1. DEFINITIONS OF SPECIALTY:

*Oral Pathology deals with the nature of oral diseases, their causes, processes and effects. It relates the clinical manifestation of oral diseases to the physiologic and anatomic changes associated with these diseases.*

**ORAL PATHOLOGY AND MICROBIOLOGY**

*Objectives:*

* To train a post graduate dental surgeon so as to ensure higher competence in both general and special pathology dealing with the nature of oral diseases, their causes, processes and effects.

* An oral pathologist is expected to perform routine histopathological evaluation of specimens relating to oral and perioral tissues, to carry out routine diagnostic procedures including hematological, cytological, microbiological, Immunological and ultra structural investigations.

* He/she is expected to have an understanding of current research methodology, collection and interpretation of data, ability to carry out research projects on clinical and or epidemiological aspects, a working knowledge on current databases, automated data retrieval systems, referencing and skill in writing scientific papers.

* He/she is expected to present scientific data pertaining to the field, in conferences both as poster and verbal presentations and ot take part in group discussions.

**Broad outline of theoretical, clinical and practical courses.**

1. Study of principles of routine and special techniques used for histopathology including principles of histochemistry, Immunochemistry, applied and theoretical biochemical basis of histochemistry as related to oral pathology.

3. Study of special and applied pathology of oral tissues as well as relation of local pathologic and clinical findings to systemic conditions.

4. Oral microbiology and their relationship to various branches of dentistry.

5. Oral microbiology affecting hard and soft tissues. Study of clinical changes and their significance to dental and oral diseases as related to oral pathology

6. Forensic odontology

7. Inter institutional postings such as cancer hospital, dermatology clinics, regional HIV detection centers, ’sophisticated instrumentation centers for electron microscopy and other techniques.

8. Maintenance of records of all postgraduates activities.


Course contents:

FIRST YEAR
1) **Biostatistics and Research Methodology**

* Basic principles of biostatistics and study as applied to dentistry and research

* Collection/organization of data/measurement scales presentation of data analysis.

* Measures of central tendency.

* Measures of variability.

* Sampling and planning of health survey.

* Probability, normal distribution and indicative statistics.

* Estimating population values.

* Tests of significance (parametric/non-parametric qualitative methods.)

* Analysis of variance

* Association, correlation and regression.

**Approach:**

* Didactic lectures on biostatistics and discussion on research methodology by eminent researchers.

* Two - day P.G. orientation course including general approach PG course, library and main dissertation, journal club topic selection and presentation, seminars, clinico-pathological meets, teaching methodology and use of audiovisual aids.

2) **Applied Gross Anatomy of Head and Neck including Histology:**

* Temporomandibular joint

* Trigeminal nerve and facial nerve

* Muscles of mastication

* Tongue

* Salivary glands

* Nerve supply; blood supply, lymphatic drainage and venous drainage of Orodental tissues.

* Embryology

  - Development of face, palate, mandible, maxilla, tongue and applied aspects of the same

  - Development of teeth and dental tissues and developmental defects of oral and maxillofacial region and abnormalities of teeth

* Maxillary sinus

* Jaw muscles and facial muscles
Genetics:

* Introduction modes of inheritance, chromosomal anomalies of oral tissues and single genetic disorders.

Approach:

* To be covered as didactic lectures.

* Posting in department of anatomy for dissection of head, face and neck.

3) **Physiology (General and oral)**

* Saliva
* Pain
* Mastication
* Taste
* Deglutition
* Wound healing

* Vitamins (Influence on growth, development and structure of oral soft and hard tissues and paraoral tissues.)
* Calcium metabolism.
* Theories of mineralization.
* Tooth eruption and shedding.

* Hormones. (Influence on growth, development and structure of oral soft and hard tissues and para oral tissues.)
* Blood and its constituents.

Approach:

To be covered as didactic lectures.

