properties of dental materials cannot be separated from their physical and chemical properties.

f) THEORY: 80 HOURS (20 hours in First BDS & 60 hours in second BDS)

Section A- Prosthodontics, Section B- Conservative Dentistry

Sl. No	Topic	Hours
1.	**Introduction - Section A Prosthodontics & Section B Conservative Dentistry**	**2**
2.	Structure of matter and principles of adhesion- Section A Change of state, inter atomic primary bonds, inter atomic secondary bonds, inter atomic bond distance and bonding energy, thermal energy, crystalline structure, non crystalline structures, diffusion, adhesion and bonding and adhesion to tooth structures.	**2**
3.	**Important physical properties applicable to dental materials - Section A** Physical properties are based on laws of mechanics, acoustics, optics, thermodynamics, electricity, magnetism, radiation, atomic structure or nuclear phenomena. Hue, value, chroma and translucency physical properties based on laws of optics, dealing with phenomena of light, vision and sight. Thermal conductivity & coefficient of thermal expansion are physical properties based on laws of thermodynamics. Stress, strain, proportional limit, elastic limit yield strength, modulus of elasticity, flexibility, resilience, impact, impact strength, permanent deformation, strength, flexure strength fatigue, static fatigue, toughness, brittleness, ductility & malleability, hardness, abrasion resistance, relaxation, rheology, Thixotropic, creep, static creep, dynamic creep, flow, colour, three dimensional colour - hue, values, chroma, Munsell system, metamersim, fluorescence, physical properties of tooth, stress during mastication.	**6**
4.	**Biological considerations in use of dental materials- Section A** Materials used are with the knowledge of appreciation of certain biological considerations for use in oral cavity. Requirement of materials with biological compatibility. Classification of materials from perspective of biological compatibility, eg. contact with soft tissues, affecting vitality of pulp, used for root canal fillings, affecting hard tissues of teeth, laboratory materials that could be accidentally be inhaled or ingested during handling. Hazards associated with materials: pH-effecting pulp, polymers causing chemical irritation, mercury toxicity, etc. Microleakage, Thermal changes, Galvanism, toxic effect of materials. Biological evaluation for systemic toxicity, skin irritation, mutagenecity and carcinogenicity. Disinfection of dental materials for infection control.	**2**
5.	**Gypsum & gypsum products- Section A** Gypsum - its origin, chemical formula, Products manufactured from gypsum. Dental plaster, Dental stone,	**4**

	Die stone, high strength, high expansion stone. Application and manufacturing procedure of each, macroscopic and microscopic structure of each. Supplied as and Commercial names. Chemistry of setting, setting reaction, theories of setting, gauging water, Microscopic structure of set material. Setting time: working time and setting time, Measurement of setting time and factors controlling setting time. Setting expansion, Hygroscopic setting expansion - factors affecting each Strength: wet strength, dry strength, factors affecting strength, tensile strength Slurry - need and use. Care of cast. ADA classification of gypsum products Description of impression plaster and dental investment Manipulation including recent methods or advanced methods. Disinfection: infection control, liquids, sprays, radiation Method of use of disinfectants Storage of material - shelf life.	
6.	**Impression materials used in dentistry- Section A** Impression plaster, Impression compound, Zinc oxide Euginol impression paste & bite registration paste incl., non Euginol paste, Hydrocolloids, reversible and irreversible, Elastomeric impression materials. Polysulphide, Condensation silicones, Addition silicones, Polyether, Visible light cure polyether urethane dimethacrylate. Historical background & development of each impression material, Definition of impression, Purpose of making impression, Ideal properties required and application of material. Classification as per ADA specification, general & individual impression material. Application and their uses in different disciplines. Marketed as and their commercial names, Mode of supply & mode of application bulk/wash impression. Composition, chemistry of setting, Control of setting time, Type of impression trays required, Adhesion to tray, manipulation, instruments & equipments required. Techniques of impression, storage of impression, (Compatibility with cast and die material). Any recent advancement in material and mixing devices. Study of properties: Working time, setting time, flow, accuracy, strength, flexibility, tear strength, dimensional stability, and compatibility with cast & die materials incl., electroplating Biological properties: tissue reaction, Shelf life & storage of material. Infection control - disinfection Advantages & disadvantages of each material.	**10**
7.	**Synthetic resins used in dentistry - Section A** Historical background and development of material, Denture base materials and their classification and requirement. Classification of resins, Dental resins - requirements of dental resins, applications, polymerisation, polymerisation mechanism stages in addition polymerisation, inhibition of polymerisation, co-polymerization, molecular weight, crosslinking, plasticizers, Physical properties of polymers, polymer structures types of resins.	**3**
	Acrylic resins: - Section A Mode of polymerisation: Heat activated, Chemically activated, Light activated Mode of supply, application, composition, polymerisation reaction of each. Technical considerations: Methods of manipulation for each type of resin. Physical properties of denture base resin. Miscellaneous resins & techniques: Repair resins, Relining and rebasing. Short term and long-term soft-liners, temporary crown and bridge resins, Resin impression trays, Tray materials, Resin teeth, materials in maxillofacial prosthesis, Denture cleansers, Infection control in detail, Biological properties and allergic reactions.	**3**
	Restorative resins: - Section B Historical background, Resin based restorative materials, unfilled & filled, Composite restorative materials, Mode of supply, Composition, Polymerisation mechanisms: Chemically activated, Light activated, Dual cure: Degree of conversion, Polymerisation shrinkage. Classification of Composites: Application, composition and properties of each, Composites of posterior teeth, Prosthodontics resins for veneering. Biocompatibility - microleakage, pulpal reaction, pulpal protection Manipulation of composites: Techniques of insertion of Chemically activated, light activated, dual cure Polymerisation, Finishing and polishing of restoration, Repair of composites. Direct bonding, Need for bonding, Acid - etch technique, Enamel bonding, Dentin bonding agents. Mode of bonding, Bond strength, Sandwich technique its indication and procedure Extended application for composites: Resins for restoring eroded teeth, Pit and fissure sealing, Resin inlays system - Indirect & direct, Core build up, Orthodontic applications.	**4**
8.	**Metal and alloys - Section B** Structure and behaviour of metals, Solidification of metals, mechanism of crystallisation amorphous & crystalline. Classification of alloys, Solid solutions, and Constitutes or equilibrium phase diagrams: Electric alloys, Physical properties, Peritectic alloys, Solid state reaction other binary systems: Metallography & Heat treatment Tarnish and corrosion Definition, causes of corrosion, protection against corrosion, Corrosion of dental restorations, clinical significance of galvanic current. **Dental amalgam- Section B** History, Definition of dental amalgam, application, Alloy classification, manufacture of alloy powder composition - available as. Amalgamation: setting reaction & resulting structure, properties, Micro leakage Dimensional stability, Strength, Creep, Clinical performance Manipulation: Selection of alloy, proportioning, mechanism of trituration, condensation, carving & finishing. Effect of dimensional changes, Marginal deterioration. Repair of amalgam, mercury toxicity, mercury hygiene. **Direct filling gold- Section B** Properties of pure gold, mode of adhesion of gold for restoration forms of direct filling gold for using as restorative material. Classification: Gold Foil, Electrolytic precipitate, powdered gold Manipulation: Removal of surface impurities and compaction of direct filling gold. Physical properties of compacted	**10**
9.	**Dental casting alloys - Section B**	**6**

	Historical background, desirable properties of casting alloys. Alternatives to cast metal technology: direct filling gold, amalgam, mercury free condensable intermetallic compound - an alternative to metal casting process. CAD-CAM process for metal & ceramic inlays - without need of impression of teeth or casting procedure, pure titanium, most bio compatible metal which are difficult to cast can be made into crowns with the aid of CAD- CAM technology . Another method of making copings - by copy milling (without casting procedures). Classification of casting alloys: By function & description. Recent classification, High noble (HN), Noble (N) and predominantly base metal (PB) Alloys for crown & bridge, metal ceramic & removable partial denture. Composition, function, constituents and application, each alloy both noble and base metal, Properties of alloys: Melting range, mechanical properties, hardness, elongation, modulus of elasticity, tarnish and corrosion. Casting shrinkage and compensation of casting shrinkage. Biocompatibility - Handling hazards & precautions of base metal alloys, casting investments used. Heat treatment: Softening & hardening heat treatment. Recycling of metals. Titanium alloys & their application, properties & advantages. Technical considerations in casting. Heat source, furnaces, gold, Clinical performance.	
10	**Dental waxes including inlay casting wax - Section B** Introduction and importance of waxes: Sources of natural waxes and their chemical nature. Classification of Waxes: Properties: melting range, thermal expansion, mechanical properties, flow & residual stresses, ductility. Dental Wax: Inlay wax: Mode of supply: Classification & composition, Ideal requirements: Properties of inlay wax: Flow, thermal properties Wax distortion & its causes. Manipulation of inlay wax: Instruments & equipment required, including electrically heated instruments metal tips and thermostatically controlled wax baths. Other waxes: Applications, mode of supply & properties. Casting Wax, Base plate wax, Processing wax, Boxing wax, Utility wax, Sticky wax, Impression wax for corrective impressions Bite registration wax.	**2**
11	**Dental casting investments - Section A** Definition, requirements, classification Gypsum bonded - classification. Phosphate bonded, Silica bonded Mode of Supply: Composition, application , setting mechanism, setting time & factors controlling. Expansions: Setting expansion, Hygroscopic Setting expansion, & thermal expansion: factors affecting. Properties: Strength, porosity, and fineness & storage. Technical considerations: For Casting procedure Preparation of die, Wax pattern, spruing, investing, control of shrinkage compensation, wax burnout, and heating the invested ring, casting. Casting machines, source of heat for melting the alloy. Defects in casting.	**2**
12.	**Soldering, brazing and welding - Section B(Classes to be handled by orthodontics department)** Need of joining dental appliances, Terms & Definition,Solders: Definition, ideal requirement, types of solders - Soft & hard and their fusion temperature, application. Mode of supply of solders, Composition and selection, Properties. Tarnish & corrosion resistance mechanical properties, microstructure of soldered joint. Fluxes & Anti fluxes: Definition, Function, Types, commonly used fluxes & their selection Technique of Soldering & Brazing: free hand soldering and investment, steps and procedure. Welding,: Definition, application, requirements, procedure, weld decay - causes and how to avoid it. Laser welding.	**2**
13.	**Wrought base metal alloys - Section A (Classes to be handled by orthodontics department)** Applications and different alloys used mainly for orthodontics purpose 1. Stainless steel 2. Cobalt chromium nickel 3. Nickel titanium 4. Beta titanium Properties required for orthodontic wires, working range, springiness, stiffness, resilience, Formability, ductility, ease of joining, corrosion resistance, stability in oral environment, bio compatibility Stainless steels: Description, type, composition & properties of each type. Sensitisation & stabilisation, Mechanical properties - strength, tensile, yield strength, KHN. Braided & twisted wires their need, Solders for stainless steel, Fluxes, Welding. Wrought cobalt chromium nickel alloys, composition, allocation, properties, heat treatment, physical properties. Nickel - Titanium alloys, shape, memory & super elasticTitanium alloys, application, composition, properties, welding, Corrosion resistance	**3**
14.	**Dental cements- Section B** Definition & Ideal requirements of Dental Cements: Silicate, Glass ionomer, metal modified glass ionomer, resin modified glass ionomer, zinc oxide Euginol, modified zinc oxide Euginol, zinc phosphate, zinc silico phosphate, zinc poly carboxylate Cavity liners and cement bases Varnishes Calcium hydroxide. Gutta percha Application, classification (general and individual), setting mechanism, mode of supply, Properties, factors affecting setting, special emphasis on critical procedures of manipulation and protection of cement, mode of adhesion, biomechansim of caries inhibition. Agents for pulpal protection, Modifications and recent advances, Principles of cementation. Special emphasis on cavity liners and cement bases and luting agents.	**5**
15.	**Dental ceramics - Section B** Historical background & General applications of Dental ceramics: definition, classification, application, mode of supply, manufacturing procedure, methods of strengthening. Properties of fused ceramic: Strength and factors affecting, modulus of elasticity, surface hardness, wear resistance, thermal properties, specific gravity, chemical stability,esthetic properties, biocompatability, technical considerations. Metal Ceramics (PFM): Alloys - Types and composition of alloys Ceramic - Type and Composition. Metal Ceramic Bond,	**8**

	Nature of bond. Bonding using electro deposition, foil copings, bonded platinum foil, swaged gold alloy foil coping. Technical considerations for porcelain and porcelain fused metal restorations. Recent advances - all porcelain restorations, Manganese core, injection moulded, castable ceramics, glass infiltrated alumina core ceramic (In ceram), ceramic veners, inlays and onlays, and CAD - CAM ceramic. Chemical attack of ceramic by fluoride. Porcelain furnaces.	
16.	**Abrasion & polishing agents - Section A** Definition of abrasion and polishing. Need of abrasion and polishing. Types of abrasives: Finishing, polishing & cleaning. Types of abrasives: Diamond, Emery, aluminum oxides garnet, pumice, Kieselgurh, tripoli, rouge, tin oxide, chalk, chromic oxide, sand, carbides, diamond, zirconium silicate Zinc oxide.Abrasive action. Desirable characteristics of an abrasive, Rate of abrasion, Size of particle, pressure and speed. Grading of abrasive & polishing agents. Binder, Polishing materials & procedures used. Technical consideration , Material and procedure used for abrasion and polishing Electrolytic polishing and burnishing.	**1**
17.	**Die and counter die materials including electroforming and electropolishing - Section A** Types - Gypsum products, Electroforming, Epoxy resin, Amalgam	**1**
18.	**Dental implants - Section A** Evolution of dental implants, types and materials.	**2**
19.	**Mechanics of cutting - Section B** Burs and points.	**1**
20	**Waste disposal - Section B** At the end of the course the student should have the knowledge about the composition, properties, manipulative techniques and their various commercial names. The student should also acquire skills to select and use the materials appropriately for laboratory and clinical use. (1) Qualitative observation of restorative dental resins. (2) Determination of setting time of chemically activated composite resins.	**1**

g) PRACTICALS: 100 Hours (40 hours in First BDS & 60 Hours in second BDS)

Demonstration of manipulation of all materials for a batch not more than 8 students.

Exercises to be done by each student:

Impression material

Manipulation and making impression and identifying setting time and defects. (Comparative studies included)

Gypsum products

Manipulation and pouring impressions - identify setting time and working time and working time with reference to proportion, water temp, and spatulation time

Self-cure and heat cure acrylic resin manipulation and curing

Cements - manipulation and studying setting time and working time for luting, base and restoration

Silver Amalgam - manipulation, trituration, condensation and studying setting and working time

h) SCHEME OF EXAMINATION:

The University Theory examination will have two sections of 50 marks each Section A Prosthodontics & Section B Conservative Dentistry

For Dental Materials University Practical Examination, if internal examiner is from Prosthodontics, External examiner should be from Conservative Dentistry and vice versa

Distribution of Topics and Type of Questions for University Written examination:

Section A: Prosthodontics

Contents	Types of Questions and Marks	Marks
Question from Any Prosthodontic topic in Section A topic	Long Essays 1 x 10 marks	10
Questions from any Section A topic including orthodontics. Avoid questions in topic from which the long essay question is set	Short Essays 5x 5 marks	25
	Short Answers 5 x 3 marks	15
	Total	**50**

i. Theory

University Written **50Marks**
Internal Assessment **15 Marks**
Viva Voce: **10 Marks**

ii. Practicals:

University Practical Examination: **40 Marks**

Spotters (*5x 2Marks)* *10 Marks*
Manipulation of Any one of the following Dental materials: *25 Marks*
Gypsum products
Irreversible Hydrocolloid
Impression Compound
Rubber base impression Material
Zinc Oxide Impression Material
Practical Work Record *5 Marks*
Internal Assessment: **10 Marks**

Grand Total 125 Marks

Distribution of Topics and Type of Questions for University Written examination:

Section B: Conservative Dentistry

Contents	Types of Questions and Marks	Marks
Question from Any Conservative Dentistry topic in Section B	Long Essays 1 x 10 marks	10
Questions from any Section B topic including orthodontics. Avoid questions in topic from which the long essay question is set	Short Essays 5x 5 marks	25
	Short Answers 5 x 3 marks	15
	Total	**50**

i. Theory

University Written **50Marks**
Internal Assessment **10 Marks**
Viva Voce: **15Marks**

ii. Practicals:

University Practical Examination: **40 Marks**

Spotters (*5x 2Marks)* *10 Marks*
Manipulation of Any one of the following Dental Cements: *25 Marks*
ZnO Euginol (Luting/Filing Consistency)
Zinc Phosphate Cement (Luting/base Consistency)
Glass Ionomer Cement Type I/II (Luting/Filling Consistency)
Polycarboxylate Cement (Luting Consistency)
Amalgam Trituration
Practical Work Record *5 Marks*
Internal Assessment: **10 Marks**

Grand Total 125 Marks

8. GENERAL AND DENTAL PHARMACOLOGY AND THERAPEUTICS

a) GOAL:

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

b) OBJECTIVES:

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

i. Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular,
ii. List the indications, contraindications; interactions, and adverse reactions of commonly used drugs with reason,
iii. Tailor the use of appropriate drugs in disease with consideration to its cost, efficacy, safety for individual and mass therapy needs,
iv. Indicate special care in prescribing common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal, hepatic damage and immuno compromised patients,
v. Integrate the rational drug therapy in clinical pharmacology,
vi. Indicate the principles underlying the concepts of "Essential drugs".

c) SKILLS:

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

i. Prescribe drugs for common dental and medical ailments.
ii. To appreciate adverse reactions and drug interactions of commonly used drugs.
iii. Observe experiments designed for study of effects of drugs.
iv. Critically evaluate drug formulations and be able to interpret the clinical pharmacology of marketed preparations commonly used in dentistry.

