

DENTAL TECHNICIAN COURSE REGULATIONS

DENTAL COUNCIL OF INDIA

NOTIFICATION

New Delhi, the 26th August, 2008

No.DE-130-2007 – In exercise of the powers conferred by Section 20 of the Dentists Act, 1948 (16 of 1948), the Dental Council of India with the previous approval of the Central Government, hereby makes the following regulations:-

1. Short title and commencement:-

- (1) These Regulations be called the Dental Council of India Post Graduate Diploma Course Regulations (Dental Materials), 2008.
- (2) They shall come into force on the date of their publication in the Official Gazette.

SECTION-I

REGULATIONS FOR THE DIPLOMA COURSE

Eligibility:

A candidate for admission to the Diploma Course must have a degree of BDS (Bachelor of Dental Surgery) from a college and University recognized by Dental Council of India or an equivalent qualification recognized by the Dental Council of India. Candidates not possessing a recognized Dental qualification for the above purpose should secure the prior approval of his qualifications by the Dental Council of India before he/she can be admitted to the Diploma courses in any of the Universities in India.

Duration of the Course:

The duration of the diploma course in Dental Materials shall be of two years duration which will be further divided into four Semesters as under:-

First and Second Semesters : Preclinical Work and Applied Basic Sciences.

Third and Fourth Semesters : Practical Work.

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All the candidates for the Post Graduate Diploma are required to pursue the prescribed course for atleast two academic years as full time candidates in a BDS recognised and MDS approved/recognised Institution under the direction of the Heads of the department who have to be a recognized postgraduate teacher in the speciality of (a) Prosthodontics and Crown of Bridge (b) Conservative and Endodontics and (c) Orthodontics and Dentofacial Orthopaedics.

Selection of candidates:

- (1) Students for Post Graduate Diploma Course (Dental Materials) shall be selected strictly on the basis of their academic merit.
- (2) For determining the academic merit, the university/institution may adopt any one of the following procedures for P.G. Diploma Course:
 - (i) On the basis of merit as determined by a competitive test conducted by the State Government or by the competent authority appointed by the State Government or by the University/group of universities in the same state; or
 - (ii) On the basis of merit as determined by a centralised competitive test held at the national level; or
 - (iii) On the basis of the individual cumulative performance at the first, second, third & Final B.D.S. examinations, if such examinations have been passed from the same university; or
 - (iv) Combination of (i) and (iii);

Staffing pattern:

The diploma courses shall be conducted only in postgraduate departments in a BDS recognised and MDS approved/recognised Institution by the Dental Council of India in the above mentioned three specialities respectively. For three seats of Post Graduate Diploma Course in Dental Materials one additional reader is required in the above three specialities.

A department, which does not have the above staff pattern, shall not start a postgraduate diploma course in this speciality.

Note: Syllabus contents relating to General Physics, Metallurgy and allied Sciences should be taught preferably by arranging teachers from these branches from the Engineering/Science colleges.

1. Examination:

Eligibility: The following requirements should be fulfilled by every candidate to become eligible to appear for the final examination.

Attendance: Every candidate should have fulfilled the minimum attendance prescribed by Dental Council of India and respective University (80% of the attendance during each academic year of the diploma course).

Progress and conduct: Every candidate should have participated in seminars, journal review meetings, symposia, conferences, case presentations and didactic lectures during each year as designed by the concerned department.

Work diary and log book: Every candidate shall maintain a work diary and log book for recording his/her participation in the training programmes conducted by the department. The work diary and log book shall be verified and certified by the Head of the Department and Head of the institution. The certification of satisfactory progress is based on the work diary and log book.

2. University Examination:

There shall be one examination at the end of 2 years.

The universities shall hold examinations twice a year with a minimum gap of four months between the two examinations. The university examination shall have the following components—

- a) Written
- b) Practical
- c) Viva voce or oral examination.

Written Examination:

The written examination shall consist of three papers pertaining to the speciality. Each paper shall be of three hours duration and shall include recent advances.

Practical Examination:

It should aim at examining practical skills and competence of candidates for undertaking independent work as a specialist. The actual format of practical examination in various specialities could be worked out by various universities making sure that the candidate is given ample opportunity to perform various practical procedures. The council desires that the actual format is made known to the students prior to the examination well in advance by the respective universities.

Viva voce Examination:

Viva voce examination shall aim at assessing depth of knowledge, logical reasoning, confidence and verbal communication skills.

The Council desires that only two examiners conduct the viva voce at a time as two teams, each team for 20 minutes. When one examiner is conducting the viva, the other examiner could make a note of the questions asked and the performance level to enable proper assessment and award of marks.

Distribution of Marks at the University Examination:**Theory:**

Paper-I	100 marks
Paper-II	100 marks
Paper-III	100 marks

Total	300 marks
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Practical Examination: 200 marks

Viva-voce : 100 marks

Examiners: There shall be at least three examiners in each subject. Out of them two shall be external examiners and one internal examiner. The qualification and teaching experience for appointment of an examiner shall be as laid down by the Dental Council of India and the respective university.

Valuation of answer Books: All the answer books shall be valued by all the three examiners and the average marks will be computed.

