

## **BRANCH V - ORTHODONTICS AND DENTOFACIAL ORTHOPEDICS**

### **OBJECTIVES:**

The training programme in Orthodontics is to structure and achieve the following four objectives

#### **Knowledge:**

1. The dynamic interaction of biologic processes and mechanical forces acting on the stomatognathic system during orthodontic treatment
2. The etiology, pathophysiology, diagnosis and treatment planning of various common Orthodontic problems
3. Various treatment modalities in Orthodontics – preventive, interceptive and corrective.
4. Basic sciences relevant to the practice of Orthodontics
5. Interaction of social, cultural, economic, genetic and environmental factors and their relevance to management of oro – facial deformities
6. Factors affecting the long-range stability of orthodontic correction and their management
7. Personal hygiene and infection control, prevention of cross infection and safe disposal of hospital waste, keeping in view the high prevalence of Hepatitis and HIV and other highly contagious diseases.

#### **Skills:**

1. To obtain proper clinical history, methodical examination of the patient, perform essential diagnostic procedures, and interpret them and arrive at a reasonable diagnosis about the Dento-facial deformities.
2. To be competent to fabricate and manage the most appropriate appliance – intra or extra oral, removable or fixed, mechanical or functional, and active or passive – for the treatment of any orthodontic problem to be treated singly or as a part of multidisciplinary treatment of oro-facial deformities.

#### **Attitude:**

1. Develop an attitude to adopt ethical principles in all aspects of Orthodontic practice.
2. Professional honesty and integrity are to be fostered
3. Treatment care is to be delivered irrespective of the social status, cast, creed and religion of the patients.
4. Willingness to share the knowledge and clinical experience with professional colleagues
5. Willingness to adopt, after a critical assessment, new methods and techniques of orthodontic management developed from time to time based on scientific research, which are in the best interest of the patient
6. Respect patients' rights and privileges, including patients right to information and right to seek a second opinion
7. Develop attitude to seek opinion from allied medical and dental specialists as and when required

#### **Communication Skills:**

1. Develop adequate communication skills particularly with the patients giving them the various options available to manage a particular Dento-facial problem and to obtain a true informed consent from them for the most appropriate treatment available at that point of time.
2. Develop the ability to communicate with professional colleagues, in Orthodontics or other specialties through various media like correspondence, Internet, e-video, conference, etc. to render the best possible treatment.

## **COURSE CONTENT:**

(components of post graduate curriculum)

The program outlined, addresses both the knowledge needed in Orthodontics and allied Medical specialties in its scope.

### **Theoretical knowledge:**

All the teaching faculty and especially Professors should actively take part in imparting clinical, theoretical knowledge to each of the student. The students can be posted on rotation under each Professor and also have their clinical cases guided equally by all of them. The Associate Professors shall also discuss and guide / co – guide the students if they have adequate teaching experience

### **Spread of the Curriculum:**

#### **PART-I:**

##### **A. Applied Basic Sciences:**

###### **Applied Anatomy:**

- a. Prenatal growth of head:  
Stages of embryonic development, origin of head, origin of face, origin of teeth.
- b. Postnatal growth of head:  
Bones of skull, the oral cavity, development of chin, the hyoid bone, general growth of head, growth of the face.
- c. Bone growth:  
Origin of bone, composition of bone, units of bone structure, schedule of Ossification, mechanical properties of bone, roentgen graphic appearance of bone
- d. Assessment of growth and development:  
Growth prediction, growth spurts, the concept of normality and growth increments of growth, differential growth, gradient of growth, methods of gathering growth data. Theories of growth and recent advances, factors affecting physical growth.
- e. Muscles of mastication:  
Development of muscles, muscle change during growth, muscle function and facial development, muscle function and malocclusion
- f. Development of dentition and occlusion:  
Dental development periods, order of tooth eruption, chronology of permanent tooth formation, periods of occlusal development, pattern of occlusion.
- g. Assessment of skeletal age.