d) INTEGRATION:

Practical knowledge of use of drugs in clinical practice will be acquired through integrated teaching with clinical departments.

e) THEORY: 70 HOURS

1. **General Pharmacology :**	
a. Definitions: Pharmacology, drug, Pharmacy, sources of drugs with examples.	1
b. Pharmacokinetics with clinical implications.	2
c. Routes of administration: oral, inhalation, intradermal, Subcutaneous, intramuscular, intravenous intrathecal, perineural & Newer drug regimes (Advantages and disadvantages with the examples of drugs administered).	1
d. Pharmacodynamics : mechanism of action, factors modifying drug actions with emphasis on factors like - age, sex, dose, frequency & route of administration, presence of other drugs, Pharmacogenetics and Pathological conditions.	2
e. Therapeutics: Principles of drug therapy, Adverse drug reactions and drug interactions.	3
2.ANS drugs : Clinically used examples, their important pharmacological actions (which form the basis for the uses), clinical uses along with dental uses if any and specific adverse effects of -	
a. Sympathomimetics	1
b. Sympatholytics - alpha blockers, Beta - blockers.	2
c. Cholinomimetics.	2
d. Anticholinergics:	2
3. Detailed pharmacology of :	
a.Clinically used opiod and non-opiod analgesics.	2
b. Clinically used local anesthetics.	2

Detailed Pharmacology & Enumeration of clinically used agents, their brief Pharmacology, clinical uses along with dental uses if any, and specific adverse effects of :	
a. Ethyl alcohol - actions, uses and drug interactions.	1
b. General anesthetics & Preanaesthetic medication	2
c. Antipsychotics, antidepressants, anxiolytics	2
d. Sedative hypnotics	2
e. Antiepileptics	1
CVS drugs : Enumeration/Classification of clinically used agents their important pharmacological actions (that form the basis of their uses)Clinical uses along with dental uses if any, and specific adverse effects of	
a. Cardiac glycosides	1
b. Antianginal drugs	1
c. Antihypertensives.	1
d. Diuretics	1
e. Pharmacotherapy of shocks - anaphylactic, cardiogenic hypovolemic & Septic.	1
Drugs acting on blood : Detailed pharmacology of :	
a. Coagulants, anticoagulants, fibrinolytics, anti platelet drugs and styptics	3
b. Hematinics : Iron preparation Vit.B12, Folic acid Vit.C	3
c. Vit.D and calcium preparations	1
Endocrines: Enumeration/Classification of clinically used agents and their preparations, Mechanism of action, clinical uses along with dental uses if any and specific adverse effects of:	
a. Drugs used in diabetes mellitus	2
b. Corticosteroids	2
Chemotherapy: Enumeration/Classification of clinically used Agents, their mechanism of action clinical uses along with dental uses if any and specific adverse effects of:	
a. Sulfonamides	1
b. Beta-lactum antibiotics	2
c. Macrolides and aminoglycosides	1
d. Broad spectrum antibiotics	1
e. Antifungal and antiviral (acyclovir) agents	2
f. Metronidazole and fluoroquinolones	1
g. Antineoplastic Drugs: Alkylating agents, Antimetabolities, Radioactive Isotopes, Vinka Alkaloids, Anti Cancerous antibiotics.	2
h. Drug Therapy of Tuberculosis, Leprosy & Malaria	3
Other drugs : Enumeration of clinically used agents, general uses along with dental uses if any and specific adverse effects of :	
a. Antihistamines and antiemetics	2
b. Drugs used in bronchial asthma and cough	1
c. Drugs used in peptic ulcer	2
d. Chelating agents - BAL, EDTA & Penicillamine	1
e. Antihelmenthics	2
Dental Pharmacology	
a. Fluoride pharmacology	1
b. Antiseptics, astringents & Sialogogues	1
c. Obtundents, Mummifying agents and disclosing agents	1
d. ***Prevention and drug therapy of emergencies in dental practice***	2
1. Seizures	
2. Anaphylaxis	
3. Severe bleeding	
4. Shock	
5. Tetany	
6. Status asthmaticus	
7. Acute addisonian crisis	
8. Diabetic Ketoacidosis	

f) PRACTICALS AND DEMONSTRATIONS: 20 HOURS

To familiarise the student with the methodology: prescription writing and dispensing. Rationale of drug combinations of marketed drugs.

Sl. No.	Procedure	Hours
1	Introduction - equipments used in dispensing pharmacy, prescription - parts and model prescription.	2
2	Demonstration of common dosage forms used in clinical practice	
3	Mixtures - one example (Expectorant/Salicylate) of simple and diffusible (Bismuth Kaolin/chalk) mixtures	2
4	Emulsion - Types and example (Liniment turpentine/ Shark liver oil) of emulsion	2
5	Powders - tooth powder	2
6	Mandl's paint/Gum paint percentage dilution - concept and calculations with suitable examples.	2
7	Mouth washes - Alkaline, antiseptic, astringent	2
8	Tooth pastes	2
9	Prescription writing for 15 general conditions commonly encountered in clinical practice. eg. Bronchial asthma, hypertension congestive heart failure, angina pectoris, peptic ulcer, bacillary dysentery, pseudomembranous colitis, diabetes mellitus, diabetic coma osteoarthritis, anaphylaxis, status asthmaticus, Status epilepticus, iron deficiency & pernicious anaemia	2
10	Dental prescriptions for about fifteen dental conditions commonly encountered in practice eg. Acute necrotising ulcerative. gingivitis, acute herpetic gingivitis/stomatitis, acute gingival abscess, pericoronal abscess (impacted teeth), dental caries, aphthous ulcers, hypersensitive dentine, dentoalveolar abscess, xerostomia, acute tooth ache, post operative pain, post extraction pain with swelling, oral candidiasis, scurvy etc.	2

g) SCHEME OF EXAMINATION

Distribution of Topics and Type of Questions for University Written examination:

Contents	Types of Questions and Marks	Marks
Questions from Pharmacokinetics, pharmacodynamics, antibiotics, NSAID's, Local Anaesthetics, Anticoagulants, Beta blockers, Glucocorticoids, Calcium Channel blockers, ACE inhibitors, Opioid analgesics, Sympathomimetics, Anti- Cholinergics, Cardiac Glycosides, Dental Pharmacology.	Long Essays 2 x 10 marks	20
Questions should Preferably be set from all other chapters excluding the one from which a Long Essay Question has been set	Short Essays 10x 5 marks	50
	Short Answers 10 x 3marks	30
	Total	**100**

iii. Theory

University Written **100 Marks**
Internal Assessment **25 Marks**
Viva Voce: **25 Marks**

iv. Practicals:

University Practical Examination: **80**
Marks

Spotters *10x 1Mark*	*10 Marks*
Prescriptions (1 Medical & 1 Dental) *2x10Marks*	*20 Marks*
Preparations (1 Medical & 1 Dental) 2x20Marks	*40 Marks*
Practical Work Record	*10 Marks*

Internal Assessment: **20**
Marks

Grand Total 250Marks

9. PRE CLINICAL CONSERVATIVE DENTISTRY

a) LABORATORY EXERCISES

Sl.No.	Practical exercise	Hours
1	Identification and study of hand cutting instruments chisels, gingival margin trimmers, excavators and hatchet.	3
2	Identification and use of rotary cutting instruments in contra angle hand pieces burs (Micromotor)	2
3	Preparation of class I and extended class I and class II and MOD's and class V amounting to 10 exercises in plaster models	30
4	Exercises on phantom head models(Typhodonts) which includes tooth preparation, base and varnish application, matrix and wedge placement followed by amalgam restoration Class I 5 Class I with extension 2 Class II 10 Class II MODS 2 Class V and III for glass ionomer 4 Class V for amalgam 2	95
5	10 exercises on mounted extracted teeth .Tooth preparation, base application, matrix and wedge placement, and restoration with amalgam. Class I 2 Class I with extension 2 Class II 4 Class V 2 Polishing of above restorations	20
6	Cast Restoration –Inlay preparation: Class I 1 To prepare Wax patterns Class II 2+1 MOD To prepare wax patterns and one to be casted Class V 1 (posterior)	20
7	Management of deep caries a. Pulp capping : Direct/ Indirect on extracted teeth	30
8	b. Pulpotomy on extracted posterior teeth	
9	Demonstration of Light cure composite and Glass Ionomer Restorations.	
10	Endodontic exercises. Root canal access preparation on Upper Extracted Central incisor. Determination of working length Demonstration of Instrumentation and Obturation of root canal space. Restoration of access preparation	

b) SCHEME OF EXAMINATION

i. Practicals

University practical examination	60
University Viva Voce	20
Internal Assessment	20
Grand Total	**100**

Distribution of Marks for Preclinical Conservative Dentistry University Practical Examination

(1) Tooth Preparation and Restoration — *45 Marks*
(2) Spotters (10 x 1 Mark) — *10 Marks*
(3) Preclinical Practical Work Record — *05 Marks*

Practical Exercise No. *(1):* 45 Marks

Class II Conventional / Conservative preparation for Silver Amalgam restoration on Maxillary or Mandibular first or second Molar typhodont tooth.

Cavity preparation	*45 Minutes*	*15 Marks*
Base and Matrix	*15 Minutes*	*10 Marks*
Amalgam restoration and carving	*30 Minutes*	*10 Marks*

Practical Exercise No. *(2):* 10 Marks

Spotters: Time: 02 minutes each
Type of Spotters:
Hand instruments used for tooth preparation and restoration
Identification of Root Canal Instruments

10. PRE CLINICAL ORTHODONTICS

a) SCHEME OF STUDY

The undergraduate study of orthodontics spans over second year, third year and fourth year. In second year the emphasis is given for basic and preclinical wire bending exercises and appliance fabrication.

b) AN OUTLINE OF THE COURSE CONTENT:

Preclinical basic wire bending exercises enable the candidate to get accustomed with the orthodontic wire, learn the basic skills of wire bending, learn how to construct various components of removable appliances and to acrylize various removable appliances.

c) PRATICAL TRAINING DURING SECOND YEAR B.DS

Sl .No.	Topic	Hours
1	Basic wire bending exercises • Straightening of wire • Equilateral triangle • Square • Rectangle • Circle • U - V	40
2	Pre clinical wire bending exercises • C – clasp • Full clasp • Triangular clasp • Adams clasp • Finger spring • Double cantilever spring • T spring • Coffin spring • Short labial bow • Long labial bow • Split labial bow • Reverse labial bow • Roberts retractor • U loop buccal canine retractor • Helical canine retractor • Self supported canine retractor • Palatal canine retractor	60
3	Appliance fabrication • Hawleys appliance • Hawleys appliance with ABP • Hawleys appliance with PBP and Z spring • Tongue guard appliance • Oral screen • Catalan's appliance • Expansion appliance	60

Theory topics to be covered in second BDS should be adjusted with the practical classes

d) SCHEME OF EXAMINATION

i. Practicals

University practical examination	60
University Viva Voce	20
Internal Assessment	20
Grand Total	100

Distribution of Marks for Preclinical Orthodontics University Practical Examination

(1) Wire bending exercises *55 Marks*

(2) Preclinical Practical Work Record *05 Marks*

Wire bending exercises and their mark distribution should be as follows:

a) Labial bow 20 Marks
b) Clasp 20 Marks
c) Spring 15 Marks

Note: Preclinical viva should be limited to, Orthodontic material science (orthodontic wire alloys, impression materials, acrylic, Gypsum products), removable appliances, study models, soldering and welding

11. PRECLINICAL PROSTHODONTICS AND CROWN & BRIDGE

a) LABORATORY EXERCISES: Total 380 Hours (I yr. 100, II yr. 200, III yr.80)

Sl.No.	Practical Exercise	Hours
	Laboratory steps related to complete denture	
1	Impression and model preparation	
2	Preparation of special trays in base plates – trimmed margin, rolled margin, reinforced.	
3	Special tray in self cure resin	
4	Special tray in heat cure resin	
5	Preparation of temporary bases	**150**
6	Preparation of bite blocks	
7	Mounting the model	
8	Ideal Teeth setting (Class I) in Three Point Articulator- 5 Numbers	
9	Fabrication of Complete Denture in Acrylic- 1	
10	Repair of fractured Denture	
	Laboratory steps related to partial denture	
11	Fabrication of Acrylic Partial Denture – class I, class II, class III, class IV (Kennedy)	
12	Surveying a model	**100**
13	Preparation RPD wax pattern on casts (class I, class II, class III & class IV)	
	Maxillofacial Prosthesis	
14	Preparation of Obturators	**50**
15	Preparation of occlusal splint	

16	Preparation of gunning splint	
	Fixed Prosthodontics	**80**
17	Preparation of individual crowns on large sized teeth – jacket crown, anterior. Full crown, posterior. Partial veneer crown – anterior. Partial veneer crown – posterior	
18	Preparation of individual crowns on phantom head. Jacket crown – central incisor	

A work record should be maintained by all students and should be submitted at the time of examination after due certification from the Head of the Department.

To appear for II BDS preclinical Prosthodontics examination it is Mandatory that Laboratory exercises from No. 1 to No. 11 mentioned in the table above is completed.

b) SCHEME OF EXAMINATION

i. Practicals

University practical examination	60
University Viva Voce	20
Internal Assessment	20
Grand Total	100

Distribution of Marks for Preclinical Prosthodontics University Practical Examination

(1) Arrangement of teeth in class I relation, Waxing, Carving, Polishing: 35 Marks
(2) Drawing the Design for a Cast Partial Denture and marking its components 15 Marks
(3) Preclinical Practical Work Record 10 Marks

Note: Preclinical viva should be limited to, Laboratory Procedures related to Complete Denture Fabrication, Articulators, Anatomical landmarks , Impression Procedures, Introduction to jaw relation recording, Selection & arrangement of teeth, Complete Denture Occlusion, Try in Procedures and Components of RPD & FPD.

12. GENERAL MEDICINE

a) GUIDELINES:

Special emphasis should be given throughout on the importance of various diseases as applicable to dentistry.

i. Special precautions/ contraindication for anaesthesia in oral and dental procedures in different systemic diseases.
ii. Oral manifestations of systemic diseases.
iii. Medical emergencies in dental practice.

A dental student should be taught in such a manner that he/she is able to record the arterial pulse, blood pressure and be capable of suspecting by sight and superficial examination of the body, diseases of the heart, lungs, kidneys, blood etc. He should be capable of handling medical emergencies encountered in dental practice.

COLLATERAL TOPICS (Desirable to Know)

b) THEORY: 60 HOURS

CORE TOPICS (Must Know)	COLLATERAL TOPICS (Desirable to know)	Hours
1. Aims of medicine, definitions of diagnosis, treatment & prognosis.History taking ,Physical examination of the patient, diagnosis and management of disease	Genetics and disease,Medical Ethics	**2**
2.Infections: Enteric fever, HIV, Herpes simplex, Herpes zoster, Syphilis ,Diphtheria, Malaria, Actinomycosis, Viral hepatitis, Tuberculosis.	Infectious mononucleosis Mumps, Measles, Rubella, Leprosy, Organisation and functions of the immune systems	**5**

3. G.I.T: Stomatitis, Gingival hyperplasia, Dysphagia, Acid peptic disease, Jaundice, Acute and chronic hepatitis, Cirrhosis of liver, Ascitis, Amoebiasis, Tender hepatomegaly , Hepatotoxic drugs, Portal hyper tension.	Diarrhoea and Dysentery including Malabsorbtion syndromes ,Helicobacter pylori	**5**
4. CVS :Acute rheumatic fever Valvular heart disease, Hypertension, Ischemic heart disease (myocardial infarction), Infective endocarditis, Common arrhythmias, Classification of congenital heart disease, Congestive cardiac failure	Heart failure, Fallot's tetralogy, ASD, VSD	**7**
5.Respiratory System: Applied Anatomy and physiology of RS, Pneumonia, COPD ,Pulmonary tuberculosis, Bronchial asthma, Pleural effusion, Acute respiratory tract infections, Pulmonary embolism , Suppurative lung diseases, Lung abscess	Pneumothorax , Bronchiectasis Lung Cancer, Empyema, Sleep apnea, ARDS, Respiratory failure	**6**
6.Hematology Hematopoiesis, Anaemias, Bleeding & Clotting disorders, Acute and chronic myeloid leukemias, Agranulocytosis and Neutropenia, Thrombocytopenia , Splenomegaly Lymphomas, Oral manifestations of haematological disorders, Generalized Lymphadenopathy.	Principles of blood and blood products transfusion, Thromboembolic disease, Oncogenesis, Haemolytic anemia, DIC (Disseminated Intravascular Coagulation)	**7**
7.Renal System :Acute nephritis and Nephrotic syndrome, U.T.I	Renal function tests ,CRF	**5**
8. Nutrition: Balanced diet, PEM, Vitamin deficiency disease, Calcium and phosphate metabolism, Flurosis	Osteomalacia, Osteoporosis	**4**
9. CNS: Facial palsy, Facial pain Trigeminal neuralgia, Epilepsy, Headache including migraine.	Meningitis (Acute and Chronic) Anticonvulsants, Examination of comatose patient, Examination of cranial nerves.	**7**
10.Endocrine : Diabetes mellitus Acromegaly, Hypothyroidism, Thyrotoxicosis, Calcium metabolism and parathyroids	Addison's disease, Cushing's syndrome ,Parathyroid disease and calcium metabolism, Preoperative assessment of diabetic patients, Acute adrenal deficiency	**6**
11. Critical care :Syncope, Cardiac arrest, Cardio Pulmonary Resuscitation (CPR), Cardiogenic shock, Anaphylaxis ,Allergy, Angio -neurotic edema	Acute LVF, ARDS, Coma	**4**
Miscellaneous : Adverse drug reactions, Drug interactions	Rheumatoid disease, Osteoarthritis, Scleroderma	

c) CLINICAL TRAINING: 90 HOURS (posting in a general hospital)

