This is as per the Subject of Section II (103) 'Subject Specific Paper' (Curriculum & syllabus will be as per concerned subject and be of Master's level)

Ph.D. Syllabus

ORAL & MAXILLOFACIAL PATHOLOGY AND ORAL 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 totake part in group discussions.

Teaching / Learning Activities:

Broad Outline of Theoretical, Clinical and Practical Courses

I MDS:

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 and analysis
   - Measures of central tendency
   - Measures of variability
   - Sampling and planning of health survey
   - Probability, normal distribution & indicative statistics
   - Estimating population values
   - Tests of significance(parametric/non-parametric qualitative methods)
   - Analysis of variance
   - Association, correlation and regression

   Approach:
   - Didactic Lectures

2. **Applied Gross Anatomy of head and neck, histology and genetics :**
   - Temporo-mandibular joint
   - Trigeminal nerve and facial nerve
   - Muscles of mastication
   - Tongue
   - Salivary glands
   - Nerve supply, blood supply, lymphatic drainage & venous drainage of oro-dental tissues
   - Development of face, palate, mandible, maxilla, tongue and applied aspects of the same
   - Development of teeth & dental tissues and developmental defects of oral and maxilla-facial region & abnormalities of teeth
   - Maxillary sinus
   - Jaw muscles and facial muscles
   - Introduction to genetics
   - Modes of inheritance
   - Chromosomal anomalies of oral tissues & single gene disorders

   Approach:
   - Didactic Lectures
   - Postings in the Department of Anatomy for dissection of Head, Face and Neck

3. ***Physiology (General & Oral)*** **:**
    - Saliva
    - Pain

- Mastication
- Taste
- Deglutition
- Wound healing
- Vitamins (influence on growth, development and structure of oral soft and hard tissues & paraoral tissues)
- Calcium metabolism
- Theories of mineralization
- Tooth eruption and shedding
- Blood and its constituents
- Hormones (influence on growth, development and structure of oral soft and hard tissues & paraoral tissues)

Approach:

- Didactic Lectures

4. ***Cell Biology*** **:**
   - Cell structure and function (ultra structural & molecular aspects)
   - Intercellular junctions
   - Cell cycle and division
   - Cell cycle regulators
   - Cell–cell & cell-extracellular matrix interactions
   - Detailed molecular aspects of DNA,RNA and intracellular organelles, transcription and translation and molecular biology techniques

   Approach:

   - Seminars & Didactic Lectures

5. ***General Histology*** **:**
   - Light & electron microscopy considerations of epithelial tissues and glands,bone.
   - Light & electron microscopy considerations of hemopoetic system, lymphatic system, muscle, neural tissue, endocrinal system (thyroid, pituitary, parathyroid)

   Approach:

   - Didactic Lectures
   - Postings in the Department of Anatomy & 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, electrophoresis, spectrophotometry and radioactive techniques

   Approach:

   - Didactic Lectures
   - Postings in the Department of Biochemistry to familiarize with various techniques
   - Record book to be maintained

7. ***General Pathology :***
   - Inflammation and chemical mediator
   - Thrombosis
   - Embolism
   - Necrosis
   - Repair
   - Degeneration
   - Shock
   - Hemorrhage
   - Pathogenic mechanisms at molecular level

- Blood dyscrasias
- Carcinogenesis and neoplasia

Approach:
- Didactic Lectures & Seminars

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

   Approach:
   - Didactic Lectures & Seminars
9. ***Basic Immunology :***
   - Basic principles of immunity, antigen and antibody reaction
   - Cell mediated and humoral immunity
   - Immunology of hypersensitivity
   - Immunological basis of auto immune phenomena
   - Immunodeficiency with relevance to opportunistic infections
   - Basic principles of transplantation and tumor immunity

   Approach:
   - Didactic Lectures & Seminars
10. ***Systemic Microbiology / Applied Microbiology :***
    Morphology, classification, pathogenicity, mode of transmission, methods of prevention, collection and transport of specimen for laboratory diagnosis, staining methods, common culture media, interpretation of laboratory reports and antibiotic sensitivity tests.
    - Staphylococci
    - Streptococci
    - Corynebacterium diphtheria
    - Mycobacteria
    - Clostridia, bacteroids & fusobacteria
    - Actinomycetales
    - Spirochetes
    - General structure, broad classification of viruses, pathogenesis, pathology of viral infections
    - Herpes virus
    - Hepatitis virus
    - HIV
    - General properties of fungi
    - Superficial, subcutaneous, deep opportunistic infections
    - General principles of fungal infections, method of collection of samples, diagnosis and examination of fungi

    Approach:
    - Didactic Lectures & Seminars
    - Postings in the Department of Microbiology to familiarize with relevant diagnostic methods
    - Record book to be maintained

11. **Oral biology (Oral and Dental Histology) :**
    - Study of morphology of permanent and deciduous teeth
    - Structure and function of oral, dental and paraoral tissues including their ultra structure, molecular and biochemical aspects

    Approach:
    - Didactic Lectures & Seminars
    - Slide discussion on histological appearance of normal oral tissues
    - Record book to be maintained

12. **Basic Histo-Techniques and Microscopy :**

- Routine hematological tests and clinical significance of the same
- Biopsy procedures for oral lesions
- Tissue processing
- Microtome and principles of microtomy
- Various stains used in histopathology and their applications
- Microscope, principles and theories of microscopy
- Light microscopy and various other types including electron microscopy
- Fixation and fixatives
- Ground sections and decalcified sections
- Cytological smears

Approach:

- Didactic Lectures & Seminars
- Postings in Clinical Pathology and Microbiology for relevant training
- Preparation of Ground and decalcified sections, tissue processing, sectioning and staining
- Tooth Carving (Permanent Dentition)
- Record book to be maintained

II MDS:

1. Oral and Dental Pathology:

- Developmental disorders of oral and paraoral structures
- Potentially malignant disorders
- Benign and malignant tumors of the oral cavity
- Odontogenic cysts and tumors
- Pathology of salivary glands
- Regressive alterations of teeth
- Bacterial, fungal, viral and protozoal infections of the oral cavity
- Dental caries
- Diseases of pulp and periapical region
- Spread of oral infection
- Healing of oral wounds
- Physical and chemical injuries of oral cavity
- Oral aspects of metabolic diseases
- Diseases of bones and joints
- Diseases of skin and mucous membrane
- Diseases of periodontia
- Diseases of blood and blood forming organs
- Diseases of nerves and muscles
- Oro-facial pain
- Immunological diseases of oral cavity including tumor immunology
- Molecular pathology
- Oral Microbiology

Approach:

- Didactic Lectures & Seminars
- Postings in the Department of Dermatology of a Medical College
- Postings in a Cancer Centre

2. Basic histo-techniques and microscopy:

- Enzyme histochemistry
- Principles, techniques and applications of immunofluorescence
- Principles, techniques and applications of immunohistochemistry
- Preparation of frozen sections
- Museum set up
- Quality control
- Animal models

Approach:

- Didactic Lectures & Seminars
- Training to be imparted in the Department or in other institutions having the facility
- Visit to the centre of animal experimentation to be familiarize with laboratory techniques, upkeep and care of animals
- Record book to be maintained

3. **Recent Molecular Techniques:**

- Basic principles, techniques and applications of –
  - PCR
  - BLOTS
  - Hybridization
  - Recombinant DNA technology
  - Micro array
  - DNA sequencing
  - Cell culture and cloning

Approach:

- Didactic Lectures & Seminars
- Training to be imparted in the Department or in other institutions having the facility
- Record book to be maintained

4. **Recording of Case History and Clinico-Pathological Discussions:**

Approach:

- Postings in the Department of Oral Medicine, Diagnosis & Radiology
- Record of minimum 10 case histories to be maintained

5. **Histopathology – Slide discussion:**

- Record book to be maintained

III MDS:

- Forensic odontology
- Giant cell lesions
- Clear cell lesions
- Round cell lesions
- Spindle cell lesions
- Pigmented lesions
- Fibro-osseous lesions
- Mechanism of formation and expansion of cysts of orofacial region
- Mechanism of growth and metastasis of tumors
- Lab diagnosis of bacterial infections
- Lab diagnosis of viral infections
- Lab diagnosis of fungal infections
- Hamartomas
- Phakomatoses
- Vascular tumors of oro-facial region
- Genodermatoses
- Tumor markers
- Histogenesis of salivary gland tumors
- Tumor angiogenesis
- Concept of premalignancy
- Blue cell lesions
- Molecular basics of oral squamous cell carcinoma
- Matrix remodelling in pathological condition
- Etiopathogenesis of developmental defects of teeth
- Viral oncogenesis
- Lesions associated with impacted and missing teeth
- Syndromes affecting oro-facial region

- Hereditary oral defects
- Techniques to assess the prognosis of neoplastic lesions
- Vesiculo-bullous lesions
- Lymphoreticular malignancy
- Haemopoietic malignancy
- Micronutrients
- Oral aspects of metabolic disorders
- Hormones and oro-maxillofacial lesions
- Matrix metalloproteinases
- Current concepts in HIV related oral diseases
- Current concepts in OSMF
- Epithelial –connective tissue interaction
- Stem cell research

Approach:

- Didactic Lectures & Seminars
- Postings in the Department of Forensic Medicine / Sciences
- Record book to be maintained

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 should 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. Checklists are given in Section IV.

Scheme of Examination:

A. Theory :	Part-I:	Basic Sciences Paper	-	**100 Marks**
	Part-II:	Paper-I, Paper-II & Paper-III	-	**300 Marks**
				(100 Marks for each Paper)

Written examination shall consist of Basic Sciences Paper (Part-I) of three hours duration and should be conducted at the end of First year of MDS course. Part-II Examination will be conducted at the end of Third year of MDS course. Part-II Examination will consist of Paper-I, Paper-II & Paper-III, each of three hours duration.Paper-I & Paper-II shall consist of two long answer questions carrying 25 marks each and five questions carrying 10 marks each. Paper-III will be on Essays. Three Questions will be given and student has to answer any two questions. Each question carries 50 marks. Questions on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows: *

PART-I : Applied Basic Sciences: Applied Anatomy, Physiology (General and oral), Cell Biology, General Histology, Biochemistry, General Pathology, General Pharmacology specially related to drug induced oral mucosal lesions, General and systemic Microbiology, Virology, Mycology, Basic Immunology, Oral Biology (Oral and Dental Histology), Biostatistics and Research Methodology

PART-II

Paper-I : Oral pathology, Oral Microbiology & Immunology and Forensic Odontology
Paper-II : Laboratory techniques & Diagnosis and Oral Oncology
Paper-III : Essays (descriptive and analyzing type questions)

** 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 Examination – 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 marksCytology or microbial smear and staining
4. **Paraffin sectioning and H & E Staining** – 30 Marks
5. **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 all components of course contents.

ii. **Pedagogy Exercise** – 20 marks
A topic be 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.