###### **Physiology:**

- a. Endocrinology and its disorders:  
Growth hormone, thyroid hormone, parathyroid hormone, ACTH.
- b. Calcium and its metabolism:
- c. Nutrition-metabolism and their disorders:  
Proteins, carbohydrates, fats, vitamins and minerals
- d. Muscle physiology:
- e. Craniofacial Biology:  
Adhesion molecules and mechanism of adhesion
- f. Bleeding disorders in orthodontics: Hemophilia

### **Dental Materials:**

- a. Gypsum products:  
Dental plaster, dental stone and their properties, setting reaction etc.
- b. Impression materials:  
Impression materials in general and particularly of alginate impression material.
- c. Acrylics:  
Chemistry, composition physical properties  
Composites:  
Composition types, properties, setting reaction
- d. Banding and bonding cements:
- e. Wrought metal alloys:  
Deformation, strain hardening, annealing, recovery, recrystallization, grain growth, properties of metal alloys
- f. Orthodontic arch wires
- g. Elastics:  
Latex and non-latex elastics.
- h. Applied physics, Bioengineering and metallurgy:
- i. Specification and tests methods used for materials used in Orthodontics:
- j. Survey of all contemporary literature and recent advances in above mentioned materials:

### **Genetics:**

- a. Cell structure, DNA, RNA, protein synthesis, cell division
- b. Chromosomal abnormalities
- c. Principles of orofacial genetics
- d. Genetics in malocclusion
- e. Molecular basis of genetics
- f. Studies related to malocclusion
- g. Recent advances in genetics related to malocclusion
- h. Genetic counseling
- i. Bioethics and relationship to Orthodontic management of patients.

### **Physical Anthropology:**

- a. Evolutionary development of dentition
- b. Evolutionary development of jaws.

### **Pathology:**

- a. Inflammation
- b. Necrosis

### **Biostatistics:**

- a. Statistical principles
  - Data Collection
  - Method of presentation
  - Method of Summarizing
  - Methods of analysis – different tests/errors
- b. Sampling and Sampling technique
- c. Experimental models, design and interpretation
- d. Development of skills for preparing clear concise and cogent scientific abstracts and publication

### **Applied Research Methodology In Orthodontics:**

- a. Experimental design
- b. Animal experimental protocol
- c. Principles in the development, execution and interpretation of methodologies in Orthodontics
- d. Critical Scientific appraisal of literature.

## Applied Pharmacology

Definitions & terminologies used – Dosage and mode of administration of drugs. Action and fate of drugs in the body, Drug addiction, tolerance and hypersensitive reactions, Drugs acting on the central nervous system, general anesthetics hypnotics, analeptics and tranquilizers. Local anesthetics, Chemotherapeutics and antibiotics. Vitamins: A, D, B – complex group, C & K etc.

## PART-II:

### **Paper-I:Basic Orthodontics**

#### **Orthodontic History:**

- a. Historical perspective,
- b. Evolution of orthodontic appliances,
- c. Pencil sketch history of Orthodontic peers
- d. History of Orthodontics in India

#### **Concepts of Occlusion and Esthetics:**

- a. Structure and function of all anatomic components of occlusion,
- b. Mechanics of articulation,
- c. Recording of masticatory function,
- d. Diagnosis of Occlusal dysfunction,
- e. Relationship of TMJ anatomy and pathology and related neuromuscular physiology.

#### **Etiology and Classification of Malocclusion:**

- a. A comprehensive review of the local and systemic factors in the causation of malocclusion
- b. Various classifications of malocclusion

#### **Dentofacial Anomalies:**

- a. Anatomical, physiological and pathological characteristics of major groups of developmental defects of the orofacial structures.

#### **Diagnostic Procedures and Treatment Planning in Orthodontics:**

- a. Emphasis on the process of data gathering, synthesis and translating it into a treatment plan
- b. Problem cases – analysis of cases and its management
- c. Adult cases, handicapped and mentally retarded cases and their special problems
- d. Critique of treated cases.

#### **Cephalometrics**

- a. Instrumentation
- b. Image processing
- c. Tracing and analysis of errors and applications
- d. Radiation hazards
- e. Advanced Cephalometrics techniques including digital cephalometrics
- f. Comprehensive review of literature
- g. Video imaging principles and application.