The student must be able to take history, do general physical examination (including build, nourishment, pulse, BP, temperature,edema,respiration, clubbing, cyanosis, jaundice, lymphadenopathy, oral cavity) and be able to examine CVS, RS , abdomen and facial nerve and signs of meningeal irritation.

d) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examnination:

Contents	Types of Questions and Distribution of Marks	Total Marks
Questions from Must Know topics only	Long Essays 2 x 10 marks	20
Questions should preferably be set from all other chapters excluding the one from which long essay questions have been set.	Short Essays 10x 5 marks	50
	Short Answers 10 x 3marks	30
	Total	**100**

i. Theory

University Written		**100 Marks**
Internal Assessment		**25 Marks**
Viva Voce:		**25 Marks**

ii. Clinicals:

University Clinical Examination:		**80 Marks**
Case History	*15 Marks*	
Clinical Examination	*30 Marks*	
Investigation	*10Marks*	
Diagnosis & D.D	*15 Marks*	
Management	*10 Marks*	
Internal Assessment:		**20 Marks**
		Grand Total 250Marks

13. **GENERAL SURGERY**

a) AIMS:

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

b) OBJECTIVES:

Skills to be developed by the end of teaching are to examine a routine swelling, ulcer and other related diseases and to perform minor surgical procedures such as draining an abscess, taking a biopsy etc.

c) THEORY: 60 HOURS

Sl. No.	Topic	Hours
1	HISTORY OF SURGERY: The development of surgery as a specialty over the years, will give the students an opportunity to know the contributions made by various scientists, teachers and investigators. It will also enable the student to understand the relations of various specialties in the practice of modern surgery.	1
2	GENERAL PRINCIPLES OF SURGERY: Introduction to various aspects of surgical principles as related to orodental diseases. Classification of diseases in general. This will help the student to understand the various diseases, their relevance to routine dental practice.	2
3	PRINCIPLES OF OPERATIVE SURGERY: Principles as applicable to minor surgical procedures including detailed description of asepsis, antiseptics, sterilisation, principles of anaesthesia and principles of tissue replacement. Knowledge of sutures, drains, diathermy, cryosurgery and use of Laser in surgery.	1
4	WOUNDS: Their classification, wound healing, repair, treatment of wounds, skin grafting, medicolegal aspects of accidental wounds and complications of wounds.	3
5	INFLAMMATION: Of soft and hard tissues. Causes of inflammation, varieties, treatment and sequelae.	1
6	INFECTIONS: Acute and chronic abscess skin infections, cellulitis, carbuncle, and erysepelas. Specific infections such as tetanus, gangrene, syphilis, gonorrhoea, tuberculosis, Actinomycosis, Vincents angina, cancrum oris. Pyaemia, toxaemia and septicaemia.	5
7	TRANSMISSABLE VIRAL INFECTIONS: HIV and Hepatitis B with special reference to their prevention and precautions to be taken in treating patients in a carrier state.	2
8	SHOCK AND HAEMORRHAGE: Classification, causes, clinical features and management of various types of shock. Syncope, Circulatory collapse. Haemorrhage -different types, causes,	5

	clinical features and management. Blood groups, blood transfusion, precautions and complications of blood and their products. Hemophilia's, their transmission, clinical features and management especially in relation to minor dental procedures.	
9	TUMOURS, ULCERS, CYSTS, GANGRENE, SINUS, AND FISTULAE: Classification, clinical examination and treatment principles in various types of benign and malignant tumours, ulcers, cysts, gangrene, sinus and fistulae.	9
10	DISEASES OF LYMPHATIC SYSTEM: Especially those occurring in head and neck region. Special emphasis on identifying diseases such as tubercular infection, lymphomas, leukaemias, metastatic lymph node diseases.	1
11	DISEASES OF THE ORAL CAVITY: Infective and malignant diseases of the oral cavity and oropharynx including salivary glands with special emphasis on preventive aspects of premalignant and malignant diseases of the oral cavity.	2
12	NECK SWELLINGS – Midline and Lateral swellings, Cystic and Solid swellings –Classification, Differential diagnosis, Treatment	1
13	DISEASES OF LARYNX, NASOPHARYNX: Infections and tumours affecting these sites. Indications, procedure and complications of tracheostomy.	2
14	NERVOUS SYSTEM: Surgical problems associated with nervous system with special reference to the principles of peripheral nerve injuries, their regeneration and principles of treatment. Detailed description of afflictions of facial nerve And its management. Trigeminal neuralgia, its presentation and treatment.	1
15	FRACTURES: General principles of fractures, clinical presentation and treatment with additional reference to newer methods of fracture treatment. Special emphasis on fracture healing and rehabilitation.	1
16	HEAD INJURY MANAGEMENT	1
17	MANAGEMENT OF SEVERELY INJURED PATIENT - RESUSCITATION	1
18	DISEASES OF ARTERIES AND VEINS IN GENERAL –Varicose veins, Atherosclerosis, Aneurysm, Carotid Body tumours	1
19	ANOMALIES OF DEVELOPMENT OF FACE: Surgical anatomy and development of face. Cleft lip and cleft palate—principles of management.	1
20	DISEASES OF THYROID AND PARATHYROID: Surgical anatomy, pathogenesis, clinical features and management of dysfunction of thyroid and parathyroid glands. Malignant diseases of the thyroid—classification, clinical features and management.	2
21	SWELLINGS OF THE JAW: Differential diagnosis and management of different types of swellings of the jaw, Osteomyelitis of mandible	2
22	BIOPSY: Different types of biopsies routinely used in surgical practice.	1
23	BURNS AND SCALDS	1

Desirable to know: Introduction to oncology, radiotherapy, surgery and genetic engineering
E.N.T: Ear: Middle ear infection; Nose: Para nasal sinuses; Throat: Tonsilitis & Peritonsillar Abscess

d) CLINICALS: 90 HOURS (posting in a general hospital)

e) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
Questions may be asked from topics mentioned under theory topics numbered 2,3,4,5,6,7,8,9,10,11,14,15	Long Essays 2 x 10 marks	20
Questions should preferably be set from all other chapters excluding the one from which long essay questions have been set.	Short Essays 10x 5 marks	50
	Short Answers 10 x 3marks	30
	Total	**100**

i. Theory

University Written **100 Marks**
Internal Assessment **25 Marks**
Viva Voce: **25 Marks**

ii. Clinicals:

University Clinical Examination: **80 Marks**

Long Case

Case History	*15 Marks*
Clinical Examination	*30 Marks*
Suggested Investigations	*10Marks*
Diagnosis & D.D	*15 Marks*
Management	*10 Marks*

Internal Assessment: **20 Marks**

Grand Total 250Marks

14. ORAL PATHOLOGY & ORAL MICROBIOLOGY

a) OBJECTIVES:

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

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

b) SKILLS

The Following skills are to be developed:

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

c) THEORY: 145 Hours (II yr. 25 hrs. III yr. 120 hrs.)

Sl. No:	Topics for II year	Description	Hours
1	**Introduction**	Scope and Outline of Oral Pathology, Broad divisions, Interrelationship with medical specialities	1
2	**Developmental disturbances of oral & paraoral structures**	a) Developmental disturbances of Jaws - Agnathia, Micrognathia, Macrognathia, Facial Hemihypertrophy, Facial Hemiatropy b) Developmental Disturbances of lips and palate - Congenital Lip pits and Commissural pits and fistulas - Double lip, Cleft lip, cleft Palate, Chelitis Glandularis, Chelitis	

		Granulomatosa, Hereditary Intestinal Polyposis, Hereditary Melanotid Macule c) Developmental disturbances of Oral Mucosa - Fordyce's Granules - Focal epithelial Hyperplasia d) Developmental disturbances of gingiva - Fibromatosis Gingiva, Retrocuspid Papilla e) Developmental Disturbances of Tongue - Macroglossia, Microglossia, Ankyloglossia, Cleft Tongue, Fissured Tongue, Median Rhomboid Glossitis, Benign Migratory Glossitis, Hairy Tongue. f) Development disturbances of oral lymphoid tissue: - Reactive lymphoid aggregates - Lymphoid hamartoma - Angiolymphoid Hyperplasia - Lympho-epithelial cyst g) Developmental disturbances of salivary glands: - Aplasia, Xerostomia, Hyperplasia of the palatal glands, Atresia, Abberrancy, Stafine's cyst h) Developmental disturbances in size of teeth: - Microdontia, Macrodontia i) Developmental disturbances in the shape of the teeth: 79 - Fusion, Germination, Concrescence, Dilacerations, Talon's Cusp, Dens in Dente, Dens Evaginatus, Taurodontism, Supernumerary Roots, Enameloma j) Developmental Disturbances in number of teeth - Anodontia, Supernumerary teeth, Predecidious and Post Permanent dentition k) Developmental Disturbances in Structure of Teeth: - Amelogenesis Imperfecta, Enamel Hypoplasia, Dentinogenesis Imperfecta, Dentinal dysplasia, Regional Odontodysplasia, Shell Teeth. l) Developmental Disturbances in eruption of teeth: - Premature Eruptions, Eruption Sequestrum, Delayed Eruption, Multiple Unerupted teeth, Submerged Teeth. m) Developmental / Fissural cysts of the Oral cavity - Median palatal cyst, Globulomaxillary cyst, Median Mandibular cyst, Naso-alveolar cyst, Palatal cyst of neonates, Thyroglossal duct cyst, Epidermoid, and Dermoid cyst, Nasopalatine cyst.	14
3	**Dental caries**	Theories,Clinicalfeatures,Classification, Histopathology,Microbiology of Dental caries ,Immunology, Caries activity tests,Factors influencing caries	4
4	**Diseases of the Pulp & Periapical tissues**	a) Diseases of the Dental Pulp - Pulpitis, Focal Reversible Pulpitis, Chronic Pulpitis, Pulp Polyp. b) Diseases of the Periapical Tissues - Periapical Granuloma, Periapical Abscess, Periapical Cyst c) Osteomyelitis - Acute Suppurative Osteomyelitis, Chronic Focal and Diffuse Sclerosing Osteomyelitis, Garre's Ostemyelitis Sequelae of periapical abscess - summary of space infections, systemic complications & significance Cellulitis,Ludwig's angina,Intra cranial complication of dental infection,Maxillary sinusitis,Focal infection and foci of infection	6
	Topics for III Year	**Description**	
1	**Benign and malignant tumours of Oral cavity**	Classification of Odontogenic, Non-Odontogenic & Salivary Gland Tumours. Etiopathogenesis, clinical features, histopathology, radiological features & laboratory diagnosis (as appropriate) of the following common tumours :- 1.Odontogenic tumours -Classification Benign a.Odontogenic epithelium without odontogenic ectomesenchyme-Ameloblastoma,Calcifying Epithelial Odontogenic Tumour,Adenomatoid Odontogenic Tumour,Squamous Odontogenic tumour b.Odontogenic epithelium with Odontogenic ectomesenchyme-Ameloblastic fibroma,Ameloblastic fibro	1 9

		odontoma,Odontoma,Dentinogenic Ghost cell Tumour c.Odontogenic ectomesenchyme with or without included odontogenic epithelium-Peripheral and Central odontogenic fibroma,Odontogenic Myxoma,Benign cementoblastoma Malignant a.Odontogenic carcinomas: Metastasizing ameloblastoma,Ameloblastic carcinoma 2. Non-odontogenic a.Benign tumours of epithelial tissue origin -Papilloma,Keratoacanthoma,Nevus b.Premalignant lesions and conditions -Definition,Classification -Epithelial dysplasia -Leukoplakia,Carcinoma in situ,Erythroplakia,,Oral submucous fibrosis c.Malignant tumours of epithelial tissue origin -Basal cell carcinoma,Epidermoid carcinoma (Epidemiology,etiology,clinical & histological features,Grading and TNM staging),Verrucous carcinoma ,Malignant melanoma,Recent advances in diagnosis , management and prevention of Oral cancer d.Benign tmours of Connective tissue origin -Fibroma,Giant cell fibroma,Peripheral and Central ossifying fibroma,Lipoma,Haemangioma(different types),Lymphangioma,Chondroma,Osteoma,Osteoid osteoma,Benign osteoblastoma,Tori and Multiple exostoses e.Tumour like lesions of Connective tissue origin- -,Peripheral ossifying fibroma f.Malignant tumours of Connective tissue origin -Fibrosarcoma,Chondrosarcoma,Kaposi's sarcoma,Ewing's sarcoma,Osteosarcoma,Hodgkin's and Non Hodgkin's lymphoma,Burkitt's lymphoma,Multiple myeloma,Solitary Plasma cell myeloma g.Benign tumours of Muscle tissue origin -Leiomyoma,Rhabdomyoma,Congenital Epulis of newborn,Granular cell tumour h.Benign and Malignant tumours of Nerve tissue origin -Neurofibroma and Neurofibromatosis ,Schwannoma,,Melanotic neuroectodermal tumour of infancy,Malignant Schwannoma. i.Metastatic tumours of Jaws and Soft tissues of Oral cavity 3. Salivary Gland Benign neoplasms - Pleomorphic Adenoma, Warthin's tumour, & Oncocytoma. Malignant neoplasms –Malignant Pleomorphic adenoma Adenoid Cystic Carcinoma, Mucoepidermoid Carcinoma, Acinic Cell Carcinoma & Adenocarcinomas.	30 8
2	**Cysts of the Oral & Paraoral region**	Classification, etiopathogenesis, clinical features, histopathology, laboratory & radiological features (as appropriate) of Odontogenic cysts- Odontogenic keratocyst,Dentigerous cyst,Primordial cyst,Dental lamina cyst of newborn,Gingival cyst of adults,Lateral periodontal cyst,Calcifying odontogenic cyst,Radicular cyst Non-Odontogenic cysts- Pseudocysts of jaws,Aneurysmal bone cyst,Traumatic bone cyst & soft tissue cysts of oral & paraoral region.	8
3.	**Non neoplastic Salivary Gland Diseases :**	Sialolithiasis, Sialosis, Sialadenitis, Xerostomia & Ptyalism. Sjogren's syndrome ,Benign lymphoepithelial lesion,,Necrotizing sialometaplasia	2
4.	**Traumatic, Reactive & Regressive lesions of Oral Cavity :**	Pyogenic granuloma,Peripheral & Central Giant cell granuloma, exostoses Fibrous Hyperplasia, Traumatic Ulcer & Traumatic Neuroma. Attrition, Abrasion, Abfraction Erosion, Bruxism, Hypercementosis, Dentinal changes, Pulp calcifications & Resorption of teeth. Radiation effects of oral cavity, Allergic reactions of the oral cavity. -Angioedema,Stomatitis medicamentosa,Stomatitis venenata	5
5.	**Microbial infections of oral soft tissues :**	Microbiology, defence mechanisms including immunological aspects, oral manifestations, histopathogy and laboratory diagnosis of common bacterial, viral & fungal infections namely :- Bacterial : Scarlet fever,Diphtheria,Tuberculosis, Syphilis, Actinomycoses & its complications - Cancrum Oris, Tetanus,Noma . Viral : Herpes Simplex, Varicella zoster, Measles, Mumps & HIV infection	10

		and Oral manifestation of AIDS. Fungal : Candidiasis,Histoplasmosis Immunological diseases: Reccurent Aphthous stomatitis,Bechet's syndrome,Reiter's syndrome,Sarcoidosis.	
6.	**Common non-inflammatory diseases involving the jaws**	Etiopathogenesis, clinical features, radiological & laboratory values in diagnosis of: Fibrous dysplasia, Cherubism, Osteogenesis Imperfecta, Paget's bone disease, Cleidocranial dysplasia, Rickets, Achondroplasia, Marfan's syndrome , Down's syndrome and Histiocytosis X disease.	6
7.	**Biopsy,Cytology and Healing of Oral wounds**	Factors affecting healing of wounds -healing of extraction wound and Dry socket Biopsy-techniques,Healing of biopsy wound -Exfoliative cytology-Indications,Staining and Interpretation	4
8.	**Systemic Diseases involving Oral cavity**	Brief review & oral manifestations, diagnosis & significance of common Blood, Nutritional, Hormonal & Metabolic diseases of Oral cavity. a.Blood dyscrasias-Clinico-pathological aspects and oral manifestations of Anemias,Polycythemia,Leukopenia,Neutropenia,Agranulocytosis,Chediak-Higashi syndrome,Leukocytosis,Infectious mononucleosis,Leukemias ,Purpura Haemophilia b.Oral aspects of Disturbances in mineral metabolism c.Oral aspects of Avitaminosis and Hypervitaminoses d.Oral Aspects of Endocrine dysfunction	4 5
9.	**Mucocutaneous lesions :**	Etiopathogenesis, clinical features & histopathology of the following common lesions. Lichen Planus, Lupus Erythematosus, Pemphigus & Pemphigoid lesions, Erythema Multiforme, Psoriasis, Scleroderma, Ectodermal Dysplasia, Epidermolysis bullosa & White sponge nevus.	10
10.	**Periodontal Diseases :**	Stains,Calculus,Dental plaque Etiopathogenesis, microbiology, clinical features, histopathology & radiological features (as appropriate) of gingivitis, gingival enlargements ,ANUG,,chronic desquamative gingivitis periodontitis and juvenile periodontitis. Basic immunological mechanisms of periodontal disease to be highlighted.	4
11.	**Diseases of TM Joint**	Ankylosis, luxation and subluxation, summary of different types of arthritis & other developmental malformations, traumatic injuries & myofascial pain dysfunction syndrome.	2
12.	**Diseases of the Nerves :**	Facial neuralgias – Trigeminal ,Sphenopalatine & Glossopharyngeal neuralgias, VII nerve paralysis, Causalgia Psychogenic facial pain & Burning mouth syndrome.	2
13.	**Pigmentation of Oral tissues**	Pigmentation of Oral & Paraoral region & Discolouration of teeth : Causes & clinical manifestations.	2
14.	**Diseases of Maxillary Sinus**	Traumatic injuries to sinus, Sinusitis, Cysts & Tumours involving antrum	2
15.	**Principles of Basic Forensic Odontology**	Introduction, definition, aims & scope. Sex and ethnic (racial) differences in tooth morphology and histological age estimation Determination of sex & blood groups from buccal mucosa / saliva. Dental DNA methods Bite marks, rugae patterns & lip prints Dental importance of poisons and corrosives Overview of forensic medicine and toxicology	6

d) LABORATORY/PRACTICAL REQUIREMENTS

Students have to maintain records of laboratory procedures/work done/report of practical:

i. Oral Pathology and Microbiology

Identification of the pathologic features of:

Microdontic tooth
Macrodontic tooth
Gaemination of tooth
Fused teeth
Concrescence of tooth

Dilaceration
Dens in dente
Dens evaginatus
Supernumerary root
Hypoplastic enamel
Fluorosis
Abrasion
Attrition
Fracture tooth
Stained tooth
Hypercementosis

Histopathologic Examination of the following gross specimens:
Papilloma
Fibroma
Torus
Carcinoma of oral structures
Salivary Gland Tumours
Ameloblastoma
Periapical Granuloma
Dentigerous Cyst
Pulp Polyp

Microbiologic Examination of:
Tuberculosis
Actinomycosis
Syphilis
Candidiasis

Histopathologic review of:
Amelogenesis Imperfecta
Dentinogenesis Imperfecta
Peripheral Giant Cell Granuloma
Leukoplakia
Carcinoma in situ
Oral Submucous Fibrosis
Carcinoma of Oral Mucosa
Pleomorphic Adenoma
Malignant Pleomorphic Adenoma
Dentigerous Cyst
Odontogenic Keratocyst
Ameloblastoma
Gingival Hyperplasia
ANG
Lichen Planus
Pemphigus
Dental Caries

Haematology Procedures:
Preparation of peripheral smear

Determination of TC, DC, ESR, Hb , Bleeding Time, Clotting Time ,Blood Picture.