4) **Cell Biology:**

* Cell-structure and function (ultrastructural and molecular aspects), intercellular junctions, cell cycle and division, cell cycle regulators, cell - cell and cell - extra cellular matrix interactions.

* Detailed molecular aspects of DNA, RNA, and intracellular organelles, transcription and translation and molecular biology techniques.

Approach:
To be covered as seminars and didactic lecture.

5) **General Histology:**

Light and electron microscopy considerations of Epithelial tissues and glands, bone, hematopoietic system, lymphatic system, muscle, neural tissue, endocrinal system (thyroid, pituitary, parathyroid)

**Approach:**

* Topics to be covered as didactic lectures.
* Postings in the department of anatomy and histology for slide discussion
* Record book to be maintained.

6) **Biochemistry:**

* Chemistry of carbohydrates, lipids and proteins.
* Methods of identification and purification.
* Metabolism of carbohydrates, lipids and proteins.
* Biological oxidation.
* Various techniques - cell fractionation and ultra filtration, centrifugation, Electrophor Spectrophotometry, and radioactive techniques.

**Approach:**

* Topics to be covered as didactic lectures.
* Postings to the department of biochemistry to familiarize with various techniques
* Record book to be maintained.

7) **General Pathology:**

* Inflammation and chemical mediators, thrombosis, embolism, necrosis, repair, degeneration, shock, hemorrhage pathogenic mechanisms at molecular level and blood dyscrasias, Carcinogenesis and Neoplasia.

**Approach:**

To be covered as seminars and didactic lectures.

8) **General Microbiology:**

* Definitions of various types of infections.
* Routes of infection and spread
* Sterilization, disinfection and antiseptics.
* Bacterial genetics.
* Physiology and growth of microorganisms.

Approach:
* To be covered as seminars and didactic lectures.
* Record book to be maintained.

9) Basic Immunology
* Basic principles of immunity, antigen and antibody reactions.
* Cell mediated immunity and Humoral immunity.
* Immunology of hypersensitivity.
* Immunological basis of the autoimmune phenomena.
* Immunodeficiency with relevance to opportunistic infections.
* Basic principles of transplantation and tumor immunity.

Approach:
To be covered as didactic lectures.

10) Systemic microbiology/applied microbiology
Morphology, classification, pathogenicity, mode of transmission, methods of pre collection and transport of specimen, for laboratory diagnosis, staining methods, comi culture media, interpretation of laboratory reports and antibiotic sensitivity tests.
* Staphylococci
* Streptococci
* Corynebacterium diphtheria
* Mycobacteria
* Clostridia, bacteroides and fusobacteria * Actinomycetales
* Spirochetes

Virology:
General properties: structure, broad classification of viruses, pathogenesis, pathology of viral infections.

Herpes virus: list of viruses included, lesions produced, pathogenesis, latency principles and laboratory diagnosis.

Hepatitis virus: list of viruses, pathogenesis, and mode of infection, list of diagnostic tests, and their interpretations, methods of prevention and control.

Human Immunodeficiency virus: structure with relevance to laboratory diagnosis, type of infection, laboratory tests and their interpretation, universal precautions, specific precautions and recent trends in diagnosis and prophylaxis.

Mycology:
* General properties of fungi, classification bases on disease, superficial, subcutaneous, deep opportunistic infections.
* General principles of fungal infections, diagnosis rapid diagnosis method of collection of sample and examination for fungi.

Approach:
* To be covered as seminars and didactic lectures
* Postings to the dept. of microbiology to familiarize with relevant diagnostic methods
* Record book to be maintained

11) Oral Biology (oral and dental histology)
* Structure and function of oral, dental and paraoral tissues including their ultra structure, molecular and biochemical aspects.
* Study of morphology of permanent and deciduous teeth
(Lectures and practical demonstrations to be given by PG students)

Approach:
* To be covered as seminars and didactic lectures.
* Slide discussion on histological appearance of normal oral tissues.
* Record book to be maintained.