#### **Practice Management in Orthodontics:**

- a. Economics and dynamics of solo and group practices
- b. Personal management
- c. Materials management
- d. Public relations

- e. Professional relationship
- f. Dental ethics and jurisprudence
- g. Office sterilization procedures
- h. Community based Orthodontics.
- i. **Orthodontic office design**

## **Paper-II:Clinical Orthodontics**

### **Myofunctional Orthodontics:**

- a. Basic principles
- b. Contemporary appliances –design, manipulation and management
- c. Case selection and evaluation of the treatment results
- d. Review of the current literature.

### **Dentofacial Orthopedics:**

- a. Principles
- b. Biomechanics
- c. Appliance design and manipulation
- d. Review of contemporary literature

### **Cleft lip and palate rehabilitation:**

- a. Diagnosis and treatment planning
- b. Mechanotherapy
- c. Special growth problems of cleft cases
- d. Speech physiology, pathology and elements of therapy as applied to orthodontics
- e. Team rehabilitative procedures.

### **Biology of tooth movement:**

- a. Principles of tooth movement-review
- b. Review of contemporary literature
- c. Applied histophysiology of bone, periodontal ligament
- d. Molecular and ultra cellular consideration in tooth movement

### **Orthodontic / Orthognathic surgery:**

- a. Orthodontist's role in conjoint diagnosis and treatment planning
- b. Pre and post-surgical Orthodontics
- c. Participation in actual clinical cases, progress evaluation and post retention study
- d. Review of current literature

### **Ortho / Perio / Prostho/Endo inter relationship:**

- a. Principles of interdisciplinary patient treatment
- b. Common problems and their management

### **Basic principles of mechanotherapy includes removable appliances and fixed appliances:**

- a. Design
- b. Construction
- c. Fabrication
- d. Management
- e. Review of current literature on treatment methods and results

### **Applied preventive aspects in Orthodontics:**

- a. Caries and periodontal disease prevention
- b. Oral hygiene measures

- c. Clinical procedures

### **Interceptive Orthodontics:**

- a. Principles
- b. Growth guidance
- c. Diagnosis and treatment planning
- d. Therapy emphasis on:
  - Dento-facial problems
  - Tooth material discrepancies
  - Minor surgery for Orthodontics

### **Evidence Based Orthodontics:**

#### **Different types of fixed Mechanotherapy:**

#### **Orthodontic Management of TMJ problems, sleep-apnoea etc.:**

#### **Retention and relapse:**

- a. Mechanotherapy – special reference to stability of results with various procedures
- b. Post retention analysis
- c. Review of contemporary literature

#### **Recent Advances :**

- a. Use of implants
- b. Lasers
- c. Application of F.E.M.
- d. Distraction Osteogenesis
- e. Invisible Orthodontics
- f. 3D imaging Digital Orthodontics, Virtual Treatment Planning
- g. CAD-CAM bracket Customization
- h. Robotic Wire Bending
- i. Accelerated Orthodontics
  - Surgical
  - Device assisted or mechanical stimulation
  - Biochemical Mediators
- j. Lingual Orthodontics

**Paper-III:** Essays (descriptive and analyzing type questions)

#### **Practical and clinical skills**

#### **PRE – CLINICAL EXERCISES ( Practical exercises)**

(Should be completed within 3 months) The students should be posted in rotation under all professors/ eligible teaching faculty.

A general outline of the type of exercises is given here:

1. General Wire bending exercises to develop the manual dexterity.
2. Clasps, Bows and springs used in the removable appliances.
3. Soldering and welding exercises.
4. Fabrication of removable, habit breaking, mechanical and functional appliances, also all types of space maintainers and space regainers.
5. Bonwill Hawley Ideal arch preparation.
6. Construction of orthodontic models trimmed and polished.
7. Cephalometric tracing and various Analyses, also superimposition methods –

8. Fixed appliance typodont exercise
9. Training shall be imparted in one basic technique i.e. Standard Edgewise / Begg technique or its derivative / Straight wire etc., with adequate exposure to other techniques.
- a) Typodont exercise
  - Band making
  - Bracket positioning and placement
  - Different stages in treatment appropriate to technique taught
10. Clinical photography
11. Computerized imaging (Computerised digital tracing using computer softwares and treatment predictions using software)
12. Preparation of surgical splints, and splints for TMJ problems.
13. Handling of equipment like vacuum forming appliances and hydro solder etc.( vacuum formed cap splint)