Criteria for declaring pass:

A candidate is declared successful in the University Examination when he or she secure not less than 50% marks in each head of passing separately which shall include theory including viva voce and practical examination (i.e., 50% of the total marks allotted in each of the theory paper and viva voce and 50% of the total marks in the practical examination) and 50% in aggregate. In other words, the candidate should secure 200 out of 400 marks (300 in theory and 100 for viva voce) and 100 out of 200 in practical examination. A candidate who secures less than this shall be declared to have failed in the examination. A candidate who failed and has secured less than 50% marks has to take the whole examination (namely theory, practical and oral examination).

A candidate who is declared successful in the Diploma Examination shall be granted a P.G. Diploma in Dental Materials by the University.

Candidate who possess PG Diploma in Dental Materials with the duration of 2 years (proposed) will not be eligible for admission in MDS in any other dental speciality.

Infrastructure & functional requirements:

In addition to the existing facilities for the training of postgraduate students all the postgraduate departments running diploma courses shall provide for each diploma admission an additional dental chair and unit and other such materials, instruments and equipments as required for the practical training.

SECTION-II**GOALS & OBJECTIVES**

The main objective of the diploma course training is to produce a specialist in Dental Materials who at the conclusion of the training is to -

Goals:

- Work in the speciality efficiently and effectively, backed by scientific knowledge and skill.
- Exercise empathy and a caring attitude and maintain high ethical standards.
- Continue to evince keen interest in continuing professional education in the speciality and allied specialities irrespective of whether in teaching or practice.
- Willing to share the knowledge and skills with any learner, junior or a colleague.
- To develop the faculty for critical analysis and evaluation of various concepts and views, to adopt the most rational approach.

Objectives:

The objective is to train a candidate so as to ensure higher competence in both general and special area of interest and practical for a career in the speciality. A candidate must achieve a high degree of practical proficiency in the area of speciality.

The above objectives are to be achieved by the time the candidate completes the course. The objectives may be considered as under -

1. Knowledge. (Cognitive domain)

2. Skills (Psycho motor domain)
3. Human values, ethical practice and communication abilities

Knowledge:

- Demonstrate understanding of basic sciences relevant to speciality.
- Update knowledge by self-study and by attending courses, conferences and seminars relevant to speciality.
- Undertake audit, use information technology and carryout research both basic and clinical with the aim of publishing or presenting the work at various scientific gatherings.

SECTION-III
COURSE SYLLABUS.

MATERIALS USED IN DENTISTRY**FIRST SEMESTER : THEORY: -**

- 1) ELEMENTS OF MATERIALS SCIENCE
- 2) CHEMISTRY OF MATERIALS
- 3) BIOLOGICAL SCIENCES
- 4) DENTAL MATERIALS

SECOND SEMESTER: THEORY & PRACTICALS: -

- 1) BASIC EXERCISES
- 2) PROSTHODONTICS
 - a) THEORY
 - b) PRACTICALS
- 3) GENERAL EXPERIMENTS
 - a) MEASUREMENTS AND TESTING
 - b) CHEMICAL METHODS OF ANALYSIS AND TESTING

THIRD SEMESTER: THEORY:-

1. ELEMENTS OF MATERIALS SCIENCE
2. BIOLOGICAL SCIENCES
3. DENTAL MATERIALS
4. EXPERIMENTAL TECHNIQUES

FOURTH SEMESTER: THEORY & PRACTICALS: -

1. BASIC EXERCISES
2. PROSTHODONTICS
 1. THEORY
 2. PRACTICALS
3. GENERAL EXPERIMENTS
 - a) MEASUREMENTS & TESTING
 - b) CHEMICAL METHODS OF ANALYSIS & TESTING OF POLYMERS
 - c) SPECTROSCOPIC ANALYSIS OF DENTAL MATERIALS

FIRST SEMESTER: THEORY: -**I: ELEMENTS OF MATERIALS SCIENCE**

1. ATOMIC STRUCTURE AND CHEMICAL BONDING
2. CRYSTAL GEOMETRY AND STRUCTURE DETERMINATION
3. IMPERFECTIONS IN CRYSTALS -
4. DIFFUSION IN SOLIDS
5. ELASTIC AND PLASTIC BEHAVIOR OF MATERIALS
6. ELEMENTS OF PHYSICAL METALLURGY
7. OPTICAL PROPERTIES

I: ELEMENTS OF MATERIALS SCIENCE**ATOMIC STRUCTURE AND CHEMICAL BONDING:- (15hrs)**

Concepts of atomic structure, Atomic bonding in solids: Bonding forces and energies, primary interatomic bonds - Ionic, Covalent & Metallic bonds, Secondary bonding (Van Der Waals bonding).

CRYSTAL GEOMETRY AND STRUCTURE DETERMINATION:- (20 hrs) Fundamental concepts, Unit cells, BCC, FCC, HCP structures, Crystal planes and directions. Miller indices Interplaner separations, polymorphism, Single crystals and anisotropy. Determination of Crystal structures: X-ray diffraction and Bragg's law, Diffraction Techniques.

IMPERFECTIONS IN CRYSTALS:- 10 hrs)

Point defects - Equilibrium concentration of vacancy, Frankel and Schottky defects. Line imperfections - Edge and Screw, Surface imperfections & Volume imperfections.

Basic principles in covalent bond formation, valence-bond theory, Molecular orbital theory & its application to Homo-nuclear diatomic molecules - hybridization delocalized. chemical bonding, concept of resonance, Aromaticity & Huckel rule. Valence shell electron pair repulsion concept (VSEPR.)