12) Basic molecular biology and techniques:
Experimental aspects - DNA extraction, PCR, western blotting.
13) **Basic Histo-techniques and microscopy:**

* Routine hematological tests and clinical significance of the same.
* Biopsy procedures for oral lesions.
* Processing of tissues for Paraffin lesions.
* Microtome and principles of microtomy.
* Routine stains, principles and theories of staining techniques
* Microscope, principles and theories of microscopy.
* Light microscopy and various other types including electron microscopy.
* Methods of tissue preparation for ground sections, decalcified sections.

**Approach:**

* Topics to be covered as seminars.
* Preparation of ground and decalcified sections, tissue processing, sectioning and staining.
* Record book to be maintained

**Academic activities:**

* Submission of synopsis of dissertation at the end of six months.
* Journal clubs and seminars to be presented by every post graduate student twice a month.
* To attend interdepartmental meetings.
* To attend dental camps based on the survey to be done.
SECOND YEAR

* Microtome and principles of microtomy
* Routine stains, principles and theories of staining techniques
* Microscope, principles and theories of microscopy
* Light microscopy and various other types including electron microscopy
* Methods of tissue preparation for ground sections, decalcified sections.
* Special stains and staining techniques for different tissues
* Immunohistochemistry
* Preparation of frozen sections and cytological smears

**Other Topics in Oral Pathology.**

- Detailed description of diseases affecting oral mucosa, teeth, supporting tissues & jaws
- Cysts of the oral & Para-oral regions
- Systemic diseases affecting oral cavity.

*Approach:* Seminars & Slide discussions. Record notebook to be maintained. Training in histopathology slide reporting.

**Experimental aspects of Oral diseases**

*Approach:* Posting is desirable in Centers where animal experimentation is carried out to familiarize with laboratory technique's, upkeep & care of experimental animals.

**Recent advances in Oral Pathology.**

*Approach:* Update of knowledge in Oral Pathology through study of recent journals & Internet browsing. Journal Clubs & Group discussions.

**Academic activities**

* Library assignment to be submitted at the end of 6 months * Commencement of dissertation work
* Journal clubs and seminars to be presented by every PG student * Clinico - pathological discussions once in a month by every PG student * To attend interdepartmental meetings.
* Lecture and practical classes and slide discussions to be taken for II BDS students in oral and dental anatomy, dental histology and oral physiology. * Year ending examination (theory and practical) to be conducted by the college.

**Oral pathology**

* Developmental defects of oral and maxillofacial region and abnormalities of teeth

Dental caries (Introduction, Epidemiology, microbiology, cariogenic bacterial including properties, acid production in plaque, development of lesion, response of dentine - pulp unit, histopathology, root caries, sequelae and immunology).
* Pulpal and Periapical diseases
* Infections of oral and Para oral regions (bacterial, viral and fungal infection
* Non - neoplastic disorders of salivary glands
* Bone pathology
* Hematological disorders
* Physical and chemical injuries, allergic and Immunological diseases.
* Cysts of odontogenic origin
* Dermatologic diseases.
* Periodontal diseases
* Oral manifestations of systemic diseases
* Facial pain and neuromuscular disorders including TMJ disorders
* Regressive alterations of teeth

**Clinical Pathology:**

* Laboratory investigations - Hematology, Microbiology and Urine analysis
* Postings to Clinical Pathology for relevant training
* Record book to be maintained.

Specialized histotechniques and special stains:
Special staining techniques for different tissues.

**Immunohistochemistry:**

Preparation of frozen sections and cytological smears

**Approach:**

Training to be imparted in the department or in other institutions having the facility Record book to be maintained

Recording of Case history and Clinico-pathological discussions:

**Approach:**

Posting to the department of Oral medicine, Diagnosis and Radiology and Oral and Maxillofacial surgery

Record of case histories to be maintained Dermatology
Study of selected mucocutaneous lesions-etiopathogenesis, pathology, clinical presentation and diagnosis.