**Basic Pre-Clinical Exercise Work for the MDS Students:**

**1. Clasps:**

Sl.No	Exercise	No.
1	$\frac{3}{4}$ Clasps	1
2.	Triangular Clasps	1
3.	Adam's clasp	2
4.	Modification of Adam's – With Helix	2
5.	Southend Clasp	1

**2. Labial Bows:**

Sl.No.	Exercise	No.
1	Short labial bow (upper & lower)	1
2	Long labial bow (upper & lower)	1
3.	Split high labial bow	1

**3. Springs:**

Sl.No.	Exercise	No.
1	Double cantilever spring	1
2	Coffin spring	1
3	T spring	1

**4. Appliances:**

Sl.No.	Exercise	No.
1	Hawley's retention appliance with anterior bite plane	1
2.	Upper Hawley's appliance with posterior bite plane	1
3.	Upper expansion appliance with expansion screw	1
4.	Habit breaking appliance with tongue crib	1
5.	Oral screen and double oral screen	1
6	Lip bumper	1
7	Inclined plane	1
8	Splint for Bruxism	1
9.	Catalans appliance	1
10.	Activator	1
11.	Bionator	1
12.	Frankel-FR 1& 2 appliance	2
13.	Twin block	1
14.	Lingual arch	1
15.	TPA	1

16.	Quad helix	1
17.	Utility arches	1
18.	Pendulum appliance	1
19.	Canine Retractor(Marcotte & PG Spring)	1
20.	Maxillary intrusion splint with tube positioning for headgear.	1
21.	Occlusal splint U/L with biostar	1

## 5. FIXED APPLIANCES – COMPONENTS

Nance holding arch(19 gauge)  
 Lower lingual arch(19 gauge)  
 Transpalatal arch(19 gauge)  
 Quad helix (19 gauge)  
 Fixed tongue crib(21 gauge)  
 Hass expansion appliance (19 gauge)  
 Adam's clasp with soldered buccal tube (21 gauge)

## 6. LIGHT ARCH ROUND WIRE EXERCISES:

- STRAIGHTENING OF WIRE 3 INCHES IN LENGTH (0.016")- one number
- CUSPID CIRCLE (0.016")
- BOOT SHAPE INTERMAXILLARY HOOK (0.016")
- 5 VERTICAL LOOPS (0.0 16")
- BAYONET BENDS (0.016")
- BUCCOLINGUAL OFFSET BENDS (0.016")
- MOLAR STOP OR LUG (0.016")
- DOUBLE BACK BEND (0.016")
- UPPER PLAIN ARCH FORM (0.016")
- LOWERARCH FORM WITH INTERMAXILLARY HOOK (0.016")
- UPPER PLAIN ARCH WIRE WITH BAYONETBENDS(0.016")
- PLAINARCH WITH TOE IN BENDS (0.016")
- PLAIN ARCH WITH TOE OUT BENDS (0.016")
- UPPER PLAIN ARCH FORM WITH ANCHOR BEND (0.016")
- LOWER LOOPED ARCH WIRE WITH ANCHOR BEND (0.016")
- STAGE II ARCH WIRE (0.018")
- STAGE III ARCH WIRE - UPPER (0.020"), LOWER (0.018")
- UPRIGHTING SPRING (RIGHT AND LEFT) (0.0 14") (CANINE AND PREMOLAR)
- ROTATION CORRECTION SPRING (0.020")
- SEPARATING SPRING (0.018")
- BREAKING AUXLARY (0.014")
- Two SPUR BEGG ARCH (0.014")
- FOUR SPUR BEGG ARCH (0.014")
- RECTANGULAR WIRE EXERCISES
- IDEAL ARCH B0NWILL-HAWLEY (SS 16x22)
- PLACEMENT OF 1ST ORDER BENDS (SS 16x22)
- PLACEMENT OF 2ND ORDER BENDS (SS16x22) PLACEMENT OF 3RD ORDER BENDS (SS 16x22)
- UTILITY ARCH WIRE (SS 16x22) o PROTRACTION o RETRACTION i TEAR DROP LOOP (SS 16x22) o WITH SWEEP o WITHOUT SWEEP
- BULL LOOP (SS 16X22)