METALLIC BOND:

Structure of metals, band theory, conductors, semiconductors & insulators.

HYDROGEN BOND:

Conditions of formation & types of hydrogen bonding with illustrative examples. Vander Waals forces.

CHEMISTRY OF TRANSITION ELEMENTS: (15 hrs)

-d- Block Elements: Correlation of general properties with electronic structure Inter relationship among 3d, 4d & 5d series. Coordinate bond & Metal complexes - Nomenclature.

Valency Bond Theory (VBT): Important features, modifications & drawbacks. Crystal Field Theory (CFT): - Important features, splitting of d-orbitals in Tetrahedral, tetrahedral and square planar complexes. Applications of CFT - Distortion of octahedral complex & Jahn Teller theorem. Crystal field stabilization energy & its uses - Limitations of CFT. Ligand field & Molecular orbital theory - comparison of different theories.

CHEMICAL THERMODYNAMICS: (10 hrs)

Review of laws of thermodynamics, concept of entropy - principles of entropy increase - Entropy & Disorder. Enthalpy - Helmholtz Free Energy - Gibbs free Energy - Gibbs Helmholtz equation - Maxwell's relations - IDE equations - Energy heat capacity equations, Thermodynamic equations of state.

Physical equilibria involving phase transitions, Clausius clapeyron's equation (1st, 2nd, 3rd, order transitions with examples) & its applications.

CHEMICAL PROCESSES IN METALLURGY:- (15HRS)

Survey of metal extraction techniques- principles of extraction of different types of metals, theoretical principles of extraction from oxide ore, sulfide Ore, chloride of metal, extraction of Fe, Cu, Al, Ni, Cr, Co, Zn, Au, Ag, Pt, Pd, Mg, Ti & properties.

CHEMISTRY OF INORGANIC MATERIALS: - (5hrs)

Oxides of Zn, Mg, Ti, Al, Fe.

Fluorides of Na, Ca., Sn, cryolite

Sulfates of Ca, Ba.

Silicates.

REACTIVITY IN SOLID STATE: - (10hrs.)

Introduction- Thermodynamics of solid state reactions classification - Chemical transport reaction in solid state, experimental methods for the study of solid state reactions. Kinetic features, diffusion mechanism in solid state reaction. Factors affecting the reactivity of solid state reactions.

CATALYSIS:- (15 hrs)

Introduction, general characteristics of catalytic reaction, types of catalysis - homogeneous, acid - base, enzyme, heterogeneous. Effect of temperature & P^H on catalytic reaction.

COLLOIDS: - (8 hrs)

Types, preparation, reviewing optical, kinetic and electric properties of Colloids. Gels and emulsions - preparation, properties and applications.

THEORY OF ACID - BASE CEMENTS (8 hrs)

Introduction, classification, requirements of cementitious bonding, acid - base concepts on AB cement chemistry, Arrhenius theory, Bronsted - Lowry theory, Lewis theory, solvent system theory, Lux- Flood theory, Usanovich theory, Relevance of acid - base-theories to AB cements, acid - Base strength, hard and soft acids and bases, P^H and buffer- buffer action, buffer capacity. The role of water in acid - base cements.

ELECTROCHEMISTRY:- (5 hrs)

Electrochemical devices, galvanic cells (primary & secondary), Concentration cells and fuel cells. Polarization, hydrogen and oxygen over voltage, passivation, decomposition potential, electrodeposition techniques (electroplating).

CORROSION: -(10 Hrs)

Introduction, theories of corrosion, and passivity (theory of direct-Chemical attack and electrochemical theory), factors which influence Corrosion - metal purity, environment and design. Forms of corrosion -Uniform galvanic, crevice, pitting, and grain boundary, selective leaching and stress corrosion. Corrosion control of material, treatment of the medium, cathodic and anodic protection. Corrosion rate measurement -Tafel extrapolation.

REFERENCES:

1. Principles of physical Chemistry - Puri, shamia, Pathani (Pub: shoban lal)
2. Principles of Inorganic Chemistry - Puri, sharma, Kalia (Pub:Shoban lal)
3. Advanced Inorganic chemistry - F.A. Cotton & G.Wilkinson 5th edition, (John Wiley & Sons)
4. Concise Inorganic Chemistry - J.D. Lee (Pub: ELBS)
5. Physical Chemistry - Atkins, 6th Edition (Oxford University Publication)
6. Engineering Chemistry by -- Jain & Jain (Dhanpat Rai & Sons)
7. Principles of Colloids & Surface Chemistry -- Paul Hcimenz (New York Marcel Dekker, Inc.)
8. Solid State chemistry - Ram Prakash (Radha publication)
9. Solid state chemistry - West (Wiley Eastern)
10. Solid state chemistry techniques - A.K.Cheetham & Peter day (Clarendon)
11. Pleat & Thermodynamics M. W. Zeernansky (Mc Graw Hill)
12. Thermodynamics of solids - R.A. Svalin (John Wiley & Sons) 13. Equilibrium Thermodynamics - C.J. Adkin (Mc Graw Hill) 14. Introduction to Metallic Corrosion- Raj Narayan (Oxford & IBH) 15. Introduction to Electrochemistry - S. Glasstone (east West) 16. Advanced Physical Chemistry - Gurdcep Jay (Goel 1992)

III: BIOLOGICAL SCIENCES

-A course of 80 lectures and 70 practicals including demonstrations and tooth carving extended over a period of one academic year viz.- 1st year.