Approach:
* Posting to the dept of Dermatology of a Medical college
* Topics to be covered as Seminars
* Record of cases seen to be maintained.

**Oral oncology**

Detailed study including Pathogenesis, molecular and biochemical changes of tumor like lesions and Premalignant lesions affecting the hard and soft tissues of oral and paraoral tissues

Tumour markers

Approach

To be covered as seminars

Posting to a Cancer center to familiarise with the pathological appearances, diagnosis, radio-diagnosis and treatment modalities.

**Oral Microbiology and immunology**

* Normal Oral microbial flora
* Defense mechanism of the oral cavity
* Microbiology and immunology of Dental caries and Periodontal diseases
  * Dental caries (Introduction, epidemiology, microbiology, cariogenic bacteria including properties, acid production in plaque, development of lesion, response of dentin-pulp unit, histopathology, root caries, sequelae and immunology)
* Tumor immunology
* Infections of Pulp and Periapical and periodontal tissues
* Oral sepsis and Bacterimia
* Microbial genetics
* Infections of oral and Para oral regions (bacterial, viral and fungal infections)

Approach

To be covered as seminars

**Forensic Odontology:**

Legal procedures like inquest, medico-legal evidences post mortem examination of violence around mouth and neck, identification of deceased individual-dental importance.

Bite marks rugae patterns and lip prints.
Approach

To be covered as seminars

Posting to a Cancer center to familiarize with the pathological appearances, diagnosis, and radio-diagnosis and treatment modalities

**Histopathology - slide discussion**

Record book to be maintained

Laboratory techniques and Diagnosis

* Routine hematological tests and clinical significance of the same

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**THIRD YEAR**

* Non-neoplastic disorders of salivary glands.
* Bone pathology
* Physical and chemical injuries, allergic and Immunological diseases.
* Cysts of odontogenic origin
* Oral manifestations of systemic diseases

Approach
To be covered as seminars Slide discussions of the same Record book to be maintained

Academic activities
* Visit to center out Animal experimentation to familiarize with Laboratory techniques, upkeep and care of animals
* Completion of Dissertation work and submission of the same, six months before the Final Examination
* Study of Journals, Internet Browsing, and group discussions, to update knowledge in the recent advances in Oral Pathology
* Lecture and Practical demonstrations for third B.D.S students in Oral pathology and Microbiology
* Reporting of histopathology slides
* Journal clubs and Seminars to be presented by every post graduate student twice a month
* Clinico-pathological discussions by every student once in a month
* To attend Interdepartmental meetings.

Monitoring learning Progress

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment is done using checklists that assess various aspects.

Scheme of Examination

A. Theory  -  300 Marks

Written examination shall consist of four question papers each of three hours duration. Total marks for each paper will be 75. Paper IV will be on Essay. Questions on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows *:
PAPER-I: Applied Basic Sciences: Applied anatomy, Physiology (General and oral), Cell Biology, General Histology, Biochemistry, General Pathology, General and systemic Microbiology, Virology, Mycology, Basic Immunology, Oral Biology (oral and dental histology), Biostatistics and Research Methodology

PAPER-II: Oral pathology, Oral Microbiology & Immunology and Forensic Odontology

PAPER-III: Laboratory techniques and Diagnosis and Oncology

PAPER-IV: Essay

* The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

B. Practical/Clinical - 200 Marks

1. Case Presentation
   a) Long case - 20 marks
   b) Short case — 10 marks

2. Clinical Hematology (any two investigations) - 20 Marks
   Hb%, bleeding time, clotting time, Total WBC count, Differential WBC count and ESR

3. Smear Presentation - 20 marks

4. Cytology or microbial smear and staining

5. Paraffin sectioning and H & E Staining - 30 Marks

6. Histopathology slide discussion - 100 Marks

C. Viva Voce 100 Marks

i. Viva-Voce examination: 80 marks

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills. It includes rill components of course contents. It includes presentation and discussion on dissertation also.