- KEYHOLE LOOP (SS 16x22)- SINGLE&DOUBLE
- BOX LOOP (SS 16x22)
- T LOOP (TMA 17x25)

**7. Soldering exercises:**

Sl.No.	Exercise	No.
1	Star/Comb/Christmas tree	1

**8. Study model preparation: As per specification of “ indian board of orthodontics” standards**

**9. Model analysis – Mixed and permanent Dentition:**

**10. Cephalometrics:**

Sl.No.	Exercise
1	Lateral cephalogram to be traced in different colors and super imposed to see the accuracy of tracing
2	Vertical and Antero-Posterior Cephalometric analysis (Steiners, Mc.Namara., Bjork, COGS, Wits, Downs, Tweeds, Ricketts, Grummons)
3	Soft tissue analysis – Holdaway and Burstone
4	Various superimposition methods

**11. Basics of Clinical Photography including Digital Photography:**

**12. Typodont exercises: Begg or P.E.A. method/Basic Edgewise:**

Sl.No	Exercise
1	Teeth setting in Class-II division I malocclusion with maxillary anterior Proclination and mandibular anterior crowding
2	Band pinching, welding brackets and buccal tubes to the bands
3	Different Stages dependent on the applied technique
4	<b>Bonding of brackets with Niti plain arch wire 17x25</b>
5	<b>Retraction mechanics — t loop and tear drop</b>
6	<b>Intrusion mechanics — k-sir and three piece</b>

**CLINICAL WORK:**

Once the basic pre-clinical work is completed in three months, the students can take up clinical cases and the clinical training.

**Each postgraduate student should start with a minimum of 50 fixed orthodontics cases and 20 removable including myofunctional cases of his/her own. Additionally he/she should handle a minimum of 25 transferred cases.**

The type of cases can be as follows:

- Removable active appliances
- Class-I malocclusion with Crowding
- Class-I malocclusion with bi-maxillary protrusion
- Class-II division – 1
- Class-II division – 2
- Class-III (Orthopedic, Surgical, Orthodontic cases)
- Inter disciplinary cases

- Removable functional appliance cases like activator, Bionator, functional regulator, twin block and new developments
- Fixed functional appliances – Herbst appliance, jasper jumper etc
- Dento-facial orthopedic appliances like head gears, rapid maxillary expansion, NiTi expander etc.,
- Appliance for arch development such as molar distalization
- Fixed mechano therapy cases (Begg, PEA, Tip edge, Edgewise, lingual)
- Retention procedures of above treated cases.

#### **WRITING THESIS/RESEARCH PAPERS:**

##### **Attitudes including Communication Skills**

- A. Develop adequate communication skills particularly with the patients giving them the various options available to manage a particular Dentofacial problem and to obtain a true informed consent from them for the most appropriate treatment available at that point of time
- B. Develop the ability to communicate with professional colleagues in orthodontics or other specialities through various media like correspondence, internet, e-video, conference, etc. To render the best possible treatment

**Training in Research Methodology, Biostatistics, Ethics / Bioethics in Dentistry, Jurisprudence and Audits** All MDS candidates shall compulsorily attend the Research Methodology Workshop conducted by the University within 6 months from the date of joining the course. In this regard, the candidates will be issued a completion Certificate by the University.

**EVERY POST GRADUATE STUDENT MUST UNDERGO A TRAINING IN RESEARCH METHODOLOGY, BIOSTATISTICS, ETHICS, BIOETHICS IN RESEARCH, JURISPRUDENCE AND AUDITS, WITHIN THE FIRST SIX MONTHS OF COURSE, WHICH WILL HELP THEM TO DECIDE THEIR DISSERTATION TOPIC AND METHODOLOGY**

**Health Informatics "C usage of Information technology (Computer) STUDENTS SHOULD BE MADE WELL FAMILIAR WITH THE REQUIRED COMPUTER AND INFORMATICS SKILLS .**

##### **(a) LECTURES:**

There shall be some didactic lectures in the speciality and in the allied fields. The departments shall encourage guest lectures in the required areas and integrated lectures by multi-disciplinary teams on selected topics, to strengthen the training programmes.