Urochemistry

Analysis for jaundice, Diabetes Mellitus. Urine deposits.

Preparation of oral swab for Microbiology.

ii. **Forensic Pathology**

Report of Post-mortem examination – three cases to be seen and prepare certificates.

Age determination from skull.

Gustafson's method of age determination

- using incisors
- based on Pillai and Bhaskar's Formula

Medico-legal importance of age – dental examination subject/model.

Identification of specimens – medico-legal importance – injury specimens abrasion – contusion – lacerated wound – incised wound – fracture.

hair – animal and human

blood – animal and human.

Barr bodies.

e) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
Both questions from Oral pathology only	Long Essays 2 x 10 marks	20
A. Oral Pathology - seven questions B. Oral Microbiology - two questions C. Forensic Odontology - one question	Short Essays 10x 5 marks	50
A. Oral Pathology - eight questions B. Oral Microbiology - one question C. Forensic Odontology - one question	Short Answers 10 x 3marks	30
	Total	**100**

i. Theory

University Written **100 Marks**
Internal Assessment **25 Marks**
Viva Voce: **25 Marks**

ii. Clinicals:

University Clinical Examination: **80 Marks**

Spotters (Specimen -identification & points in support-10x 2 Marks) *20 Marks*

Histopathology slides(Diagram,Labelling and salient features) *40Marks*

Forensic Odontology (Estimation of age from ground sections) 10 Marks

Clinical Work Record & Seminar *10 Marks*

Internal Assessment: **20 Marks**

Grand Total 250 Marks

15 PERIODONTOLOGY

a) OBJECTIVES:

The student shall acquire the skill to:-

i. Perform dental scaling diagnostic tests of periodontal diseases
ii. To use the instruments for periodontal therapy and maintenance of the same.

The student shall develop attitude to:-

i. Impart the preventive measures namely, the prevention of periodontal diseases and prevention of the progress of the disease
ii. Perform the treatment with full aseptic precautions
iii. Shall develop an attitude to prevent iatrogenic diseases
iv. To conserve the tooth to the maximum possible time by maintaining periodontal health
v. To refer the patients who require specialist's care.

b) THEORY: 80 HOURS (III yr.30hrs,IV yr. 50 hrs)

Topic	Hours
1. Introduction, Definition of Periodontology, Periodontics, Periodontia ,Brief historical background, Scope of Periodontics	**1**
2. Development of periodontal tissues, Micro-structural anatomy and biology of periodontal tissues in detail Gingiva. Junctional epithelium in detail, Epithelial-Mesenchymal interaction, periodontal ligament, Cementum, Alveolar bone	**1**
3. Defensive mechanisms in the oral cavity: Role of Epithelium, Gingival fluid, Saliva and other defensive mechanisms in the oral environment	**1**
4. Age changes in teeth and periodontal structures and their association with periodontal diseases and their significance in Geriatric dentistry	**1**
5. Classification of periodontal diseases: need for classification, Scientific basis of classification, Classification of gingival and periodontal diseases as described in World Workshopl989	**1**
6. Gingivitis: Plaque associated, ANUG, steroid hormone influenced, Medication influenced, Desquamative gingivitis, other forms of gingivitis as in nutritional deficiency, bacterial and viral infections etc.	**1**
7. Periodontitis: Adult Periodontitis, rapidly progressive Periodontitis A &B, Juvenile Periodontitis (localized, generalized, and post-juvenile), Prepubertal Periodontitis, Refractory Periodontitis	**1**
8. Gingival diseases: Localized and generalized gingivitis, Papillary, marginal and diffuse gingivitis aetiology, pathogenesis, clinical signs, symptoms and management of	**7**
a) Plaque associated gingivitis	
b) Systemically aggravated gingivitis (sex hormones, drugs and systemic diseases)	
c) ANUG	
d) Desquamative gingivitis-Gingivitis associated with Lichen Planus, Pemphigoid, Pemphigus, and other Vesiculobullous lesions	
e) Allergic gingivitis	
f) Infective gingivitis-Herpetic, Bacterial and Candidial	
g) Pericoronitis	
h) Gingival enlargement (classification and differential diagnosis)	
9. Epidemiology of periodontal diseases Definition of index, incidence, prevalence, epidemiology, endemic, epidemic, and pandemic Classification of indices (Irreversible and reversible), deficiencies of earlier indices used in Periodontics, Detailed understanding of Silness & Loe Plaque Index, Loe & Silness Gingival Index, CPITN &CPL, Prevalence of periodontal diseases in India and other countries. Public health significance (All these topics are covered at length under community dentistry. Hence, the topics may be discussed briefly. However, questions may be asked from the topics for examination.)	**3**
10. Extension of inflammation from Gingiva, mechanism of spread of inflammation from gingival area to deeper periodontal structures, Factors that modify the spread	**1**
11. Pocket ,Definition, signs and symptoms, classification, pathogenesis, histopathology, root surface changes and contents of the pocket	**1**
12. Etiology	**5**
a) Dental Plaque (Biofilm), Definition, New concept of Biofilm , Types, composition, bacterial colonization, growth, maturation &disclosing agents, Role of dental plaque in periodontal diseases, Plaque microorganisms in detail and bacteria associated with periodontal diseases, Plaque retentive factors, Materia alba, Food debris	
b) Calculus, Definition, Types, composition, attachment, theories of formation, Role of	

calculus in disease	
c) Food Impaction, Definition Types, Etiology, Hirschfield's classification ,Signs, symptoms & sequelae of treatment	
d) Trauma from occlusion, Definition, Types, Histopathological changes, Role in periodontal disease, Measures of management in brief	
e) Habits, Their periodontal significance, Bruxism & Parafunctional habits, tongue thrusting, lip biting, occupational habits	
f) Iatrogenic factors,	
(i) Conservative Dentistry:-Restorations, Contact point, marginal ridge, surface roughness, overhanging restorations, interface between restoration and teeth	
(ii) Prosthodontics, Interrelationship, Bridges and other prosthesis, Pontics (types), surface contour, relationships of margins to the periodontium, Gingival protection theory, muscle action theory& theory of access to oral hygiene.	**4**
(iii) Orthodontics ,Interrelationship, removable appliances & fixed appliances, Retention of plaque, bacterial changes	
g) Systemic diseases,Diabetes, Sex hormones, nutrition (Vit.C & proteins),AIDS & periodontium, Hemorrhagic diseases, Leukemia, clotting factor disorders, PMN 1disorder	**1**
13. Risk factors, Definition, Risk factors for periodontal diseases	**1**
14. Host response: Mechanism of initiation and progression of periodontal diseases, Basic concepts about cells, Mast cells, neutrophils, macrophages, lymphocytes, immunoglobulins, complement system, immune mechanisms & cytokines in brief, Stages in gingivitis-Initial, early, established & advanced, Periodontal disease activity, continuous paradigm, random burst & asynchronous multiple burst hypothesis	**2**
15. Periodontitis:	
a) Etiology, histopathology, clinical signs & symptoms, diagnosis and treatment of adult Periodontitis	
b) Periodontal abscess; definition, classification, pathogenesis, differential diagnosis and treatment	**5**
c) Furcation involvement, Glickman's classification, prognosis and management	
d) Rapidly progressive Periodontitis Juvenile Periodontitis: Localized and generalized Post juvenile Periodontitis	
e) Periodontitis associated with systemic diseases ,Refractory Periodontitis	
16. Diagnosis:	
a) Routine procedures, methods of probing, 2 types of probes, (According to case history)	**3**
b) Halitosis: Etiology and treatment. Mention advanced diagnostic aids and their role in brief.	
17. Prognosis, Definition, types, purpose and factors to be taken into consideration	**1**
18. Treatment plan Factors to be considered	**1**
19. Periodontal therapy	
a) General principles of periodontal therapy. Phase I, II, III, IV therapy.	
b) Definition of periodontal regeneration, repair, new attachment and reattachment	
c) Plaque control	**5**
(i) mechanical :tooth brushes, Interdental cleaning aids, dentifrices	
(ii) Chemical: classification and mechanism of action of each & pocket irrigation	
20. Pocket eradication procedures	
a) Scaling and root planning: Indications, Aims & objectives, Healing following root planning, Hand instruments, sonic, ultrasonic & Piezo-electric Scalers	
b) Curettage: Definition Indications present concepts Aims &objectives, Procedures & healing response	**5**
c) Flap surgery: Definition, Types of flaps, Design of flaps, papilla preservation Indications & contraindications, Armamentarium, Surgical procedure & healing response	
21. Osseous Surgery:	
a) Osseous defects in periodontal disease, Definition, Classification	
b) Surgery: resective, additive osseous surgery (osseous grafts with classification of grafts)	**6**
c) Healing responses	
d) Other regenerative procedures; root conditioning	
e) Guided tissue regeneration	

22. Mucogingival surgery & periodontal plastic surgery:	**5**
a) Definition, Mucogingival problems: etiology,	
b) classification of gingival recession (P.D.Miller Jr. and Sullivan and Atkins), Indications, objectives	
c) Gingival extension procedures: Lateral Pedicle Graft, Frenectomy, Frenotomy	
d) Crown lengthening procedures	
e) Periodontal microsurgery in brief	
23. Splints: Periodontal splints, Purpose & classification, Principles of splinting	**1**
24. Hypersensitivity, Cause, theories & Management	**1**
25. Implants: Definition, types, scope & biomaterials used, Periodontal considerations: such as Implant-bone interface, Implant-Gingiva interface, Implant failure, Peri-implantitis &management	**1**
26. Maintenance phase (SPT):	**4**
a) Causes, Theories & management	
b) Aims, objectives, and principles	
c) Importance	
d) Procedures	
e) Maintenance of implants	
27. Pharmacotherapy:	**4**
a) Periodontal dressings	
b) Antibiotics & anti-inflammatory drugs	
c) Local drug delivery systems	
28. Periodontal management of medically compromised patients: Topics concerning periodontal management of medically compromised patients	**2**
29. Inter-disciplinary care: Pulpo-Periodontal involvement, Routes of spread of infection, Simons classification, Management	**1**
30. Systemic effects of periodontal diseases in brief: Cardiovascular diseases, Low birth weight babies etc.	**1**
31. Infection control protocol: Sterilization and various aseptic procedures	**1**
32. Ethics.	**1**

c) TUTORIALS DURING CLINICAL POSTING:

i. Infection control
ii. Periodontal instruments
iii. Chair position and principles of instrumentation
iv. Maintenance of instruments (sharpening)
v. Ultrasonic, Piezoelectric and sonic scaling - demonstration of technique
vi. Diagnosis of periodontal disease and determination of prognosis
vii. Radiographic interpretation and lab investigations
viii. Motivation of patients- oral hygiene instructions
ix. Students should be able to record a detailed periodontal case history, determine diagnosis, prognosis and plan treatment.
x. Student should perform scaling, root plaining local drug delivery and SPT.
xi. Shall be given demonstration of all periodontal surgical procedures.

d) DEMONSTRATIONS:

i. History taking and clinical examination of the patients
ii. Recording different indices
iii. Methods of using various scaling and surgical instruments
iv. Polishing the teeth
v. Bacterial smear taking
vi. Demonstration to patients about different oral hygiene aids
vii. Surgical procedures- gingivectomy, gingivoplasty, and flap operations
viii. Follow up procedures, post operative care and supervision

e) MINIMUM CLINICAL REQUIREMENTS MANDATORY TO APPEAR FOR UNIVERSITY EXAMINATION:

i. Diagnosis, treatment planning, and discussion and total periodontal treatment- 25 cases
ii. Dental scaling, oral hygiene instructions – 50complete cases/equivalent
iii. Sub gingival Scaling and Root Plaining - 15 cases
iv. Assistance in periodontal surgery- 5 cases
v. A work record should be maintained by all the students and should be submitted at the time of examination after due certification from the head of the department.
vi. Students should have to complete the work prescribed by the concerned department from time to time and submit a certified record for evaluation.

f) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
Questions from any of the Periodontology Topics	Long Essays 2 x 10 marks	20
	Short Essays 10x 5 marks	50
	Short Answers 10 x 3marks	30
	Total	**100**

iii. Theory

University Written **100 Marks**
Internal Assessment **25 Marks**
Viva Voce: **25 Marks**

iv. Clinicals:

University Clinical Examination: **80 Marks**
Case History, Clinical Examination, Diagnosis & Treatment Planning 30 *Marks*
Oral prophylaxis 30 Marks
Clinical Work Record & Seminar 20 *Marks*
Internal Assessment: **20 Marks**

Grand Total 250 Marks

16. PEADIATRIC & PREVENTIVE DENTISTRY

a) THEORY: 65 HOURS (III yr. 20 hrs. IV yr. 45 hrs.)

Theory topics for III Year		
Sl. No.	**Topic**	**Hours**
	Introduction to Pediatric and Preventive Dentistry Definition, Scope, Objectives and Importance	**1**
1.	Dental Anatomy and Histology ♦ Chronology of Eruption of teeth ♦ Differences between primary and permanent teeth ♦ Eruption disorders and their management including teething, ectopic eruption, ankylosis etc. ♦ Importance of first permanent molar	**1**
2.	Growth and Development (will be covered by Department of Orthodontics also) ♦ Importance of study of growth and development in Pedodontics ♦ Prenatal and postnatal factors in growth and development ♦ Theories of growth and development	**2**

	♦ Methods to measure growth ♦ Development of maxilla and mandible and age related changes	
3.	Development of occlusion from birth to adolescence ♦ Mouth of neonate, gumpads ♦ Primary Dentition period ♦ Mixed dentition period ♦ Establishment of occlusion ♦ Study of variation and abnormalities	**2**
4.	Case history recording ♦ Principles of history taking, examination, investigations, ♦ diagnosis and treatment planning	**1**
5.	Child Psychology ♦ Definition ♦ Importance of understanding Child Psychology in Pedodontics ♦ Theories ♦ Psychological development from birth through adolescence ♦ Dental fear, anxiety and their management, types of cry ♦ Application of Psychology principles in management of child ♦ patients in the dental office ♦ Psychological disorders including anorexia, bulimia ♦ Child abuse and neglect	**4**
6.	Behaviour management ♦ Definition ♦ Classification and types of behaviour ♦ Factors influencing child behaviour ♦ Non- Pharmacologic management of behaviour ♦ Pharmacologic management of behaviour- ♦ Conscious sedation including nitrous oxide- oxygen inhalational anaesthesia ♦ Pharmacological principles in Pediatric Dentistry- drug dosage formulae ♦ Analgesics, anti-inflammatory and antibiotics commonly prescribed for children	**5**
7.	Dental Caries ♦ Diagnostic procedures and caries detection ♦ Caries pattern in primary, young permanent and permanent teeth ♦ Early childhood Caries, rampant caries- definition, classification, etiology, pathogenesis, clinical features, complications and management ♦ Role of diet and nutrition in dental caries and sugar substitutes ♦ Diet counselling and diet modifications ♦ Caries activity tests , caries prediction, susceptibility and their clinical application	**3**
8.	Dental Radiology as related to Pedodontics	**1**
	Theory topics for IVth Year	
1.	Dental materials used commonly in children and adolescents (Outline revision)	**1**
2.	Pediatric Operative Dentistry ♦ Principles of Operative Dentistry ♦ Isolation- Importance and techniques ♦ Young Permanent Teeth and clinical considerations ♦ Modifications in cavity preparation and recent cavity designs for primary and young permanent teeth ♦ Atraumatic / Alternative Restorative Technique (ART) ♦ Other methods of caries removal ♦ Restoration of carious teeth (Primary, young permanent and permanent teeth) using various restorative materials like glass ionomers, composites, silver amalgam ♦ Preformed crowns: Stainless steel, polycarbonate and strip crowns	**5**
3.	Gingival and Periodontal diseases in children ♦ Normal gingival and periodontium in children ♦ Definition, classification ♦ Etiology, Pathogenesis and management of gingival and periodontal condition seen in children and adolescents	**2**
4.	Flourides ♦ Historical background ♦ Systemic fluorides: Availability, agents, concentrations, advantages and disadvantages ♦ Topical fluorides: agents, composition, method of application both for professional and home use, advantages and disadvantages ♦ Mechanism of action and its anticariogenic effect ♦ Fluoride toxicity and its management ♦ Defluoridation techniques	**4**