LECTURES: -

Structure of the teeth with their chemical composition and physical properties, clinical significance from the view of histology and embryology.

Enamel

Dentin

Cementum

Pulp

Periodontal ligament

Oral mucosa

Alveolar mucosa

Temporomandibular joint

Muscles of mastication

Morphology, chronology of primary and permanent dentition.

Physiology of mastication, deglutition

Composition and physiology of saliva, and their influencing factors:

Calcium and phosphorous metabolism including calcification of hard tissues.

Blood

PRACTICALS:-

Microscopic study by drawing it) journals of normal dental tissues

Identification of teeth

Carving of permanent teeth (both anterior and posterior crown and root), drawing of the teeth in journals.

Effect of chemicals on dental tissues.

Preparation of artificial saliva

REFERENCE BOOKS:-

Orban's oral histology and embryology s.n. bhaskar - X edition

Text book of oral histology (development, structure & function) - A.R. tencate ; 3rd edition

Dental anatomy - Julian B woelfel

Wheeler's dental anatomy Major M. Ash: 7th edition

IV: DENTAL MATERIALS

1. PERFORMANCE STANDARDS OF DENTAL MATERIALS
2. GYPSUM PRODUCTS
3. IMPRESSION MATERIALS
4. CHEMISTRY OF SYNTHETIC RESINS
5. DENTURE BASE RESINS
6. DENTAL APPLICATIONS OF GENERAL PROPERTIES OF MATERIALS
7. SOLDERING & WELDING
8. FINISHING, POLISHING & CLEANSING MATERIALS
9. WAXES

11. RADIOGRAPHIC MATERIALS**1. PERFORMANCE STANDARDS FOR DENTAL MATERIALS: - (4 hrs)**

Scope, aims, objectives, criteria for selection, specifications, requirements

2- GYPSUM PRODUCTS (Model and Die Materials): - (10 hrs)

Introduction, chemical and physical nature, manufacturing, chemistry, properties: setting time, consistency, viscosity, strength, surface hardness, reproduction of details, setting expansion, accelerators & retarders (practice & theory), Manipulation, critique of cast & die materials based on gypsum products, infection control concerns, recent developments, alternative die materials.

IMPRESSION MATERIALS: - (25 hrs)

Purpose & requirements of impression materials, classification

3 A. -Elastic Impression materials**Hydrocolloids**

Introduction to colloids, general properties; Reversible hydrocolloids (Agar) & Irreversible hydrocolloids (alginate) History, composition, types, properties, manipulation, applications, critique of hydrocolloid as impression material, Recent developments in Hydrocolloids.

Elastomers

Development of elastomers, general properties, classification.

Polysulphides, polysilicones & polyethers: - composition, chemistry, Properties, manipulation & applications. Common failure, critique of elastomers with hydrocolloids (relationship of properties and clinical applications)

New advances in elastomers Comparison of impression and die materials

3B. Duplicating materials**3C. Inelastic impression materials****Impression plaster**

Impression compound: - composition, types, properties with reference to thermal, flow, manipulation, applications.

Zinc oxide eugenol impression paste: composition, types, chemistry, Properties, manipulation, applications, modifications of ZnOE paste.

Wax as an impression material.

CHEMISTRY OF SYNTHETIC RESINS:- (15 hrs)

Basic nature of polymers, definition and classification of resins, polymerization. Mechanism & stages in addition polymerization (free radical, ring opening & ionic). Inhibitors, copolymers, cross-linking, plasticizers, polymer structure, physical properties. Resins in dentistry.

5- DENTURE BASE RESINS: - (20 hrs)

Requirements, history, composition and properties of PMMA heat activated, manipulation & processing of PMMA (denture base plastics), compression molding & injection molding technique, chemically activated PMMA fluid resins (pour type), comparison with heat cure acrylic, critique of acrylics as dentures base, recent developments in denture base resins, fabrication defects of

dentures (rough surface, dimensional changes, porosities & crazing), denture repair materials, relining and rebasing of dentures, hard relining, soft liners & tissue conditioners, Acrylic artificial teeth, Denture cleansers, Denture adhesives. Materials in maxillofacial prosthesis.

Temporary crown & Bridge acrylics. Plastic facings for crown and bridge applications, special trays, orthodontic splints and space retainers. Athletic mouth protectors & Inlay patterns.

6. DENTAL APPLICATIONS OF GENERAL PROPERTIES, OF MATERIALS: - (20 hrs)

MECHANICAL:

Force, stress, strain, proportional and elastic limits, yield strength ultimate strength, fracture strength, elongation, modulus of elasticity, Poisson's ratio, ductility and malleability, resilience, toughness, tensile stress, compressive stress, shear stress, impact strength, fatigue strength, tear strength, bond strength, transverse strength, bending, torsion, flow, viscosity, creep, surface hardness, friction, wear. Stress analysis and design of dental structures, mechanical properties of tooth structure, mastication forces and stresses, criteria for selection of restorative materials.

PHYSICAL:

Color, pigmentation, metamerism, fluorescence, opacity, translucency, transparency, refractive index, optical constants.