##### **(b) JOURNAL REVIEW:**

The journal review meetings shall be held at least once a week. All trainees, associate and staff associated with the post-graduate programme are expected to participate actively and enter relevant details in the logbook. The trainee shall make presentations from the allotted journals of selected articles.

##### **(c) SEMINARS:**

The seminars shall be held at least twice a week in each department. All trainees are expected to participate actively and enter relevant details in logbook.

##### **(d) SYMPOSIUM:**

It is recommended to hold symposium on topics covering multiple disciplines.

**(e) CLINICAL POSTINGS:**

Each trainee shall work in the clinics on regular basis to acquire adequate professional skills and competency in managing various cases.

**(f) CLINICO-PATHOLOGICAL CONFERENCE:**

The clinico pathological conference shall be held once a month involving the faculties of Oral Medicine and Radiology, Oral Pathology and allied clinical departments. The trainees shall be encouraged to present the clinical details, radiological and histo-pathological interpretations and participation in the discussions.

**(g) INTER-DEPARTMENTAL MEETINGS:**

To encourage integration among various specialities, there shall be inter-departmental meeting chaired by the Dean with all heads of post-graduate departments at least once a month.

**(h) TEACHING SKILLS:**

All the trainees shall be encouraged to take part in undergraduate teaching programmes either in the form of lectures or group discussion.

**(i) DENTAL EDUCATION PROGRAMMES:**

Each department shall organise dental education programmes on regular basis involving other institutions. The trainees shall also be encouraged to attend such programmes conducted outside their university or institute.

**(j) CONFERENCES/WORKSHOPS/ADVANCED COURSES:**

The trainees shall be encouraged to attend conference/workshops/advanced courses and also to present at least two scientific papers and two posters at State/national level speciality and allied conferences/conventions during the training period.

**(k) ROTATION AND POSTING IN OTHER DEPARTMENTS:**

To bring in more integration among the specialities and allied fields, each department shall workout a programme to rotate the trainees in related disciplines.

**STRUCTURED TRAINING PROGRAMME**

- (a) Journal Clubs 5 in a year
- (b) Seminars 5 in a year
- (c) Clinical Case Presentations 4 in a year
- (d) Lectures taken for undergraduates1 in a year
- (e) Scientific Paper / Poster Presentations In State /National Level Conferences 4 papers/posters during three years of training workshop period
- (f) Clinico Pathological Conferences 2 presentations during three years of training period
- (g) Scientific Publications (optional) one publication in any indexed scientific journal
- (h) Submission of Synopsis one synopsis within six months from the date of commencement of the course
- (i) Submission of Dissertation months one dissertation within six months before appearing for the University examination
- (j) Submission of Library Dissertation one dissertation within eighteen months from the date of commencement

## **DISSERTATION:**

Every candidate appearing for the post-graduate degree examination shall at least six months prior to the examinations, submit with his form for examination, four typewritten copies of the dissertation undertaken by the candidate, prepared under the direction and guidance of his/her guide.

It must be approved by the Institutional Review Board consisting of Principal, all the HOD's, an advocate, medical specialties and social worker within the first six months after the commencement of the course. The application for registration of dissertation topic must be sent through the Principal duly forwarded by the Professor/ HOD. The University will register such dissertation topic. In case the students want to change the topic of dissertation, they can do it within the next three months. No change in the Guide/dissertation topic shall be made without prior approval of the University.

The aim of dissertation is to train a postgraduate student in research methodology. It includes identification of a problem with recent advances, designing of research study on collection of data, practical analysis and comparison of results and drawing conclusions

The dissertation should be written under the following headings.

Introduction /Aims and objective/Review and literature/Materials & Methods/Results/Discussion

Conclusion/Summary

The written text of dissertation shall not be less than 100 pages. It should be neatly typed in double line spacing on one side ( A4 size, 8. 27"x 11.69") and bounded properly. Photos, charts, tables, graphs can be attached where ever necessary. Spiral binding should not be used. The dissertation shall be certified by the Guide and Head of the department and forwarded by the Principal to the University.