5.	Pediatric Endodontics ♦ Principles and diagnosis ♦ Classification of pulp pathology ♦ Management of pulpaly involved primary, young permanent and permanent teeth including materials used and techniques followed: ♦ Pulp capping ♦ Pulpotomy ♦ Pulpectomy ♦ Apexogenesis ♦ Apexification	**4**
6.	Traumatic injuries to teeth ♦ Definition, classification ♦ Etiology and incidence ♦ Management of trauma to primary teeth ♦ Sequelae and reaction following trauma to primary teeth ♦ Management of trauma to young permanent teeth ♦ Prevention of trauma: mouth protectors	**5**
7.	Preventive Orthodontics ♦ Importance and functions of deciduous dentition ♦ Effects of premature loss of primary teeth Preventive Orthodontics: ♦ Definition ♦ Preventive measures ♦ Space loss ♦ Space maintenance and space management ♦ Space maintainers: definition, classification, indications and contra indications, advantages and disadvantages including construction of fixed space maintainers ♦ Space regainers ♦ Mixed dentition analysis ♦ Serial extraction	**5**
8.	Interceptive Orthodontics ♦ Oral Habits in children ♦ Definition, classification and etiology of all habits ♦ Clinical features of deleterious oral habits including non- nutritive sucking, mouth breathing, non functional grinding, masochistic and occupational habits ♦ Management of oral habits in children ♦ Other problems seen during primary and mixed dentition period and their management	**4**
9.	Dental management of children with special needs ♦ Definition, classification, etiology, clinical features, special considerations in the dental management of : ♦ Physically handicapping conditions ♦ Mentally handicapping conditions ♦ Medically compromising conditions ♦ Genetic disorders and importance of genetic counselling including cleft lip and palate and its management	**5**
10.	Oral surgical procedures in children ♦ Indications and contra indications for extraction ♦ Minor surgical procedures in children ♦ Knowledge of local and general anaesthesia	**2**
11.	Preventive Dentistry ♦ Definition, principles and scope ♦ Levels and types of prevention ♦ Infant oral health care and first dental visit Preventive measures: ♦ Minimal intervention ♦ Pit and fissure sealants ♦ Preventive resin restorations ♦ Newer agents available for caries prevention and demineralization ♦ Caries vaccine	**3**
12.	Nanodentistry – Introduction, principles and technique – an outline	**1**
13.	Dental Health Education and school dental health programmes	**1**
14.	Importance of Dental HOME and anticipatory guidance	**1**
15.	Dental emergencies in children and their management	**1**
16.	Setting up of pediatric dental practice including ethics	**1**

b) PRACTICALS/ CLINICALS

Student is trained to arrive at proper diagnosis by following a scientific and systematic procedure of history taking and examination of orofacial region. Training is also imparted in management whenever possible.

In view of the above each student shall maintain a record of work done, which shall be evaluated for marks at the time of university examination.

The following is the minimum prescribed work.

III Year

Drawing of individual primary teeth morphology

Preparation of various cavity designs on typhodont teeth and extracted primary and permanent teeth.

A study model or chart as instructed should be submitted during the III year posting.

Clinical Exercises (III Year + IV Year)

The following is the minimum prescribed work

Case history recording and Treatment Planning

Short cases : 20

Long cases : 5

Total : 25

Communication and Management of child patient

Preventive measures:

Oral prophylaxis; 15

Topical Fluoride application: 15

Restoration of carious teeth using different Materials (Class I and II):**15**

Extraction of teeth: 50

Fabrication of preventive and interceptive orthodontic appliances: 5

Treatment for Children with Special health care needs: 2

(Children with cardiac problems, bleeding disorders, neurological problems, visually challenged etc)

Education and motivation of the patients using disclosing agents, educating patients about oral hygiene measures like tooth brushing, flossing etc.

Presentation of seminars / library assignments – preferably in power point, during the IV year clinical posting in the department. Seminar should be submitted in a book form and the same certified by the HOD should be submitted along with the record at the time of University Practical Examination.

g) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
Questions from any of the Pediatric & Preventive Dentistry Topics	Long Essays 2 x 10 marks	20
	Short Essays 10x 5 marks	50
	Short Answers 10 x 3marks	30
	Total	**100**

v. Theory

University Written **100 Marks**
Internal Assessment **25 Marks**
Viva Voce: **25 Marks**

vi. Clinicals:

University Clinical Examination: **80 Marks**

Case History, Clinical Examination, Diagnosis & Treatment Planning	40 *Marks*
Clinical Procedure:	20 Marks
Oral prophylaxis and topical fluoride application Restoration of decayed tooth Extraction of tooth	
Chair side preparation, Measures taken for infection control, Overall management of the child patient & Post operative instructions	10 Marks
Clinical Work Record & Seminar	10 *Marks*

Internal Assessment: **20 Marks**

Grand Total 250 Marks

17. ORAL MEDICINE AND RADIOLOGY

a) AIM

i. To train the students to diagnose the common disorders of Orofacial region by clinical examination and with the help of such investigations as may be required and medical management of oro-facial disorders with drugs and physical agents.

ii. To train the students about the importance, role, use and technics of radiographs and other imaging methods in diagnosis.

iii. The principles of the clinical and radiographic aspects of Forensic Odontology.

b) COURSE CONTENT

i. The syllabus in ORAL MEDICINE & RADIOLOGY is divided into two main parts.
   (1) Diagnosis, Diagnostic methods and Oral Medicine
   (2) (II) Oral Radiology. Again the part ONE is subdivided into three sections. (A) Diagnostic methods (B) Diagnosis and differential diagnosis (C) Oral Medicine & Therapeutics.

ii. Emphasis should be laid on oral manifestations of systemic diseases and ill-effects of oral sepsis on general health.

iii. To avoid confusion regarding which lesion and to what extent the student should learn and know, this elaborate syllabus is prepared. As certain lesions come under more than one group, there is repetition.

iv. Theory: 65 Hours (III yr. 20 hrs, IV yr. 45 hrs.)

Sl.No.	Topic	Hours
	SECTION (A) - DIAGNOSTIC METHODS.	
1.	Definition and importance of Diagnosis and various types of diagnosis	1
2.	Method of clinical examinations.	2
	(a) General Physical examination by inspection.	
	(b) Oro-facial region by inspection, palpation and other means	
	(c) To train the students about the importance, role, use of saliva and techniques of diagnosis of saliva as part of oral disease	
	(d) Examination of lesions like swellings, ulcers, erosions, sinus, fistula, growths, pigmented lesions, white and red patches	

	(e) Examination of lymph nodes	
	(f) Forensic examination - Procedures for post-mortem dental examination; maintaining dental records and their use in dental practice and post-mortem identification; jurisprudence and ethics.	
3.	Investigations	2
4.	(a) Biopsy and exfoliative cytology (b) Hematological, Microbiological and other tests and investigations necessary for diagnosis and prognosis	
	SECTION (B) - DIAGNOSIS, DIFFERENTIAL DIAGNOSIS	
	While learning the following chapters, emphasis shall be given only on diagnostic aspects including differential diagnosis	
5.	Anomalies of Skull – No., Size, Shape, other defects. (1) Anomalies of jaw bones – a. Mandible, (Ant. region, Body, Post. region (angle), Ramus b. Maxilla (Ant. region, Post. region, palate) (2) Teeth: Developmental abnormalities, causes of destruction of teeth and their sequelae and discoloration of teeth	1
6.	Diseases of bone and Osteodystrophies: Development disorders: Anomalies, Exostosis and tori, infantile cortical hyperostosis, osteogenisis imperfecta, Marfans syndrome, osteopetrosis. Inflamation - Injury, infection and sperad of infection, fascial space infections, osteoradionecrosis.	1
7.	Metabolic disorders – Histiocytosis	1
8.	Endocrine - Acro-megaly and hyperparathyroidism Miscellaneous - Paget's disease, Mono and polyostotic fibrous dysplasia, Cherubism.	1
9.	Anomalies of Temperomandibular joint: No., size, shape, positon, function - Developmental abnormalities of the condyle, Rheumatoid arthritis, Osteoarthritis, Sub-luxation and luxation.	1
10.	Common cysts and Tumors:	3
	CYSTS:	
	Cysts of soft tissue: Mucocele and Ranula	
	Cysts of bone: Odontogenic and nonodontogenic.	
	TUMORS: Soft Tissue:	
	Epithelial: Papilloma, Carcinoma, Melanoma	
	Connective tissue: Fibroma, Lipoma, Fibrosarcoma	
	Vascular: Haemangioma, Lymphangioma	
	Nerve Tissue: Neurofibroma, Traumatic Neuroma, Neurofibromatosis	
	Salivary Glands: Pleomorphic adenoma, Adenocarcinoma, Warthin's Tumor, Adenoid cystic carcinoma.	
	Hard Tissue:	
	Non Odontogenic: Osteoma, Osteosarcoma, Osteoclastoma, Chondroma, Chandrosarcoma, Central giant cell rumor, and Central haemangioma Odontogenic: Enameloma, Ameloblastoma, Calcifying Epithelial Odontogenic tumor, Adenomatoid Odontogenic tumor, Periapical cemental dysphasia and odontomas	
11.	Periodontal diseases: Gingival hyperplasia, gingivitis, periodontitis, pyogenic granuloma	1
12.	Granulomatous diseases: Tuberculosis, Sarcoidosis, Midline lethal granuloma, Crohn's Disease and Histiocytosis X	1
13.	Miscellaneous Disorders: Burkitt lymphoma, Sturge - Weber syndrome, CREST syndrome, rendu-osler-weber disease	1
	SECTION (C): ORAL MEDICINE AND THERAPEUTICS.	
	The following chapters shall be studied in detail including the eiology, pathogenesis, clinical features, investigations, differential diagnosis, management and prevention	2
14.	Infections of oral and paraoral structures:	
	Bacterial: Streptococcal, tuberculosis, syphillis, vincents, leprosy, actinomycosis, diphtheria and tetanus Fungal: Candida albicans	
	Virus: Herpes simplex, herpes zoster, ramsay hunt syndrome, measles, herpangina, mumps, infectious mononucleosis, AIDS and hepatitis-B	
15.	Important common mucosal lesions:	3
	White lesions: Chemical burns, leukodema, leukoplakia, fordyce spots, stomatitis nicotina palatinus, white sponge nevus, candidiasis, lichenplanus, discoid lupus erythematosis	
	Veiculo-bullous lesions: Herpes simplex, herpes zoster, herpangina, bullous lichen planus,	

	pemphigus, cicatricial pemphigoid erythema multiforme.	
	Ulcers: Acute and chronic ulcers	
	Pigmented lesions: Exogenous and endogenous	
	Red lesions: Erythroplakia, stomatitis venenata and medicamentosa, erosive lesions and denture sore mouth.	
16.	Cervico-facial lymphadenopathy	1
17.	Facial pain:	
	(i) Organic pain: Pain arising from the diseases of orofacial tissues like teeth, pulp, gingival, periodontal tissue, mucosa, tongue, muscles, blood vessels, lymph tissue, bone, paranasal sinus, salivary glands etc.,	
	(ii) Pain arising due to C.N.S. diseases:	
	(iii) Pain due to intracranial and extracranial involvement of cranial nerves. (Multiple sclerosis, cerebrovascular diseases, trotter's syndrome etc.	1
	(iv) Neuralgic pain due to unknown causes: Trigeminal neuralgia, glossopharyngeal neuralgia, sphenopalatine ganglion neuralgia, periodic migrainous neuralgia and atypical facial pain	
	(v) Referred pain: Pain arising from distant tissues like heart, spine etc.,	
18.	Altered sensations: Cacogeusia	
19.	Tongue in local and systemic disorders: (Aglossia, ankyloglossia, bifid tongue, fissured tongue, scrotal tongue, macroglossia, microglossia, geographic tongue, median rhomboid glossitis, depapillation of tongue, hairy tongue, atrophic tongue, reactive lymphoid hyperplasia, glossodynia, glossopyrosis, ulcers, white and red patches etc.	1
20.	Oral manifestations of:	
	(i) Metabolic disorders: (a) Porphyria (b) Haemochromatosis (c) Histocytosis X diseases	
	(ii) Endocrine disorders: (a) Pituitary: Gigantism, acromegaly, hypopitutarism (b) Adrenal cortex: Addison's disease (Hypofunction) Cushing's syndrome (Hyperfunction) (c) Parathyroid glands: Hyperparathyroidism. (d) Thyroid gland: (Hypothyroidism) Cretinism, myxedema (e) Pancreas: Diabetes	4
	(iii) Nutritional deficiency: Vitamins: riboflavin, nicotinic acid, folic acid Vitamin B12, Vitamin C (Scurvy)	
	(iv) Blood disorders: (a) Red blood cell diseases Deficiency anemias: (Iron deficiency, Plummer- Vinson-syndrome, pernicious anemia) Haemolytic anemias: (Thalassemia, sickle cell anemia, erythroblastosis fetalis) Aplastic anemia Polycythemia (b) White Blood cell diseases Neutropenia, cyclic neutropenia, agranulocytosis and leukemias.	
21.	Disease of salivary glands: (a) Development distrubances: Aplasia, atresia and aberration (b) Functional disturbances:Xerostomia, ptyalism (c) Inflammatory conditions: Nonspecific sialadenitis, mumps, sarcoidosis heerdfort's syndrome (Uveoparotid fever), Necrotising sialometaplasia (d) Cysts and. tumors: Mucocele, ranula, pleomorphic adenoma, mucoepidermoid carcinoma. (e) Miscellaneous: Sialolithiasis, Sjogren's syndrome, Mikuliez's disease and sialosis	1
22.	Dermatological diseases with oral manifestations: (a) Ectodermal dysplasia (b) Hyperkerotosis palmarpiantaris with periodontopathy (c) Scleroderma (d) Lichen planus including ginspan's syndrome (e) Lupus erythematosus (f) Pemphigus (g) Erythema multiforme (h) Psoriasis	1
23.	Immunological diseases with oral manifestations (a) Leukemia (b) Lymphomas (c) Multiple myeloma (d) AIDS clinical manifestations (e) opportunistic infections	1

	(f) neoplasms (g) Thrombcytopenia (h) Lupus erythematosus (i) Scleroderma (j) Dermatomyositis (k) Submucous fibrosis (l) Rhemtoid arthritis (m) Recurrent oral ulcerations including behcet's syndrome and reiter's syndrome	
24.	Allergy: Local allergic reactions, anaphylaxis, serum sickness (local and systemic allergic manifestations to food drugs and chemicals)	
25.	Foci of oral infection and their i l l effects on general health	
26.	Management of dental problems in medically compromised persons: (a) Physiological changes: Puberty, pregnancy and menopause (b) The patients suffering with cardiac, respiratory, liver, kidney and bleeding disorders, hypertension, diabetes and AIDS. Post-irradiated patients.	2
27.	Precancerous lesions and conditions	1
28.	Nerve and muscle diseases:	
	(i) Nerves: (a) Neuropraxia (b) Neurotemesis (c) Neuritis (d) Facial nerve paralysis including Bell's palsy, Heerfordt's syndrome, Melkerson Rosenthel syndrome and ramsay hunt syndrome (e) Neuroma (f) Neurofibromatosis (g) Frey'syndrome	2
	(ii) Muscles: (a) Myositis ossificans (b) Myofascial pain dysfunction syndrome (c) Trismus	
29.	Forensic odontology:	
	(a) Medico legal aspects of orofacial injuries	
	(b) Identification of bite marks	2
	(c) Determination of age and sex	
	(d) Identification of cadavers by dental appliances, Restorations and tissue remnants	
30.	Therapeutics: General therapeutic measures - drugs commonly used in oral medicine viz., antibiotics, chemotherapeutic agents, anti-inflammatory and analgesic drugs, astringents, mouth washes, styptics, demelucents, local surface anaesthetic, sialogogues, antisialogogues and drugs used in the treatment of malignancy-	
	Part - II ORAL RADIOLOGY	
31.	Scope of the subject and history of origin	1
32.	Physics of radiation: (a) Nature and types of radiations (b) Source of radiations (c) Production of X-rays (d) Properties of X-rays (e) Compton effect (f) Photoelectric effect (g) Radiation measuring units	4
33.	Biological effects of radiation	1
34.	Radiation safety and protection measures	1
35.	Principles of image production	1
36.	Radiographic techniques:	
	(i) Intra-Oral: (a) Periapical radiographs (Bisecting and parallel techniques) (b) Bite wing radiographs (c) Occlusal radiographs	3
	(ii) Extra-oral: (a) Lateral projections of skull and jaw bones and paranasal sinuses (b) Cephalograms (c) pantomograms (d) Projections of temperomandibular joint and condyle of mandible (e) Projections for Zygomatic arche (f) Specialised techniques:	3

	• Sialography • Xeroradiography • Tomography	
37.	Factors in production of good radiographs: (a) K.V.P. and mA.of X-ray machine (b) Filters (c) Collimations (d) Intensifying screens (e) Grids (f) X-ray films (g) Exposure time (h) Techniques (i) Dark room (j) Developer and fixer solutions (k) Film processing	4
38.	Radiographic normal anatomical landmarks	2
39.	Faulty radiographs and artefacts in radiographs	1
40.	Interpretation of radiographs in various abnormalities of teeth, bones and other orofacial tissues	1
41.	Principles of radiotherapy of Oro-facial malignancies and complications of radiotherapy	1
42.	Contrast radiography and basic knowledge of radio-active isotopes	1
43.	Recent Advances in Imaging	1
44.	Radiography in Forensic Odontoloy - Radiographic age estimation and postmortem radiographic methods	2

v. Clinicals:

1. Training in:

   - Patient examination
   - Patient assessment
   - Treatment planning
   - Medications if any, with dose
   - Follow up protocols

2. In view of the above each student shall maintain a record of work done, which shall be evaluated for marks at the time of university examination.
3. The following is the minimum clinical requirement to appear for University examination:
   a) ……Recording of detailed case histories of interesting cases-10
   b) ……Routine OP, short cases – minimum 100 (third and Final year)
   c)…… Intra-oral radiographs (Periapical, bitewing, occlusal)-25
   d) Discussions - should have participated in a minimum of 20 long case discussions
   e) Investigative procedures – Biopsy, Cytology etc:-

c) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
One question from oral medicine and one from radiology	Long Essays 2 x 10 marks	20
A. Diagnostic Methods – Two questions B. Differntial Diagnosis - two questions C. Therapuetics – Two question D. Radiation Physics – One question E. Techniques – Two Questions F. Radiographic Interpretation – One Question	Short Essays 10x 5 marks	50
A. Four Questions from Oral Medicne B. Four Questions from Radiology C. Two from Forensic Odontology	Short Answers 10 x 3marks	30
	Total	**100**

vii. Theory

University Written **100 Marks**
Internal Assessment **25 Marks**
Viva Voce: **25 Marks**

viii. Clinicals:

University Clinical Examination: **80 Marks**

Spotters (1 mark each)	*1x 10*	*10 Marks*
DiscussionLong Case	*1x30*	*30 Marks*
Taking and Interpretation of Radiograph	*1x30*	*30 Marks*
Work Record and seminar		*10 Marks*

Internal Assessment: **20 Marks**
TOTAL 100 Marks
Grand Total 250Marks

18. ORTHODONTICS & DENTOFACIAL ORTHOPAEDICS

a) GOAL

Undergraduate programme in Orthodontics is designed to enable the qualifying dental surgeon to diagnose, analyze and treat common orthodontic problems by preventive, interceptive and corrective orthodontic procedures

b) SCHEME OF STUDY

The undergraduate study of orthodontics spans over second year, third year and fourth year. In second year the emphasis is given for basic and preclinical wire bending exercises and appliance fabrication. In third year the student has to undergo clinical postings where patient care and appliance management is emphasized. In fourth year of study the candidate will be allotted with long cases for detailed discussion treatment plan formulation appliance construction, insertion and management. In addition they will be trained to attend routine out patients, appliance activation, cephalometric interpretation etc.

c) SKILLS

i. To diagnose a case of malocclusion and formulate a treatment plan
ii. To make a good alginate impression
iii. To fabricate a good study model
iv. To perform various model analysis and cephalometric analysis
v. To construct routine removable and myofunctional appliances using cold cure acrylic
vi. Insertion and management of appliance

d) INTEGRATION

By learning the science of Orthodontics, the student should be able to diagnose different types of malocclusion, develop a treatment plan for simple malocclusions and management of simple malocclusions. The student should acquire skills to recognize Complex malocclusions and the same may be referred to a specialist.

This insight is gained in a variety of ways:

i. Pre clinical training
ii. Lectures & small group teaching
iii. Demonstrations
iv. Spot diagnosis and discussions
v. Long case discussions
vi. Seminar presentations

e) AN OUTLINE OF THE COURSE CONTENT:

Study of clinical Orthodontics to enable the student to understand the science and art of orthodontics

f) THEORY: 50 Hours(III yr. 20hrs, IV yr. 30 Hrs)

Sl no	Topics for III year	Hours
1	Introduction definition historical background aims and objectives of orthodontics and need for orthodontic care	1
2	Growth and development –General principles. Definition, growth spurts and differential growth, factors influencing growth and development, methods of measuring growth, Growth theories (Genetic, Sicher's, Scott's, Moss's, Petrovic's, Multifactorial) 1. Genetic and epigenetic factors in growth 2. Cephalocaudal gradient in growth. 3.Morphologic Development Of Craniofacial Structures a.Methods of bone growth b.Prenatal growth of craniofacial structures c.Postnatal growth and development of: cranial base, maxilla, mandible, dental arches and occlusion. 4. Functional Development of Dental Arches and Occlusion a.Factors influencing functional development of dental arches and occlusion. b.Forces of occlusion c.Wolfe's law of transformation of bone d.Trajectories of forces 5. Clinical Application Of Growth And Development Normal And Abnormal Function Of Stomatognathic System	7
3	Occlusion and Malocclusion in general a. Concept of normal occlusion b. Definition of malocclusion c. Description of different types of dental, skeletal and functional malocclusion.	4

	Classification of Malocclusion Principle, description, advantages and disadvantages of classification of malocclusion by Angle's, Simon's, Lischer's and Ackerman and Proffitt's.	
4	Etiology of malocclusion a. Definition, importance, classification, local and general etiological factors. b. Etiology of various types of malocclusion.	2
5	Diagnosis And Diagnostic Aids a. Definition, Importance and classification of diagnostic aids b. Importance of case history and clinical examination in orthodontics c. Study Models: - Importance and uses - Preparation and preservation of study models d. Importance of intraoral X-rays in orthodontics e. Panoramic radiographs: - Principles, Advantages, disadvantages and uses f) Cephalometrics: Its advantages, disadvantages 1. Definition 2. Description and use of cephalostat 3. Description and uses of anatomical landmarks lines and angles used in Cephalometric analysis 4. Analysis- Steiner's, Down's, Tweed's, Witts, Ricket's-E- line g. Electromyography and its uses in orthodontics h. Wrist X-rays and its importance in orthodontics	6
	Topics for IV year	
1	Preventive orthodontics Definition and Different procedures undertaken in preventive orthodontics and their limitations	1
2	Interceptive orthodontics a. Definition b. Different procedures undertaken in interceptive orthodontics c. Serial extractions: Definition, indications, contra-indication, technique, advantages and disadvantages. d. Role of muscle exercises as an interceptive procedure	2
3	General principles in orthodontic treatment planning	1
4	Anchorage Anchorage in Orthodontics - Definition, Classification, Types and Stability Of Anchorage	1
5	Biomechanical principles in orthodontic Tooth Movement a. Different types of tooth movements b. Age factor in orthodontic tooth movement	1
6	Biology of tooth movement Tissue response to orthodontic force application	1
7	Methods of gaining space Proximal stripping Extractions Expansions Distalization Proclination of anteriors and de-rotation of posteriors	5
8	Orthodontic appliances – general Indications, classifications, advantages and disadvantages	1
9	Removable orthodontic appliances Components, indications, advantages and disadvantages	1
10	Fixed orthodontic appliances Historical development, various systems, components, advantages disadvantages.	1
11	Myo functional appliances Definition, classification, various appliances like activator, Frankel, Twinblock, bionator and fixed functional appliances	3
12	Orthopedic appliances Head gear, face mask and chin cap	2
13	Cleft lip and palate – orthodontic management	1
14	Surgical orthodontics - general Minor surgical procedures Major surgical procedures Surgical decompensation	2
15	Principles of management of various malocclusions Deep bite, open bite, cross bites, midline diastema, class I, II and III malocclusion	2
16	Adult orthodontics	1
17	Retention and relapse Schools of thought, theorems of retention, various fixed and removable retainers	1

18	Computers and recent developments in orthodontics	1
19	Genetics	1
20	Ethics	1

g) CLINICAL TRAINING

Sl no	Training In III year	Hours
1	Model analysis • Pont's analysis • Ashley Howe's analysis • Carey's analysis • Bolton's analysis • Moyer's mixed dentition analysis	**70**
2	Cephalometric analysis • Down's analysis • Steiner's analysis • Tweed's analysis • Witts appraisal	
3	Short cases • Impressions • Model fabrication • Wire bending • Acrylization • Trimming and polishing • Insertion of appliance	
	Training In IV year	
1	Long case taking • Case taking • Model analysis • Discussion • Appliance fabrication and insertion	**130**
2	Short cases • Spot diagnosis and spot discussion • Appliance fabrication and insertion	
3	Attending O P cases and appliance review	
4	Desirable exercises Modified Adam's clasp Adams clasp on anterior teeth Split labial bow, reverse labial bow, mills retractor, Roberts retractor, high labial bow with aprons spring	

h) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
Growth and development, classification and etiology of malocclusion, diagnostic aids, interceptive orthodontics, anchorage, biomechanics, biology of tooth movement, methods of gaining space, myofunctional appliances, orthopedic appliances, retention and relapse	Long Essays 2 x 10 marks	20
Introduction and historical background, growth and development, occlusion and malocclusion – classification and etiology. Diagnostic aids, skeletal maturity indicators, preventive and interceptive orthodontics, general principles of treatment planning, anchorage, biomechanics, biology of tooth movement, methods of gaining space, orthodontic appliances – removable and fixed appliances, myo-functional and orthopedic appliances, management of various malocclusions, management of cleft lip and palate, surgical orthodontics, adult orthodontics, retention and relapse, computers in orthodontics, genetics and ethics.	Short Essays 10x 5 marks	50
	Short Answers 10 x 3marks	30

	Total	**100**

ix. Theory

University Written	**100 Marks**
Internal Assessment	**25 Marks**
Viva Voce:	**25 Marks**

x. Clinicals:

University Clinical Examination:		**80 Marks**
Case Presentation	*25Marks*	
Impression Making	*20 Marks*	
Spotters (10 x 2 Marks)	20 Marks	
Clinical Work Record/Seminar/Assignment	1*5 Marks*	
Internal Assessment:		**20 Marks**

Grand Total 250 Marks

19. ORAL & MAXILLOFACIAL SURGERY

a) AIM

To produce a graduate who is competent in performing extraction of teeth and minor surgeries under both local and general anaesthesia, prevent and manage related complications, acquire knowledge regarding aseptic procedures, have reasonable understanding of management of infectious patients and prevention of cross infections, learn about BLS, acquire a reasonable knowledge and understanding of the various diseases, injuries, infections occurring in the Oral & Maxillofacial region and offer solutions to such of those common conditions and has an exposure in to the in-patient management of maxillofacial problems and also to acquire reasonable knowledge regarding the surgical principals involved in implant placement and be able to communicate properly and understand medico legal responsibilities

b) OBJECTIVES:

i. Knowledge & Understanding

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

(1) Able to apply the knowledge gained in the preclinical subjects and related medical subjects like general surgery and general medicine in the management of patients with oral surgical problem.
(2) Able to diagnose, manage and treat (understand the principles of treatment of) patients with oral surgical problems.
(3) Knowledge of range of surgical treatments.
(4) Ability to decide the requirement of a patient to have oral surgical specialist opinion or treatment.
(5) Understand the principles of in-patient management.
(6) Understand the principles of emergency management of maxillofacial injuries, BLS measures and the medico legal responsibilities and formalities.
(7) Understanding of the management of major oral surgical procedures and principles involved in patient management.
(8) Be able to decide the need for medical/ surgical consultations and the method of doing so.
(9) Should know ethical issues and have communication ability.
(10) Should know the common systemic and local diseases, drugs used and drug interactions

ii. Skills:

A graduate should have acquired the skill to:

(1) Examine any patient with an oral surgical problem in an orderly manner.
(2) Be able to understand requisition of various clinical and laboratory investigations and is capable of formulating differential diagnosis.
(3) Should be competent in the extraction of teeth under both local and general anesthesia.

(4) Should be able to carry out certain minor oral surgical procedures under L.A. simple impactions, draining of abscesses, simple dental wiring, biopsies etc.
(5) Ability to assess, prevent and manage various complications during and after surgery.
(6) Able to provide primary care and manage medical emergencies in the dental office.
(7) Understanding of the management of major oral surgical problems and principles involved in inpatient management.
(8) Should be competent in measures necessary for homeostasis and wound closures.

c) THEORY: 70 HOURS (III Year 20 hrs, IV Year. 20 hrs. V year. 30 hrs.)

Sl. No.	Topics	Description	Hours
	Topics for III Year		
1.	Introduction	Definition, scope, aims and objectives. Diagnosis in oral surgery:History taking, Clinical examination, Investigations. Principles of infection control and cross-infection control with particular reference to HIV/AIDS and Hepatitis.	**1**
2.	Principles of Oral Surgery	1) Asepsis: Definition Measures to prevent introduction of infection during Surgery. Preparation of the patient, Measures to be taken by operator, Sterilization of instruments - various methods of sterilization etc, Principles and need for cleaning of infected/ used instruments prior to re sterilization Surgery set up. 2) Painless Surgery: Pre- anesthetic considerations Pre-medication: purpose, drugs used Anesthetic considerations a) Local b) Local with IV sedations Use of general anesthetic 3) Access: Intra-oral: Mucoperiosteal flaps, principles, commonly used intraoral incisions. Bone Removal: Methods of bone removal. Use of Burs: Advantages & precautions Bone cutting instruments: Principles of using chisel & osteotome. Extra-oral. Skin *incisions - principles, various extra-oral incision to expose facial* skeleton. a) Submandibular b) Pre auricular Incision for TMJ, Access to maxilla & orbit , Bi coronal incision 4) Control of hemorrhage during surgery Normal Haemostasis Local measures available to control bleeding Hypotensive anaesthesia etc. 5) Drainage & Debridement Purpose of drainage in surgical wounds Types of drains used Debridement: purpose, soft tissue & bone debridement. 6) Closure of wounds Type wounds, Classification of wounds Suturing: Principles Suture material: Classification, ideal requirements Body response and resorbability of various	**4**

		materials etc. 7) Post operative care Post operative instructions Physiology of cold and heat in the control of pain and swelling Analgesics and anti-inflammatory drugs in the control of pain and swelling Control of infection – antibiotics, principles of antibiotic therapy, prevention of antibiotic abuse Long term post operative follow up - significance.	
3.	Local Anaesthesia	Introduction and Neurophysiology Concept of LA Classification of local anesthetic agents Ideal requirements Mechanism of action Armamentarium required Types of local anaesthesia Use of vaso constrictors in local anesthetic solution -Advantages, contra-indications, Various vaso constrictors used. Anaesthesia of the mandible -Pterygomandibular space - boundaries, contents etc. Intra oral and extra oral techniques of Inferior Alveolar Nerve Block, Mandibular Nerve Block, Mental Nerve Block, Infiltrations, etc. Anaesthesia of Maxilla – Infiltrations, Infra - orbital nerve block, Posterior superior alveolar nerve block, Infiltrations, Maxillary nerve block – Intra oral and extra oral Techniques Complications of local anaesthesia- local and systemic Disposal of sharp instruments	**5**
4.	General Anaesthesia	Concept of general anaesthesia. Indications of general anaesthesia in dentistry. Pre-anesthetic evaluation of the patient. Pre-anesthetic medication - advantages, drugs used. Conscious sedation Commonly used anesthetic *agents.* Complication during and after G.A. I.V. sedation with Diazepam and Midazolam. Indications, mode of action, technique etc. Cardiopulmonary resuscitation Use of oxygen and emergency drugs. Tracheostomy **.**	**2**
5.	Exodontia	General considerations Ideal Extraction. Indications/ contra indications for extraction of teeth Extractions in medically compromised patients. Methods of extraction Forceps or intra-alveolar or closed method. Principles, types of movement, force, role of left hand etc. Trans-alveolar, surgical or open method Indications, surgical procedure. Dental elevators, uses, classification, principles in the use of elevators, commonly used elevators. Armamentarium Complications Complications during exodontia Common to both maxilla and mandible. Post-operative complications Prevention and management of complications.	**4**
6.	Medical Emergencies in dental practice	Primary care of medical emergencies in dental practice (a) Cardio vascular (b) Respiratory (c) Endocrine (d) Anaphylactic reaction (e) Epilepsy Basic Life Support	**3**
7.	Emergency drugs & Intra muscular and I.V. Injections	Emergency drugs required in a dental clinic Applied anatomy. Sites for intra muscular and intra venous injections, techniques etc.	**1**

	Topics for IV Year		
8.	Impacted teeth	i. Incidence, definition, etiology. ii. Impacted mandibular third molar Classification, reasons for removal Assessment - both clinical & radiological. Armamentarium and surgical procedures for removal. Complications during and after removal, its prevention and management. iii. Maxillary third molar, Indications for removal, classification, Armamentarium and surgical procedure for removal, Complications during and after removal, its prevention and management. iv. Impacted maxillary canine. Reasons for canine impaction, indications for removal, Methods of management, Localization, labial and palatal approaches, Complications during and after removal, its prevention and management Surgical exposure, Transplantation	**4**
9.	Neurological Diseases	i. Trigeminal neuralgia - definition, etiology, clinical features and methods of management including medical and surgical. ii. Facial paralysis - etiology, clinical features. iii. Nerve injuries - Classification, clinical features and management, Nerve Grafting -Neuropathy etc.	**3**
10.	Implants	Concept of osseointegration, History of implants their design & surface characteristics. Knowledge of various types of implants, Bone biology, Morphology, Classification of bone and its relevance to implant placement. Bone augmentation materials. Soft tissue considerations in implant dentistry. Surgical procedure to place implants.	**2**
11.	Diseases of the maxillary sinus	Surgical anatomy and development of the sinus. Sinusitis both acute and chronic Surgical approach of sinus - Cald well-Luc procedure, Knowledge of FESS, Removal of root from the sinus. Oro-antral fistula and communications- etiology, clinical features and surgical methods for closure.	**2**
12.	Cysts of the mouth and jaws	Definition, classification, pathogenesis. Diagnosis - Clinical features, radiological, FNAC, use of contrast media and histopathology. Management - types of surgical procedures. Rationale of the techniques, indications, contraindications, procedures, complications etc.	**4**
13.	Jaw deformities	Basic forms - Prognathism, Retrognathism and open bite. Reasons for correction. Diagnosis and treatment planning Outline of surgical methods carried out on mandible and maxilla-subapical, body,sagittal split osteotomy, genioplasty, anterior maxillary Osteotomy, Le fort I osteotomy Role of distraction osteogenesis in correction of jaw deformities	**3**
14.	Pre-prosthetic Surgery	Definition Classification of procedures Corrective procedures: Alveoloplasty, Reduction of maxillary tuberosities, Frenectemies and removal of tori. Ridge extension or Sulcus extension procedures, Indications and various surgical procedures Ridge augmentation and reconstruction. Indications, use of bone grafts, hydroxyapatite etc	**2**
	Topics for V Year		
15.	Cleft Lip and Palate	Etiology of the clefts, incidence, classification Role of dental surgeon/ maxillofacial surgeon in the cleft team. Outline of the closure procedures,	**1**