THERMAL:

Characterization of solid surface, adhesive diffusion, adsorption, absorption, surface, surface tension & wetting, capillary rise, angle of contact, penetration coefficient, adhesion and cohesion.

OTHER PROPERTIES:

Water sorption; water solubility, setting time, shelf life.

7- SOLDERING AND WELDING : -(8 hrs)

Metal joining terminology, soldering, desirable properties of dental solders, types, gold solders, silver solders, fluxes and antifixes, practical points in soldering, heat source, technique, soldering failures, radiographic analysis of solder-joint quality, recent advances. Welding -Theory - spot welding, pressure welding, laser welding, cast joining, properties.

8- FINISHING, POLISHING AND CLEANSING MATERIALS : -(7hrs).

Mechanics of cutting -| dental burs, factors affecting rate of abrasion, desirable qualities of abrasion, finishing, cutting, grinding & polishing processes. Abrasive and erosive wear. Abrasive instrument design, abrasive and polishing agents. Dentifrice's.

9. WAXES:- (6 hrs)

Introduction to waxes, gums, fats and resins, characteristic properties of waxes.

Dental waxes classification.

inlay pattern wax

Casting wax

Base plate wax

Boxing wax

Utility wax

Sticky wax

Bite registration wax; etc.

RADIOGRAPHIC MATERIALS: - (10hrs)

Constituents of radiographic films, production of the radiographic image, intensifying screens properties of x-ray films, faults, and xeroradiography.

REFERENCES:

1. Phillip's science of Dental Materials, 10th edition, K.D.Anusavice (W.B. Saunders co.)
2. Skinner's science of Dental Materials, 8th edition, R.W. Phillips (W.B.Saunders Co.)
3. Restorative Dental Materials, 11th edition, Robert G Craig (Mosby year Book Inc.)
4. Notes on Dental Materials, 7th edition, E.C.Comb (Churchill Livingstone)
5. The clinical handling of Dental Materials, 2nd edition Bernard G.N.Smith, Paul S.Wright, David Brown, (Wright)
6. Introduction to Dental Materials, Richard Van Noort, (Mosby)
7. Clinical Handling of restorative materials & techniques, Karl F. Leinfelder, Jack E. Lemons (Lea & Febiger)
8. Dental Materials: properties & selection, 6th edition, William J.O'Brien,(Quintessence publishing c9., Inc)
9. Dental Materials: properties & Manipulation, Craig, O'Brien, Powers (Mosby year Book Inc.)
10. An outline of Dental Materials & their selection, William J.O'Brien, Gunner Ryge (W.B.Saunders co.)

SECOND SEMESTER: THEORY & PRACTICALS: -

1. BASIC EXERCISES

1. Setting times of gypsum products with, respect to different W/P ratios, accelerators, retarders & mixing times.
2. Setting times of alginate impression material.
3. Setting times elastomers
4. Consistency measurements.
5. Acrylisation of wax patterns

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6. Abrasion and polishing

2. PROSTHODONTICS

a) THEORY SYLLABUS: -

COMPLETE DENTURES: -

1. Introduction to Terminologies,
2. Brief outline of biological considerations for maxillary & mandibular impressions. Anatomic landmarks of the Denture bearing and limiting areas of the month (Macroscopic)
3. Technical considerations for maxillary & mandibular impression Procedures,
 - Objectives of impression making.
 - Factors affecting retention.
 - Factors affecting stability.
 - Support for complete dentures.
 - Impression Trays for preliminary, and final impressions (including fabrication.)
 - Brief outline of impression procedures.
4. Technical considerations for jaw relations and brief outline of Biological considerations.
 - Fabrication, of Trial base and occlusal rims.
 - Brief outline of concept of orientation, vertical and horizontal jaw relations.
5. Articulators:
 - Definition, classification;
 - Advantages, uses.
 - Different types, (emphasis on mean value, Hanau)
6. Occlusal considerations for complete dentures with emphasis on arrangement of teeth in class I, II, III ridge relations.
 - Concept of centric occlusion in centric relation.
 - Briefly concept of balanced occlusion.
 - Arrangement of teeth in different ridge relations with guidelines for setting anterior and posterior teeth.
 - Selection of posterior teeth.
7. Denture esthetics.
 - Definition.
 - Selection of anterior teeth.
 - Selection of denture base material.
8. Processing of dentures
 - Wax up, carving and polishing.
 - Flasking, dewaxing, packing and acrylisation.
 - Laboratory remount and selective grinding (rationale and procedure)
 - Denture recovery, finishing and polishing.
9. Complete denture repair.
 - Repair of fractured/debonded teeth. (Anterior & Posterior)
 - Repair of fractured denture base.
 - Materials used.
10. Relining and rebasing - Technical considerations.
 - Articulator and flask method of relining.
11. Technical aspects of immediate denture treatment.

REMOVABLE PARTIAL DENTURES: -

1. Introduction and terminologies.
 2. Classification of edentulous spaces in brief (Kennedy's classification)
- b) PRACTICAL LABORATORY EXERCISES:-**
1. Making preliminary impression with impression compound of U/L edentulous die.
 2. Preparing U/L preliminary casts using beading and boxing technique.
 3. Preparing U/L special trays.
 - a. Using shellac base plate.
 - b. Using autopolymerising resin.
 - c. Using autopolymerising resin with spacer and stoppers.