The dissertation so submitted shall be referred to the examiners for their examination and acceptance of it shall be a condition precedent to allow the candidate to appear for the written part of the examination.

Provided that a candidate whose dissertation has been accepted by the examiner, but declared failed at the examination, shall be permitted to re-appear at the subsequent examination without a new dissertation.

Provided further that if the dissertation is rejected by the examiner, the examiner shall assign reasons thereof with suggestions for its improvement to the candidate and such candidate shall re-submit his/ her dissertation to the examiner who shall accept it before appearing in the examination.

## **Scheme of examination:**

<b>A. Theory:</b>	Part-I: Basic Sciences Paper	-	<b>100 Marks</b>
	Part-II: Paper-I, Paper-II & Paper-III	-	<b>300 Marks</b>
(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. In Paper-III 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, Dental Materials, Genetics, Pathology, Physical Anthropology, Applied Research methodology, Bio-Statistics and Applied Pharmacology.

**PART-II**

**Paper I:** Orthodontic history, Concepts of occlusion and esthetics, Child and Adult Psychology, Etiology and classification of malocclusion, Dentofacial Anomalies, Diagnostic procedures and treatment planning in Orthodontics, Practice management in Orthodontics

**Paper II :** Clinical Orthodontics

**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**

**Exercise No: 1 50 Marks**

**Functional Case :**

Selection of case for functional appliance and recording of construction bite.  
Fabrication and delivery of the appliance the next day.

**Exercise No: 2 : 50 Marks**

1. III stage with auxiliary springs/Wire bending of any stage of fixed orthodontics (OR)
2. Bonding of SWA brackets and construction of suitable arch wire.

**Exercise No. 3 75 Marks**

**Display of records of the treated cases  
(Minimum of 5 cases)**

**Exercise No: 4 25 Marks**

**Long case discussions**

**Time allotted for each exercise:**

No	Exercise	Marks allotted	Approximate Time
1	Functional appliance	50	1 hour (each day)
2	III stage mechanics / Bonding and arch wire fabrication	50	1 hr 30 min
3	Display of case records (a minimum of 5 cases to be presented along with all the patients and records)	75	1 hour
4	Long cases	25	2 hours

**Note: The complete records of all the cases should be displayed (including transferred cases)**

<b>C. Viva Voce</b>	:	<b>100 Marks</b>
<i>i. Viva-Voce examination</i>	:	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. It includes presentation and discussion on dissertation also.

<b>ii. Pedagogy Exercise</b>	:	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.		

#### REFERENCE BOOKS:

- 1) Dentofacial orthopedics with functional appliances by thomas m graber thomas rakosi alexander g petrovic
- 2) Orthodontics - current principles and techniques by lee w graber robert vanersdall jr katherine vig greg j huang
- 3) Esthetics and biomechanics in orthodontics by ravindran nanda
- 4) Orthodontic diagnosis by thomas rakosi irmtrud jones thomas graber
- 5) Contemporary orthodontics by william r proffit henry fields david sarver
- 6) Twin block functional therapy - application in dentofacial orthopedics by william j clark
- 7) Systematised orthodontic by mclaughlin bennett trevisi
- 8) Contemporary treatment of dentofacial deformity by william r proffit raymond p white david m sarver
- 9) Facial growth -by donald h.enlow
- 10) Dentofacial deformities- bruce n.epker, john paul stella and leward c.fish.
- 11) The biomechanical foundation of clinical orthodontics - charles j burstone and kwangchul choy.
- 12) Self ligation in orthodontics - nikolaos pandis and theodore eliades

#### JOURNALS:

- 1) American Journal of Orthodontics and dentofacial orthopedics
- 2) Seminars in orthodontics
- 3) Journal of clinical orthodontics
- 4) World journal of orthodontics
- 5 Australian journal of orthodontics
- 6) Journal of Indian Orthodontic Society
- 7) Angle orthodontist
- 8) Journal of dental research
- 9) European journal of orthodontics
- 10) Cleft palate craniofacial journal
- 11) British journal of plastic surgery