ii. Pedagogy Exercise: 20 marks

A topic is given to each candidate in the beginning of clinical examination. He/she is asked to make a presentation on the topic for 8-10 minutes
TEACHING/LEARNING ACTIVITIES AND MONITORING LEARNING PROGRESS

All the candidates registered for MDS course in various specialties shall pursue the course for a period of 3 years as full time students. During this period, each student shall take part actively in learning activities designed by the institution / university. A list is given below. Institutions may include additional activities, if so, desired.
It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also helps students to evaluate themselves. The monitoring is done by the staff of the department based on participation of students in various teaching / learning activities using checklists. They may be copied and used. The number of activities attended and the topics prevented are to be recorded in log book. The log book should periodically be validated by the supervisors.

i) Acquisition of Knowledge

Journal Review Meeting (Journal Club): The trainees should make presentation from the allotted journals of selected article at least five times in a year. The ability to do literature search, in depth study, presentation skills, and use of audio-visual aids are to be assessed during presentation. The assessment be made by faculty members and peers attending the meeting using Checklist.

Seminars: The seminars may be held at least twice a week in each postgraduate department. All candidates are expected to participate actively and enter relevant detail in the logbook. Each candidate shall make at least five seminars presentations in each year. The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio-visual aids are to be assessed using the Checklist.

Symposium: It is recommended to hold symposiums on topics covering multiple disciplines Clinico-Pathological Conferences (CPC): The CPCs should be held once in a month involving the faculties in Oral Medicine and Radiology, Oral Pathology and concerned clinical departments. The PG student should be encouraged to present the clinical details, radiological, and histo-pathological interpretations, and participation in the discussion. All departments should attend CPCs.

Interdepartmental meetings: To bring in more integration among various specialities, interdepartmental meetings are recommended, chaired by the dean, with all heads of post graduate departments, at least once a month.

ii) Clinical skills

Day to Day work: Skills in outpatient and ward work should be assessed periodically, assessment. They should include the candidate's sincerity and punctuality, analytical ability and
communication skills.

Clinical meetings: Candidates should periodically present cases to his peers and faculty members.

Clinical and Procedural skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book.

iii) Teaching skills: All the candidates shall be encouraged to take part in undergraduate teaching programs, either in the form of lectures or group discussions. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students.

iv) Periodic tests: The concerned departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.

vii) Work Diary / Log Book: Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate.

viii) Records: Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or DCI.

Continuing dental education programmes: Each postgraduate department is recommended to organize these programs on regular basis involving other institutions. The trainees shall also be encouraged to attend such programs conducted elsewhere.

Conferences / workshops / advance courses: The trainee shall be encouraged not only to attend conferences/workshops/advanced courses, but also to present at least 2 papers at state, national specialty meetings during their training period.
Dissertation: Every candidate shall prepare a dissertation based on the clinical or experimental work or any other study conducted by them under the supervision of the post graduate guide.

The log book is a record of the important activities of the candidates during the training. Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by exte agencies. The record includes academic activities as well as the presentations and p carried out by the candidate.

Format for the log book for the different activities is given in Tables 1, 2 and 3 of Section IV. Copies may be made and used by the institutions.

Procedure for defaulters: Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

SEMINARS
Seminars will be held once a week in the morning. Topics will be assigned to each postgraduate trainee (PGT) in the beginning of each academic year. Before presenting, the seminar protocol should be approved from the head of department (HOD). A copy of the seminar on CD-R as well as print after successful completion and approval by the HOD will be submitted to the department within a week of presentation.

CASE PRESENTATION
Cases of clinical interest, which report to the department, are selected for discussion for this weekly activity. Normally, the cases for clinicopathological investigation are also presented for discussion.