4. Preparation U/L wax occlusal rims on shellac trial base.
5. Articulation of casts in class I (orthognathic) ridge relation and setting up of teeth.
6. Articulation of casts in class II (retrognathic) ridge relation and setting up of teeth.
7. Articulation of casts in class III (Prognathic) ridge relation and setting up of teeth.
8. Waxing, carving and polishing of a complete denture set up.
9. Acrylisation of one set of waxed dentures.
10. Laboratory remount and selective grinding.
11. Denture recovery, finishing and polishing.
12. Upper and lower complete denture repair.
 - a. Repair of fractured tooth,
 - b. Repair of fractured denture base.
13. Laboratory procedure of relining and rebasing of U/L complete dentures.
14. Fabrication of acrylic removable partial denture.

3. GENERAL EXPERIMENTS

a) MEASUREMENTS AND TESTING:-

1. Dimensions of regular bodies
2. Densities of regular bodies
3. Specific gravities of powders and liquids
4. Surface tension and angle of contact
5. Viscosity (poiseuillus- searles's and ostwald's methods)
6. Stress-strain relation (Modulus of elasticity) by stretching
7. Modulus of elasticity by uniform bending
8. Modulus of elasticity by non-uniform bending
9. Modulus of elasticity by searle's double bar.
10. Modulus of elasticity by single cantilever
11. Modulus of rigidity (shear) static torsion
12. Thermal expansion
13. Thermal conductivity of good conductor
14. Thermal conductivity of insulator
15. Refractive index of solids and liquids
16. Spectrometer: Disperse power (prism)
17. Spectrometer; Measurement of wavelength (diffraction grating)

b) CHEMICAL METHODS-OF ANALYSIS AND TESTING:-

1. pH measurements.
2. Potentiometric titrations
3. Conductometric titrations
4. Phase diagram of two-component system (Pb--Sn system)
5. Analysis of gypsum products
6. Analysis of cements
7. Cooling curve for waxes
8. Analysis of cast gold alloys
9. Analysis of Co-Cr alloy
10. Analysis of stainless steel
11. Analysis of Ag - amalgam alloy products
12. Determination of creep in amalgam.

CLINICAL POSTING

PROSTHODONTICS:-

1. Clinical steps in complete denture fabrication
2. Use of impression compound as a preliminary impression material and low fusing green stick compound as border moulding material for secondary impression.
 - a. Use of ZnOE impression paste as a final impression material.
 - b. Use of wax occlusal rims to establish jaw relation.
 - c. Waxed dentures for try in.
 - d. Use of tissue conditioners as a treatment material.
 - e. Use of temporary soft liners as a chair side denture relining material.

3. Removable partial denture and fixed partial denture
- a. Use of alginate impression material as a diagnostic / final impression material.
- b. Use of elastomeric impression materials in fixed prosthodontics;
- c. Use of different luting cements in fixed restorations.
- d. Use of cutting and finishing instruments for tooth preparation in fixed Prosthodontics.

THIRD SEMESTER: THEORY

I: ELEMENTS OF MATERIALS SCIENCE

A) SECTION - A: -

1. POLYMER SCIENCE: -

- ✓ BASIC CONCEPTS OF POLYMER SCIENCE
- ✓ POLYMERIZATION
- ✓ CHARACTERIZATION OF POLYMERS
- ✓ STRUCTURE & PROPERTIES OF POLYMERS
- ✓ POLYMER ADDITIVES
- ✓ SYNTHESIS OF REACTANTS & INTERMEDIATES FOR POLYMERS.
- ✓ POLYMER TECHNOLOGY
- ✓ PROPERTIES OF DENTAL POLYMERS

B) SECTION - B: -

2. CERAMICS
3. COMPOSITES

POLYMER SCIENCE

1. BASIC CONCEPTS OF POLYMER SCIENCE (5 hrs.)

2. POLYMERIZATION: - (20 hrs)

Step-Reaction (condensation) polymerization.

Radical chain polymerization.

Ionic, condensation & chain (Addition) polymerization, copolymerization Polymerization conditions & polymer reactions.

3. CHARACTERIZATION:- (10 hrs)

Polymer solutions.

Measurement of molecular weight & size

Analysis & testing of polymers.

4. STRUCTURE: & PROPERTIES OF POLYMERS:- (10 hrs)

Stereo chemistry of polymers

Rheology & mechanical properties of polymers

Polymer structure & physical properties:

5- POLYMER ADMIXTURES:- (9 hrs.)

Fillers.

Plasticizers

Antioxidants & thermal stabilizers. UV Stabilizers & absorbers.

6. SYNTHESIS OF REACTANTS & INTERMEDIATES FOR POLYMERS (13 hrs)

7. POLYMER TECHNOLOGY:- (5 hrs)

Fibers, elastomers, films & sheets, molded, plastics, castings, extrusion, coatings, adhesives.

8. PROPERTIES OF DENTAL POLYMERS (3 hrs)

COMPOSITES

1. Introduction, classification

2. Particle reinforced composites-large particle composites, dispersion strengthened composites.

3. Fiber- reinforced composites - polymer matrix composites, Metal matrix composites, ceramic matrix composites, and carbon fiber composites.

