BAREILLY INTERNATIONAL UNIVERSITY

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Course Work - Ph. D.

Syllabus – Faculty of Dentistry

Paper-II (100 Marks)

Orthodontics & Dentofacial Orthopedics (Code – 91196)

Credits : 04
Hrs. : 60

UNIT-I

- **Orthodontic Biomechanics**
  - Concepts of classical mechanics
  - Scalar and vector quantities
  - Force
  - Components and resolution of forces
  - Moment of a force and principle of moments
  - levers
  - Moment of a couple
  - Resolution of the system of forces and couples
  - stress, strain, elasticity
  - Friction

- **Orthodontic Mechanisms**
  - Load deflection properties
  - Mechanical response of periodontal support
  - Centre of rotation
  - Wire under load-stress strain analysis
  - Torquing auxiliaries
  - Orthodontic anchorage and mechanical analysis ~ maximum anchorage requirements
  - Appliance design factors
  - Optimal tooth movement and orthodontic forces.
  - Orthopedic forces in the maxilla and mandible

UNIT-II

- **Recent Advances in Diagnosis and Treatment Planning in Orthodontics Radiodiagnosis CBCT and Computer-Aided Cephalometric Analysis and Imaging Techniques and Assessment**
  - Occlusal stability or change
  - Imaging techniques and assessment
  - Radiography
  - Cephalometries
  - Cephalometric methods
  - Cephalometric analysis
  - Cephalometric superimpositions and assessment of
  - Photography

- **Current Research In Orthodontic Therapies, Strategies, Outcomes**
  - Review of treatment / corrective methods and options
  - Active mechanical components
  - Passive appliances
  - Retention: relapse control - truth and fiction’

- Special clinical strategies
- Space maintenance
- Extraction site selection factors
- Enamel reduction.
- Expansion of arch perimeter
- Dental space opening and closing
- Over corrections'
- Jaw growth modification
- Surgical orthodontics
- Orthodontic and orthopedic anchorage requirements
- Timing of orthodontics
- Case studies: problems, examples and solutions

UNIT-III

- **Interdisciplinary and Interdepartmental Concepts in the Treatment of Special Cases, Oral Clefts, Craniofacial and Jaw Syndrome Anomalies of Dental Developments, TMJ Dysfunction, and Medically Compromised Patients**
  - Evidence based research
- **Concepts: Such As Accelerated Tooth Movement, Gene Expression During Myofunctional Therapy And Related Craniofacial Research**
  - Quality audit and assurances
  - Cell biology and its relevance to orthodontic tooth movement
  - Alveolar bone structure and function
  - Dentoalveolar response to loading
  - Centre of rotation, moment and resistance
  - Iatrogenic changes
  - Skeletal, craniofacial and oral biology and its relevance to craniofacial research

UNIT-IV

- **Genetics and Developmental Biology and Its Relevance to Craniofacial Anomalies**
  - Stem cells
  - Orofacial anomalies
  - Embryonic origins of dysmorphology
  - Congenital syndrome
  - Stomatognathic anomalies
  - Risk assessment and prevention
  - Familial characteristics and malocclusion patterns
- **Cell Signaling and Pharmacology as Related to Orthodontics**
  - Preventive measures
  - Health risks and orthodontic risk assessment

UNIT-V

- **Biomaterials and Bioengineering as Related to Orthodontics & Dentofacial Orthopedics**
  - Frictional phenomena
  - Heat treatment processes
  - Steels
  - Other low-ferrous and non-ferrous alloys
  - Adhesion and bonding
  - Polymers
  - Ceramics
  - Luting agents
  - Biocompatibility of materials