JOURNAL CLUB
This academic activity shall be held once a week. The PG will scan articles from recent journals and get one finally selected from the teaching staff for presentation. The articles should be meaningful, constructive with sound scientific base in relation to any topic of oral pathology, microbiology, immunology, genetics & other recent advances.

SLIDE SEMINAR
JODHPUR DENTAL COLLEGE GENERAL HOSPITAL

DEPARTMENT OF ORAL AND MAXILLOFACIAL PATHOLOGY

Slide seminar will be held once a week in the morning. Selected slides of histopathological interest will be given to the postgraduate students. The student must describe the histopathological findings and discuss the diagnoses.

CLINICOPATHOLOGICAL DISCUSSION

It will be held with the active participation of Oral & Maxillofacial Surgery/Oral Medicine departments and the discussion shall involve clinical, pathological, diagnostic and surgical aspects of an interesting case.

CLINICAL PATHOLOGY POSTINGS

The PGTs will be posted periodically to the clinical pathology and Microbiology Departments to perform routine haematological and microbiological investigations and reporting.

PERIPHERAL POSTINGS

During the 1st, 2nd and 3rd academic years of M.D.S course the PGT will be sent for peripheral postings to allied specialties at the hospital as well as other institutions:

APPLIED BASIC SUBJECTS

A thorough knowledge of basic medical subjects as relevant to the practice of oral pathology & microbiology is desired. It is also desirable to have adequate knowledge in biostatistics, epidemiology, research methodology, nutrition and computers.

LIBRARY DISSERTATION

The PGT will be given a topic for a library dissertation related to oral pathology & microbiology at the beginning of the academic session. Completed dissertation signed by the HOD has to be submitted to the department by the end of the second academic year.

DISSERTATION

The dissertation topic has to be selected by the end of 1st term of 1st year and the synopsis of the same should be submitted to the Principal’s Office by the end of first academic year. The dissertation will be submitted to the university by the middle of third academic year i.e. six months prior to the main university exams.

OTHER ACADEMIC ACTIVITIES

UNDERGRADUATE TEACHING

During the course of training, the PGT has to take a minimum of six lectures for the undergraduate students on topics allotted by the HOD, which will be evaluated by the faculty.
PGTs are also expected to take discussions and demonstrations for the undergraduates in the department.

**PUBLICATIONS AND PRESENTATIONS**

All PGTs are required to compulsorily attend at least one specialty conference in each academic year and present one quality paper and one poster during the 3 academic years. In addition, they should contribute to at least one national and international journal during their tenure.

**RECORD MAINTENANCE**

**Graduate Training Manual:** The PGT will complete the “Graduate Training Manual” during the first year. The manual should be duly signed by the HOD before proceeding to the pre-clinical work.

**Preclinical Record:** The PGTs will complete the pre-clinical procedure in the first year of the M.D.S course. A brief description of each procedure has to be regularly signed by the HOD / Guide after completion of the same in the log book.

**Biopsy Record:** The PGTs will complete the biopsy record given by the department. This biopsy record has to be presented to and duly signed by any oral pathology staff member. The records will be preserved in the files of each PGT until the end of the course. At the end of the course all records will be submitted to the records section of the department.

**Clinical Pathology record:** The PGTs will fill the haematological investigation form given by the department after routine haematologic procedures. The record has to be presented to and duly signed by HOD on the same day. The haematologic record will be preserved in the files of each PGT until the end of the course. At the end of the course all records will be submitted to the records section of the department.

**Case History record:** The PGTs will make an entry of the case seen by them in the department under the following headings: General details, Case History, Provisional Diagnosis, Blood investigations, Radiological findings & Histopathological Report, Treatment Given. A separate file with all such details will be maintained by the PGT till the end of his tenure.

**Log Book:** This book contains an overview of the complete work done by the PGT during three years of his training.

**WEEKLY REPORT**

All PGTs will submit a weekly report to the HOD or designated staff member every Saturday afternoon detailing the progress in pre-clinical, clinical, library dissertation, dissertation work,
etc.