4. Strength, fracture & fatigue in composites.

CERAMICS

1. Introduction, ceramic structures - crystal structures, silicate ceramics, carbon ceramics, imperfections in ceramics, ceramic phase diagrams.

2. Mechanical properties

3. Applications & processing of ceramics - Introduction, glasses- glass properties, glass forming, heat treating of glasses, glass ceramics. Clay products - characteristics of clay, composition of

clay products, fabrication techniques, drying & other applications and ceramic processing methods.

Abrasion, powder pressing, cements & advanced ceramics.

REFERENCES:

1. Polymer science -- V.R. Gowariker, N.V. Vishwanath, Jaydev Sridhar. (Wiley eastern, 1987)
2. Polymer chemistry- Billmeyer Fred (Wiley Interscience, 1984).
3. Polymer chemistry, An Introduction - Raymond B. Seymour Charles. E Carraher Jr. (Marcel Dekker, 1987).
4. Physical chemistry of polymers - A. Tager (MIR, 1978)
5. An introduction to polymer physics - I.I. Perepechko (MIR, 1981)
6. Polymer chemistry, High Temperature polymers - Charles L. Segal (Marcel Dekker, 1967)
7. Principles of polymer science -- Rodrigues F. (McGraw Hill, 1974),
8. Polymers, inorganic chemistry-RAY H.N. (Academic, 1978)
9. W.D. Kingery, H.K. Bowen & D.R. Uhlmann, Introduction to ceramics, 2 edition, John Wiley & sons, 1976.
10. James S. Reed, "Introduction to the principles of ceramic processing, John Wiley & sons 1988.
11. Modern composite materials, Holiday L. (Ed), New York Publication Co. 1966.
12. Materials science & Engineering an introduction, 3rd edition, William D. Callister, John Wiley & Sons, Inc.

II: BIOLOGICAL SCIENCES

1. TOXICOLOGY:-

- ✓ PRINCIPLES OF CORROSION & DEGRADATION OF MATERIALS
- ✓ THE CELLULAR RESPONSE TO IMPLANT MATERIALS
- ✓ PRINCIPLES OF TOXICOLOGY
- ✓ SPECIFIC BIOMATERIAL TISSUE INTERACTION

2. PATHOLOGY: -

- ✓ INTRODUCTION
- ✓ CELLULAR INJURY
- ✓ NECROSIS
- ✓ INFLAMMATION
- ✓ HYPERSENSITIVITY
- ✓ BLOOD GROUPS & ANEMIA'S

3. BIOCOMPATIBILITY:-

- ✓ EVALUATION OF BIOCOMPATIBILITY
- ✓ BIOCOMPATIBILITY OF PREVENTIVE MATERIALS & BONDING AGENTS.

TOXICOLOGY

1. PRINCIPLES OF CORROSION AND DEGRADATION OF MATERIALS: -

- Electrochemical aspects of corrosion in the physiological environment.
- Degradation of polymers: mechanisms and implication for biomedical applications.
- Stability of ceramics in the physiological environment
- The fate of natural tissue prosthesis.

2. THE CELLULAR RESPONSE TO IMPLANTED MATERIALS: -

- The tissue response at implant sites
- The response of the macrophage to foreign material
- Cell biochemistry in relation to the inflammatory response to foreign materials.

3. PRINCIPLES OF TOXICOLOGY

- The metabolic facts of foreign compounds
- Toxicology of implanted metals - toxicological aspects of implantable plastics used in medical, paramedical & dental applications.
- Toxicology of ceramics - the relationship between biocompatibility and general toxicity.

4. SPECIFIC BIOMATERIAL TISSUE INTERACTIONS

- Adsorption of proteins on polymers and its role in the response of soft tissues to foreign compounds.

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- Biodegradation in the human body - localized tissue infection and the influence of foreign bodies.
 - Immunological aspects of biomaterials - tumor induction by implant materials.
- 5. THE EVALUATION OF BIOCOMPATIBILITY**
- Level I, II, III & IV tests.

PATHOLOGY

1. Introduction of pathology
2. Causes of disease-cellular injury, causes and pathogenesis of reversible and irreversible injury.
3. Necrosis - definition, morphology and mechanisms
4. Inflammation and repair
5. Repair and regeneration
6. Hypersensitivity and allergy
7. Anemia's
8. A general overview of bleeding and clotting disorder.
9. Blood groups

BIOCOMPATIBILITY

1. BIOCOMPATIBILITY OF PREVENTION DENTAL MATERIALS:-

- i. Fluoride agents - solutions, gels and coatings
- ii. Fissure sealants
- iii. Bonding systems in orthodontics
- iv. Cavity cleaners and etchants
- v. Primers and mineralizing solutions
- vi. In vitro testing of dental cements
- vii. Tissue reactions to dental cements
- viii. In detail about synthetic apatite

2. BIOCOMPATIBILITY OF DENTAL RESTORATIVE MATERIALS

Biocompatibility of amalgam, unfilled and filled composite resins, endodontic medicaments, endodontic filling materials, periodontal dressing materials and impression materials.