16.	Infections of the Oral cavity	Introduction, surgical anatomy of the superficial and deep fasciae of head and neck Factors responsible for infection, pathogenecity, virulence Dento-alveolar abscess - aetiology, clinical features and management. Spread of odontogenic infections through various facial spaces and its management Ludwig's angina - definition, aetiology, clinical features, management and complications Course of odontogenic infections	**6**
17.	Fungal Infections of head and neck region	Candidiasis, Actinomycosis, Coccidiodmycosis, Rhinosporidosis, Antifungal agents	**1**
18.	Osteomyelitis of the jaws	Definition, etiology, pre-disposing factors, classification, clinical features and management.	**1**
19.	Carcinoma of the oral cavity	Lymphatic Spread. TNM classification, Staging . Biopsy-types, filling of Histopathology request form Outline of management of Squamous Cell Carcinoma: surgery, radiation and chemotherapy Role of dental surgeons in the prevention and early detection of oral cancer.	**2**
20.	Osteoradionecrosis -	Definition, etiology, theories, pre-disposing factors, classification, clinical features and management.	**1**
21.	Maxillofacial Traumatology	Emergency management in maxillofacial trauma General considerations, types of fractures, aetiology, clinical features and general principles of management. Mandibular fractures - Applied anatomy, classification. Diagnosis - Clinical and radiological features, Management - Reduction - closed and open Fixation and immobilization methods outline of rigid and semi-rigid internal fixation Fractures of the condyle - etiology, classification, clinical features, principles of management Fractures of the middle third of the face. Definition of the mid face, applied surgical anatomy, classification, clinical features and outline of management. Alveolar fractures - methods of management Fractures of the Zygomatic complex and orbit. Classification, clinical features, indications for treatment, various methods of reduction and fixation Faciomaxillary Injuries in Children Complications of fractures - delayed union, non-union and malunion.	**7**
22.	Salivary gland diseases	Surgical Anatomy of Minor and Major salivary glands Sialography, contrast media, procedure. Inflammatory conditions of the salivary glands Sialolithiasis - Sub mandibular duct and gland , parotid duct and gland ,Clinical features, management, Intraoral and extra oral Sialolithotomy. Salivary fistulae, sialocoele Autoimmune diseases of the salivary glands, diagnosis managment Common tumours of salivary glands like Pleomorphic adenoma including minor salivary glands.	**3**
23.	Tumors of the Oral cavity	General considerations, surgical principles Non odontogenic benign tumours occurring in oral cavity - fibroma, papilloma, lipoma, ossifying fibroma, myxoma etc. Odontogenic tumors: both benign and malignant. Ameloblastoma - Clinical features, radiological appearance and methods of management. Osteogenic tumours of the faciomaxiliary region.	**4**
24.	Disorders of T.M. Joint	Applied surgical anatomy of the joint. Development of the TMJ Surgical approaches to TM.J Radiological investigations Hypermobilty of TMJ; Dislocation - Types, aetiology, clinical	**4**

		features and management. Hypomobility of TMJ; Classification, Ankylosis - Definition, aetiology, clinical features and management Myo-facial pain dysfunction syndrome, etiology, clinical features, management- Non surgical and surgical. Internal derangement of the joint. Inflammatory Diseases of T.M. Joint. Arthroscopy	

e) CLINICAL AND ACADEMIC REQUIREMENTS

i. Case Taking: Detailed clinical examinations, investigations and diagnosis – 10 nos.
ii. Dental extractions under local anesthesia – 300 nos.
iii. Suturing of extraction wound -5 nos
iv. Incision and drainage – 3 nos.
v. Arch bar wiring, eyelet wiring and intermaxillary fixation on plaster or acrylic models- 1 each
vi. IV/ IM injection technique on patients- 5 no each
vii. Wound dressing – 5 nos.
viii. Observing minor surgery done by staff member- 5 nos
ix. Surgical Assistance of minor surgeries- 5 nos.
x. Observation of major surgeries in Operation Theatre- 3 nos.
xi. Observation of surgical procedures performed in casualty– 5 nos.
xii. Training in handling medical emergencies. CPR and basic life support
xiii. Seminars: 6 nos. Two in the third year, Two in the fourth year and Two in the final year

A work record should be maintained by all students detailing each of the clinical and academic requirements duly signed by the teacher in charge and should be submitted at the time of examination after due certification from the head of the department.

f) CLINICAL REQUIREMENTS YEAR WISE SPILT UP:

Sl. No.	Topic	Procedures in III Year	Quota: Must do
1	Case Taking	Detailed clinical examinations, investigations and diagnosis	2 cases
2	Dental Extraction	Extraction of anterior and mobile teeth under LA : Infiltration only	60 cases
3	Seminars	Seminars on basic subjects, local anesthesia, investigative procedures, exodontia etc	2 no.
	Injection	IV/ IM injection technique on patients-	5nos.each
4	Observation	Observing minor surgery under LA done by staff member	2 cases
Procedures in IV Year			
1	Case Taking	Detailed clinical examinations, investigations and diagnosis	3 cases
2	Dental Extraction	Extraction of anterior and posterior teeth under LA : Infiltration and blocks	100 cases
3	Suturing	Suturing of extraction wound	5 no.
4	Seminars	Seminars on oral surgery subjects, cross contamination and infection, impactions, medically compromised patients, medical emergencies etc.	2 no.
5	Observation	Observing minor surgery under LA done by staff member	3 cases
6	Assistance	Assistance of minor surgery under LA done by staff member	2 cases

7	Observation	Observation of cases managed in the casualty	2 cases
8	Skill development	Wiring procedures in models	3 nos.
Procedures in V Year			
1	Case Taking	Detailed clinical examinations, investigations and diagnosis	5 cases
2	Dental Extraction	Extraction of anterior and posterior teeth under LA : Infiltration and blocks	140 cases
3	Seminars	Seminars on oral surgery subjects like TMJ, Tumors, Maxillofacial injuries, Infections, Salivary Gland diseases and Medico-legal cosiderations	2 no.
4	Observation	Observation of major surgery under GA do in the OT	3 cases
5	Assistance	Assistance of minor surgery under LA done by staff member	3cases
6	Procedure	Incision and drainage	3
7	Procedure	Wound dressing	5
8	Observation	Observation of cases managed in the casualty	3 cases

i) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
One Question From Local Anaesthesia One Question From Oral Surgery	Long Essays 2 x 10 marks	20
Eight Question From Oral Surgery, One Question From Local Anaesthesia, , One Question From General Anaesthesia	Short Essays 10x 5 marks	50
Questions from any of the Oral & Maxillofacial Surgery topics.	Short Answers 10 x 3marks	30
	Total	**100**

xi. Theory

University Written **100 Marks**
Internal Assessment **25 Marks**
Viva Voce: **25 Marks**

xii. Clinicals:

University Clinical Examination: **80 Marks**
Extraction of one firm tooth (Maxillary/ Mandibular)
Case History *20 Marks*
Local Anaesthesia technique *25 Marks*
Extraction of firm tooth & patient management 25 Marks
Clinical Work Record & Seminar *10 Marks*
Internal Assessment: **20 Marks**

Grand Total 250 Marks

20. CONSERVATIVE DENTISTRY AND ENDODONTICS

a) OBJECTIVES:

i. Knowledge and Under Standing:

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

(1) To diagnose and treat simple restorative work for teeth.

(2) To gain knowledge about aesthetic restorative material and to translate the same to patients needs.

(3) To gain the knowledge about endodontic treatment on the basis of scientific foundation.

(4) To carry out simple endodontic treatment.

(5) To carry out simple luxation of tooth and its treatment and to provide emergency endodontic treatment.

ii. Skills:

He should attain following skills necessary for practice of dentistry

(1) To use medium and high speed hand pieces to carry out restorative work.

(2) Poses the skills to use and familiarize endodontic instruments and materials needed for carrying out simple endodontic treatment.

(3) To achieve the skills to translate patients esthetic needs along with function.

iii. Attitudes:

(1) Maintain a high standard of professional ethics & conduct and apply these in all aspects of professional life.

(2) Willingness to participate in CDE programme to update the knowledge and professional skill from time to time.

(3) To help and participate in the implementation of the national oral health policy.

(4) He should be able to motivate the patient for proper dental treatment and maintenance of oral hygiene should be emphasise which will help to maintain the restorative work and prevent future damage.

Sl.No.	Topic for II Year	Hours
1.	Introduction to Conservative Dentistry.	1
2.	Definition, Aim & Scope of Conservative Dentistry & Endodontics	
3.	Nomenclature of dentition; Tooth Numbering systems	1
4.	Restoration - Definition & Objectives	
5.	Hand Instruments - Classification, Nomenclature, Design, Formula of hand cutting instruments, Grasps and Rests, Sterilization.	2
6.	Rotary Cutting instruments - Burs, Design, Types. Various speeds in tooth preparation. Hazards with cutting instruments.	2
7.	Dental caries – Aetiology, classification, caries terminology	1
8.	Fundamentals in Tooth preparation	4
9.	Definition, Stages and steps , Classification of Tooth preparations, Nomenclature, Concepts in tooth preparations for Silver Amalgam, Cast gold inlay, Composite resins and Glass Ionomer	
10.	Tooth preparation for amalgam restorations. Stepwise procedure for Class I, II, III, IV, V amalgam restorations. Failure of amalgam restoration.	6
11.	Contact and contour of teeth – different methods of tooth separation	1

12.	Matrices, Retainers, Wedges – methods of wedging	1
13.	Finishing & polishing of restorations.	1
14.	Chair side positions – patient and operator positions	1
15.	Management of deep carious lesions – Technique of caries excavation with hand and rotary instruments, Affected and Infected dentin, Caries detector dyes, Concept of Remaining Dentin Thickness, Pulp capping and Pulpotomy.	2
16.	Access cavity and brief introduction of root canal instruments	2
	Topic for III Year	
17.	**Nomenclature of Dentition** Tooth numbering systems: ADA, Zsigmondy- Palmer, and FDI systems	1
18.	**Gnathological concepts of Restoration** Physiology of occlusion, normal occlusion, ideal occlusion mandibular movements and occlusal analysis. Occlusal rehabilitation and restoration.	2
19.	**Dental Caries** Aetiology, classification clinical features, morphological features, microscopic features, clinical diagnosis and sequel of dental caries. Caries treatment.	4
20.	**Treatment Planning For Restorative Procedure**: Patient assessment, clinical examination, radiographic examination, tooth vitality tests, diagnosis and treatment planning, preparation of the case sheet. Patient and operator position.	2
21.	**Preventive measures in restorative practice** Plaque control, Pit and Fissure sealants, Fluorides, Dietary measures, restorative procedures and periodontal health.	3
22.	**Armamentarium for Tooth Preparation**: General classification of operative instruments. a) Hand cutting instruments Terminology and classification Design, formula and sharpening of instruments. Grasp Rest and application. b) Rotary cutting instruments Dental bur , mechanism of cutting Common design characteristics Diamond and other abrasive instruments Cutting mechanism Hazards and precations Sterilization and maintenance of instruments. Basic Instrument tray set up.	4
23.	**Isolation of Operating Filed**: Control of moisture ,purpose and methods of isolation, rubber dam isolation in detail, antisialogogues	2
24.	**Infection Control** Routes of transmission of dental infection Personal barrier protection Control of infection from aerosol, spatter Sterilization procedures for dental equipment and instruments, monitoring sterilization, disinfection of operatory Dental water line contamination and Biofilm Disposal of waste	2
25.	**Pulp Protection** Liners, Varnishes , Bases. Affected and infected dentin, Caries detector dyes Concepts of Remaining Dentin Thickness	1
26.	**Pain control in restorative procedures**	1
27.	**Amalgam Restoration**: Indication, contraindication. Physical and mechanical properties Clinical behavior. Advantages and disadvantages. Tooth preparation for Class I , II, V and III. Step wise procedure for tooth preparation and restoration including modified designs. Bonded amalgam, Failure and repair of amalgam restorations	5
28.	**Contacts and contour** Tooth separation Matrices, retainers and wedges, methods of wedging	1
29.	**Management Of Deep Carious Lesions** Technique of caries excavation – Hand and rotary	1

	Indirect and Direct Pulp Capping, Pulpotomy	
30.	**Dentinal Hypersensitivity** Theories of hypersensitivity Management	1
	Topic for IV Year	
31.	**Complex amalgam restorations** Pin Amalgam Restoration Indications, Contra Indication, Advantages, Disadvantages of pin amalgams, types of pins, methods of placement, alternative means for providing retention for complex amalgam restorations. Failure of pin amalgam restoration	4
32.	**Gingival Tissue Management** Indication and methods, including recent techniques for gingival retraction.	1
33.	**Adhesion to tooth structure** Definition and mechanism Enamel and Dentin bonding Classification and recent development in dentin bonding systems components of dentin bonding agents critical steps in dentin bonding.	3
34.	**Anterior Restorations** Selection of cases, selection of material, shade selection, Clinical technique for anterior composite restorations.	1
35.	**Composite Restorations** Composition, classification, properties Recent advances in composite resins Indications, contraindications, advantages, disadvantages Step wise procedures of tooth preparation for composite restorations. Finishing and polishing of composite restoration	2
36.	**Minimal Invasive Dentistry** Principles of MID, caries risk assessment, materials and techniques	2
37.	**Alternate methods of tooth preparation for restorations** Air abrasion, chemo mechanical method, lasers	1
	Endodontics	
38.	**Introduction, definition, scope and future of Endodontics**	1
39.	**Rationale and principles of Endodontics** Case selection, indication and contraindications for root canal treatments	1
40.	**Clinical diagnostic methods** Case history, diagnosis and treatment plan	3
41.	**Microbiology of endodontic infection**	1
42.	**Isolation and infection control in Endodontics** Rubber dam application	1
43.	**Endodontic instruments** Hand instruments Power driven instruments Standardization Principles of using endodontic instruments Sterilization	3
44.	**Pulpal diseases** Classification, etiology, diagnosis, management	2
45.	**Periapical diseases**: Classification, etiology, diagnosis, management	2
46.	**Vital pulp therapy**: Indirect and direct pulp capping Pulpotomy - types and medicaments used Apexogenesis and apexification and problems of open apex	2
	Topic for V Year	
47.	**Esthetics in dentistry** Introduction and scope Anatomy and physiology of smile Role of colour and translucency Esthetic recontouring Alteration of tooth form, shape, size and colour Management of discoloured teeth	4
48.	**Composite restorations** Recent advances in posterior composite resins	3

	Indications, contraindications, advantages and disadvantages Stepwise procedure of tooth preparation for composite restoration. Clinical technique for posterior direct composite restorations Finishing and polishing of composite restoration Indirect posterior composite restoration	
49.	**Casts restorations** Indications, contraindications, advantage and disadvantages Materials used Class II cavity preparation for inlays Types of bevels in cast restoration Fabrication of wax patterns Differences in tooth preparation for amalgam and cast restorations	3
50.	**Casting** Die materials and preparation of dies Refractory materials Alloys used for casting Casting machines Casting procedure Casting defects Cementation of restoration	2
51.	**Temporisation or interim restoration** Materials and procedure	1
52.	**Root Caries** Etiology, clinical features and management	1
53.	**Non carious destruction of tooth structure** Definition, etiology, diagnosis, clinical features and management	2
54.	**Ceramic Restorations** Recent advances in ceramic materials & techniques including CADCAM (in brief) Ceramic laminates, inlays, onlays and crowns, Indications, contraindications, advantages, disadvantages and techniques (in brief)	3
55.	**Direct Filling gold Restorations** Introduction Types of direct filling gold Indications, contraindications, advantages, disadvantages tooth preparation and restoration	1
	Endodontics	
56.	**Emergency endodontic procedures**	2
57.	**Anatomy of pulp space** Root canal anatomy of maxillary and Mandibular teeth. Classification of canal configuration and variations in pulp space.	2
58.	**Access preparation** Objectives Principles Instruments used Sequential steps of access preparation for individual tooth	2
59.	**Preparation of root canal space** a. Determination of working length definition and methods of determining working length	1
	Cleaning and shaping of root canals Objectives Principles Instruments used Techniques – hand and rotary Step back & Crown down methods	2
60.	**Disinfection of root canal space** a. Irrigants Functions Requirements Types Methods and techniques of irrigation	1

	b. Intracanal medicaments Functions Requirements Types Method of placement and limitations	1
61.	**Problems during cleaning and shaping of root canal spaces** Perforation and its management Broken instruments and its management Management of curved root canals	2
62.	**Obturation of the root canal system** a. Materials- Ideal root canal filling material, classification of materials b. Obturation techniques Classification and procedure	2
63.	**Root canal sealers** Ideal properties Classification, functions Manipulation and application of root canal sealers	2
64.	**Post endodontic restoration** Principles of post endodontic restorations Post and core-materials and procedure(in brief)	2
65.	**Smear layer and its importance in endodontics and conservative treatment**	1
66.	**Discoloured teeth and its management** Bleaching agents , Vital and non vital bleaching methods	1
67.	**Traumatized teeth** Classification of fractured teeth. Management of fractured tooth. Luxated teeth and its management	2
68.	**Endodontic surgeries** Indication contraindications, pre operative preparation Surgical instruments and techniques Apicoectomy, retrograde filling Post operative sequale Trephination, hemisection Radisectomy Reimplantation (both intentional and accidental)	3
69.	**Root resorption** Etiology and management	1
70.	**Success and failures of endodontic treatments**	1
71.	**Retreatment in Endodontics**	1
72.	**Use of specialized equipments like lasers and microscopes in conservative dentistry and Endodontics**	1

j) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
One Question From Conservative Topics One Question From Endodontic Topics	Long Essays 2 x 10 marks	20
Seven Question From Conservative Topics including esthetics and Three Question From Endodontic Topics	Short Essays 10x 5 marks	50
Questions from any of the Conservative & Endodontic topics.	Short Answers 10 x 3marks	30
	Total	**100**

xiii. Theory

University Written	**100 Marks**
Internal Assessment	**25 Marks**
Viva Voce:	**25 Marks**

xiv. Clinicals:

University Clinical Examination:	**80 Marks**
Internal Assessment:	**20 Marks**
	Grand Total 250 Marks

Details of Mark distribution for university Practical examination:

Clinical Exercise: 45 marks

Work Record : 05 marks

Clinical Exercises

1. Preparation for class II amalgam and restoration
   Or
2. Anterior composite restoration
   Or
3. Root canal treatment for anterior tooth up to selection of master cone

Mark distribution for the clinical examinations

1. Class II amalgam restoration

i) Case history recording, examination, diagnosis and treatment planning : 05 marks
ii) Tooth preparation : 20 marks
iii) Base and matrix : 10 marks
iv) Restoration and carving : 10 marks
Total : 45 marks

2. Anterior composite restoration

i) Case history recording, examination, diagnosis and treatment planning : 10 marks
ii) Tooth preparation : 15 mark
iii) Lining and matrix : 10 marks
iv) Restoration and finishing : 10 marks
Total : 45 marks

3. Anterior RCT

i) Case history recording, examination, diagnosis and treatment planning : 10 marks
ii) Access preparation : 15 marks
iii) Working length : 05 marks
iv) Cleaning and shaping, master cone selection : 15 marks
Total : 45 marks

21. PROSTHODONTICS AND CROWN & BRIDGE

a) THEORY:135 HOURS (II yr. 25 hrs, III yr.30 hrs, IV yr.30 hrs, V yr.50 hrs)

Sl. No.	Topic	Description	Hours
Removable Complete Prosthodontics			
1.	Applied Anatomy and Physiology	Introduction Biomechanics of the edentulous state. Residual ridge resorption	3
2.	Communicating with the patient	Understanding the patients, mental attitude. Instructing the patient.	1
3.	Diagnosis and treatment planning for patient.	With some teeth remaining. With no teeth remaining. Systemic status. Local factor. The geriatric patient Diagnostic procedures.	2
4.	Articulators – discussion		3
5.	Improving the patient's denture foundation and ridge relation- an overview	Pre-operative examination. Initial hard tissue & soft tissue procedure, Secondary hard & soft tissue procedure Implant procedure. Congenital deformities Postoperative procedure	3
6.	Principles of Retention, Support and Stability		2
7.	Impressions- detail.	Muscles of facial expression. Biologic considerations for maxillary and Mandibular impression including anatomy landmarks and their interpretation. Impression objectives Impression Materials Impression techniques. Maxillary and Mandibular impression procedures Preliminary impressions Final impressions. Laboratory procedures involved with impression making (Beading & Boxing, and cast preparation).	7
8.	Record bases and occlusion rims- in details.	Materials & techniques Useful guidelines and ideal parameters.	2
9.	Recording and transferring bases and occlusal rims		1
10	Biological consideration in jaw relation& jaw movements – craniomandibular relations.	Mandibular movements. Maxillo- Mandibular relation including vertical and horizontal jaw relations.	3
11	Concepts of occlusion- discuss in brief.	Discuss in brief.	2
12.	Relating the patient to the articulator	Face bow types & uses – discuss in brief. Face bow transfer procedure- discus in brief.	1
13.	Recording Maxillo Mandibular relation.	Vertical relation Centric relation records. Eccentric relation records. Lateral relation records	4
14.	Tooth selection and arrangement.	Anterior teeth.	2

		Posterior teeth. Esthetic and functional harmony.	
15.	Relating inclination of teeth to concept of occlusion- in brief.	Neutrocentric concept. Balanced occlusal concept.	2
16.	Trial dentures		3
17.	Laboratory procedures	Wax contouring. Investing of dentures. Preparing of mold. Preparing & packing acrylic resin. Processing of dentures. Recovery of dentures. Lab remount procedures Recovering the complete denture from the cast. Finishing and polishing the complete denture. Plaster cast for clinical denture remount procedure	3
18.	Denture insertion	Insertion procedures. Clinical errors. Correcting occlusal disharmony. Selective grinding procedures	3
19.	Treating problems with associated denture use	Discuss in brief (tabulation/ flow chart form).	1
20	Treating abused tissues	Discuss in brief	1
21	Relining and rebasing of dentures	Discuss in brief	2
22	Immediate complete dentures construction procedure	Discuss in brief	2
23	The single complete dentures	Discuss in brief	2
24	Overdentures dentures	Discuss in brief	2
25	Implant Supported complete denture	Discuss in brief	3
26	Reduction of residual ridge	Discuss in brief	1
Removable Partial Prosthodontics			
1.	Introduction		1
2	Terminologies and scope		1
3	Classification		2
4	Examination, Diagnosis & Treatment planning & evaluation of diagnostic data.		2
5	Components of a removable partial denture.	Major connectors Minor connectors Rest and rest seats Direct retainers Indirect retainers Tooth replacement.	12
6.	Principles of Removable Partial Denture Design		3
7	Survey and design – in brief		1
8	Surveyors		1
9	Surveying		1
10	Designing		3
11	Mouth preparation and master cast		1
12	Impression materials and procedures for removable partial dentures		2
13	Preliminary jaw relation and esthetic try in for some anterior replacement teeth		2
14	Laboratory procedures for framework construction- in brief		1
15	Fitting the framework- in brief		1
16	Try in of the partial denture- in brief		1
17	Completion of the partial denture- in brief		1
18	Inserting the Removable partial denture in brief		1
19	Post insertion observations		1
20	Temporary Acrylic Partial Dentures		1
21	Immediate Removable Partial Denture		1
22	Removable partial Dentures opposing Complete denture.		1
Fixed Partial Prosthodontics			
1.	Introduction		1

2	Fundamentals of occlusion in brief.		1
3	Articulators	In brief.	1
4	Treatment planning for single tooth restoration.		1
5	Treatment planning for the replacement of missing teeth including selection and choice of abutment teeth.		2
6.	Fixed partial denture configurations		1
7	Principles of tooth preparations.		2
8	Preparations for full veneer crowns		3
9	Preparations for partial veneer crowns	In brief.	1
10	Provisional Restorations		1
11	Fluid Control and Soft Tissue Management		1
12	Impressions		1
13	Working Casts and Dies		1
14	Wax patterns		1
15	Pontics and Edentulous Ridges		1
16	Esthetic Considerations		1
17	Finishing and Cementation		1
18	Implant Supported Fixed Restorations		2
Miscellaneous Topics to Be Covered In Brief :			
1	Solder Joints and Other Connectors		10
2	All - Ceramic Restorations		
3	Metal - Ceramic Restorations		
4	Preparations of intracoronal restorations.		
5	Preparations for extensively damaged teeth.		
6	Preparations for Periodontally weakened teeth	`	
7	The Functionally Generated Path Technique		
8	Investing and Casting		
9	Resin - Bonded Fixed Partials Denture		

It is suggested that the above mentioned topics be dealt with wherever appropriate in the following order so as to cover -

Definition
Diagnosis (of the particular situation /patient selection /treatment planning)
Types / Classification
Materials
Methodology - Lab /Clinical
Advantages & disadvantages
Indications, contraindications
Maintenance Phase
Recent advances
Failure

b) Mandatory requirement to appear for V BDS Prosthodontics University Examination:

1. *Treating completely edentulous conditions with Complete Denture – Minimum 5 nos. (including all clinical and laboratory procedures)*
2. *Treating partially edentulous conditions with Removable Partial Denture – Minimum 5 nos. (including all clinical and laboratory steps)*
3. *Should have satisfactorily completed all the Preclinical Prosthodontic exercises*
4. *Minimum of one seminar presentation on any Prosthodontic topic. A hard copy of the seminar to be submitted at the time of University examination.*

c) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
One Question From Complete Denture topics and one from either FPD or RPD	Long Essays 2 x 10 marks	20
4 Questions from Complete dentures, 3 questions from RPD, 2 questions from FPD and 1 question from Miscellaneous topics.	Short Essays 10x 5 marks	50
Questions from any of the Prosthodontic topics	Short Answers 10 x 3marks	30
	Total	**100**

xv. Theory

University Written **100 Marks**
Internal Assessment **25 Marks**
Viva Voce: **25 Marks**

xvi. Clinicals:

University Clinical Examination: **80 Marks**
Case History *5 Marks*
Complete Denture clinical steps *45 Marks*
Tooth Preparation on Typhodont or RPD designing 20 Marks
Clinical Work Record & Seminar *10Marks*
Internal Assessment: **20 Marks**

Grand Total 250 Marks

22. PUBLIC HEALTH DENTISTRY

a) *GOAL:*

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

b) OBJECTIVES:

i. ***Knowledge:***

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

ii. ***Skill and Attitude:***

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

iii. ***Communication abilities:***

At the conclusions of the course the student should be able to communicate the needs of the community efficiently, inform the society of all the recent methodologies in preventing oral disease

c) *THEORY: 30 HOURS (III yr. 30hrs, IV yr. 30 hrs)*

Sl.No.	Topic	No. of hours
1.	Introduction to Dentistry: Definition of Dentistry, History of dentistry, Scope, aims and objectives of Dentistry.	3
2.	**Public Health:**	
	i. Health & Disease: - Concepts, Philosophy, Definition and Characteristics	4
	ii. Public Health: - Definition & Concepts, History of public health	1
	iii. General Epidemiology: - Definition, objectives, methods	3
	iv. Environmental Health: - Concepts, principles, protection, sources, purification environmental sanitation of water, disposal of waste, sanitation, their role in mass disorder	3
	v. Health Education: - Definition, concepts, principles, methods, and health education aids	2
	vi. Public Health Administration: - Priority, establishment, manpower, private practice management, hospital management	1
	vii. Ethics and Jurisprudence: Professional liabilities, negligence, malpractice, consents, evidence, contracts, and methods of, identification in forensic dentistry	3
	viii. Nutrition in oral diseases	1
	ix. Behavioral science: Definition of sociology, anthropology and psychology and their relevance in dental practice and community	3
	x. Health care delivery system: Center and state, oral health policy, primary health care, national programmes, health organizations.	2
3.	**Dental Public Health**	
	i. Definition and difference between community and clinical health.	2
	ii. Epidemiology of dental diseases-dental caries, periodontal diseases, malocclusion, dental fluorosis and oral cancer.	6
	iii. Survey procedures: Planning, implementation and evaluation, WHO oral health survey methods 1997, indices for dental diseases	3
	iv. Delivery of dental care: Dental auxiliaries, operational and non-operational, incremental and comprehensive health care, school dental health.	2
	v. Payments of dental care: Methods of payments and dental insurance, government plans	2
	vi. Preventive Dentistry- definition, Levels, role of individual, community and profession, fluorides in dentistry, plaque control programmes.	5
4.	**Research Methodology and Dental Statistics**	
	i. Health Information: - Basic knowledge of Computers, MS Office, Window 2000, Statistical Programmes	1
	ii. Research Methodology: -Definition, types of research, designing a written protocol	1
	iii. Bio-Statistics: - Introduction, collection of data, presentation of data, Measures of Central tendency, measures of dispersion, Tests of significance, Sampling and sampling techniques-types, errors, bias, blind trails and calibration.	6
5.	**Practice Management**	
	i. Place and locality ii. Premises & layout iii. Selection of equipments iv. Maintenance of records/accounts/audit.	4
	v. Dentist Act 1948 with amendment. Dental Council of India and State Dental Councils Composition and responsibilities.	1
	vi. Indian Dental Association Head Office, State, local and branches.	1

d) PRACTICALS/CLINICALS/FIELD PROGRAMME IN PUBLIC HEALTH DENTISTRY:

These exercises designed to help the student in IV and V year:

i. Understand the community aspects of dentistry
ii. To take up leadership role in solving community oral health programme
iii. To gain hands on experience on research methodology

e) PRACTICALS: 90 HOURS

Sl.No.	Exercise	No. of hours
1.	**Short term research project:** Epidemiology & Advocacy Purpose: Apply the theory and practice of epidemiology, planning and evaluation, statistics to dental public health. Most of the students are unfamiliar with research and hence this short term project which will be divided across two years (IV and V BDS) would address this issue. Depending on the topic chosen student can incorporate a) Collection of statistical data (demographic) on population in India, birth rates, morbidity and mortality, literacy, per capita income b) Incidence and prevalence of common oral diseases like dental caries, periodontal disease, oral cancer, fluorosis at national and international levels c) Preparation of oral health education material posters, models, slides, lectures, plays acting skits etc. d) Oral health status assessment of the community using indices and WHO basic oral health survey methods **e)** Exploring and planning setting of private dental clinics in rural, semi urban and urban locations, availment of finances for dental practices-preparing project report.	60
2.	**Field visits** a) Visit to primary health center-to acquaint with activities and primary health care delivery. b) Visit to water purification plant/public health laboratory/center for treatment of western and sewage water c) Visit to schools-to assess the oral health status of school children, emergency treatment and health education including possible preventive care at school (tooth brushing technique demonstration and oral rinse programme etc.) d) Visit to institution for the care of handicapped, physically, mentally, or medically compromised patients **Note :** Field visits should have relevance to the short term research project as far as possible Minimum of two visits – one per year (IV and V BDS)	20
3.	**Preventive dentistry**: in the department application of pit and fissure sealants, fluoride gel application procedure, A. R. T., Comprehensive health for 5 pts at least 2 patients.	10

Note :

The colleges are encouraged to involve in the N.S.S. programme for students to carry out social work in rural areas.

f) SCHEME OF EXAMINATION

Distribution of Topics and Types of Questions for University Written Examination:

Contents	Types of Questions and Distribution of Marks	Total Marks
Any topic within the syllabus of Public Health Dentistry	Long Essays 2 x 10 marks	20
	Short Essays 10x 5 marks	50
	Short Answers 10 x 3marks	30
	Total	**100**

xvii. Theory

University Written	**100 Marks**
Internal Assessment	**25 Marks**
Viva Voce:	**25 Marks**

xviii. Clinicals:

University Clinical Examination:	**80 Marks**
Case history taking	*10 Marks*
Assessment of oral health status using any 2 relevant indices	*30Marks*
Preventive clinical procedures (Any one)	
[Topical fluoride application, Pit and fissure sealants and ART]	30 Marks
Oral Health Education Talk/ Presentation of oral health education material/Short term student research project presentation	10 Marks
Internal Assessment:	**20 Marks**

Grand Total 250 Marks

Section IX

COMPULSORY ROTATING RESIDENT INTERNSHIP PROGRAMME

After passing the V BDS Degree Examination the candidate has to undergo Compulsory Rotating Resident Internship programme (CRRI) for six months (i.e. 183 days) in the same institution. During this period the candidates will be posted in all the clinical departments of the institution. The Degree will be awarded only after successful completion of the CRRI programme. During this training period they will have to attend to the routine clinical activities of the department under the supervision of faculty members. The interns will also be posted in the Dental Casualty for attending to the emergency services of the institution.

a) **The duration of posting of interns in various departments is as follows:-**

Sl.No.	Department	No. of Days
1.	Prosthodontics	30
2.	Conservative dentistry	30
3.	Oral & maxillofacial Surgery	30
4.	Orthodontics	21
5.	Pedodontics	21
6.	Oral Medicine & Radiology	21
7.	Periodontics	20
8.	Community Dentistry	10

b) **Duties & responsibilities of Intern posted in various departments include:-**

i. Attending to the routine O.P in the Department
ii. Carrying out the routine clinical procedures in the department
iii. Carrying out Patient and instrument Preparation for clinical procedures.
iv. Carrying out all Clinical procedures including impression making, and pouring casts (i.e. steps including mixing of impression materials & gypsum products, mixing of restorative materials and removal of casts from impressions to be done by the internee without seeking assistance)
v. Fabrication insertion and follow up of removable orthodontic appliances.
vi. Attending to the casualty duties of the institution
vii. Maintenance of log book and records
viii. Carrying out any other duty as instructed by the head of the department.
ix. Maintenance of proper dress code and attire.

Note: The entire clinical work done by intern will be under the supervision of faculty members. In the absence of faculty the intern will be under the supervision of Senior/Junior Resident.

c) Suggested internship programme in community dentistry:

i.	**AT THE COLLEGE:** Students are posted to the department to get training in dental practice management. a) Total oral health care approach- in order to prepare the new graduates in their approach to diagnosis, treatment planning, cost of treatment, prevention of treatment on schedule, recall maintenance of records etc. at least 10 patients (both children and adults of all types posting for at least one month). b) The practice of chair side preventive dentistry including oral health education
ii.	**AT THE COMMUNITY ORAL HEALTH CARE CENTRE (ADOPTED BY THE DENTAL COLLEGE IN RURAL AREAS)** Graduates posted to familiarize in: (a) Survey methods, analysis and presentation of oral health assessment of school children and community independently using WHO basic oral health survey methods. (b) Participation in rural oral health education programmes. **(c)** Stay in the village to understand the problems and life in rural areas
iii.	**DESIRABLE:** Learning use of computers-at least basic programme.