REFERENCES

1. Fundamental aspects of Biocompatibility vol 1 & vol II
David F. Williams. Ph.D.
2. Biocompatibility of Dental Materials vol. I, II, III & IV
Dennis C. Smith, David Williams

III: DENTAL MATERIALS

1. DENTAL CEMENTS
2. ENDODONTIC MATERIALS
3. RESTORATIVE MATERIALS
4. DENTAL AMALGAM
5. DIRECT FILLING GOLD
6. METALLURGY
7. IN LAY PATTERN WAX
8. INVESTMENT MATERIALS & ITS RECENT MODIFICATIONS
9. CASTING PROCEDURES & CASTING DEFECTS
10. DENTAL CERAMICS
11. IMPLANT MATERIALS
12. CORROSION OF DENTAL MATERIALS

DENTAL MATERIALS

1. CEMENTS:- (20 hrs)

Introduction, classification & requirements

Theory of acid-base cements, water and acid base cements. ZnO-B cement & its modifications, Zinc phosphate cement & its modifications, Silicate cement & Zinc silicophosphate, Zinc polycarboxylate cement, Glass ionomer cements, Acrylic cements, Cavity lining agents - varnish, liners, primers, Cement bases - low strength bases, high strength bases. Recent advances in above mentioned materials.

2. ENODONTIC MATERIALS: -(7 hrs)

Introduction, requirements and the materials used & recent advances.

3. RESTORATIVE RESINS: - (20 hrs)

Historical perspective

Unfilled acrylic resins (type 1)

Filled acrylic resins (composites): classification, composition, curing, light sources, properties (of all varieties of composites), manipulation, application's, critique of composites.

Bonding: Acid etch technique, EBA, DBA, Recent developments Miscellaneous resins, pit & Fissure sealant, treatment of cervical lesions, comparative properties of direct anterior restorative materials.

4. DENTAL AMALGAM: - (10 hrs)

Historical developments, classification, composition & morphology Manufacture of the alloy powder, amalgamation processes

Properties: strength, creep, dimensional changes, corrosion, marginal failure (ditching), and thermal properties. Manipulation, copper amalgam.

Clinical performance of amalgam restoration.

Factors affecting quality of amalgam restorations.

Repair of amalgam restorations and amalgam bonding agents, Mercury and its toxicity.

5. DIRECT FILLING GOLD:- (4 hrs)

Characteristic of pure gold, classification, gold foil, electrolytic gold, powdered Gold, manipulation, and properties,

6. METALLURGY: (35 hrs.)

Characteristic properties of pure metals, solidification, crystal defects, work hardening, annealing. Alloys, classification of alloys, solid solutions, constitution diagrams, (Ag-Pd, Ag-Cu systems), Eutectic alloys, Peritectic alloys, heat treatment, Dental casting alloys (High noble, Noble, Predominantly base metal alloys), wrought metal alloys with reference to Orthodontic & other dental applications (steel, Fe-C phase diagram, heat treatment, stainless steel, Ti & its alloys, Cr-Co-Ni alloys).

7. INLAY PATTERN WAX (2hrs.)**8. INVESTMENT MATERIALS & ITS RECENT DEVELOPMENTS (4 Hrs)****9. CASTING PROCEDURE & DEFECTS (9 Hrs)****10- DENTAL CERAMICS (11 hrs)**

Metal - ceramics

Recent techniques and developments

11. IMPLANT MATERIALS:- (2 Hrs)**12. CORROSION OF DENTAL MATERIALS (2 Hrs)****REFERENCES:**

1. Phillip's science of Dental Materials, 10th edition, K. J. Anusavice (W.B.Saunders co.)
2. Skinner's science of Dental Materials, 8th edition, R.W. Phillips (W.B. Saunders Co.)
3. Restorative Dental Materials, 11th edition, Robert g Craig (Mosby Year Book Inc.)
4. Notes on Dental Materials, 7th edition, EC. Comb (Churchill Livingstone)
5. The clinical handling of Dental Materials, 2nd edition Bernard G.N: Smith, Paul s. Wright, David brown (Wright)
6. Introduction to Dental Materials, Richard van Nora, (Mosby)
7. Clinical handling of restorative materials & techniques, karl F. Leinfelder, jack E. Lemon's (Lea & Febiger)
8. Dental Materials: Properties & Selection, 6th edition, William J.O'Brien, (Quintessence publishing Co., inc.)
9. Dental Materials: Properties & Manipulation, Craig, O'Brien, powers (Mosby year Book Inc.)
10. An outline of Dental Materials & their selection, "William J.O'Brien, Gunner Ryge (W.B.Saunders Co.)

IV: EXPERIMENTAL TECHNIQUES

1. SPECTROSCOPY
2. X - RAY METHODS

3. THERMAL METHODS
4. NON DESTRUCTIVE TESTING OF MATERIALS
5. CHARACTERIZATION OF MATERIALS BY SOPHISTICATED METHODS
6. CAD/CAM

EXPERIMENTAL TECHNIQUES

1 SPECTROSCOPY:- (5 hrs)

Fundamental principles of spectroscopy: regions of electromagnetic radiation, properties of electromagnetic radiation, interactions of Electromagnetic radiation, interaction of electromagnetic radiation with matter, atomic absorption and molecular absorption.

a) Atomic spectroscopy: -(10 hrs)

Introduction, atomic absorption spectroscopy: principle, flame atomic absorption spectrometer instrumentation and applications. Atomic emission spectroscopy: Flame emission spectroscopy: flame emission spectroscopy- principle, flame photometers and spectrophotometers - Instrumentation and applications, Non-flame emission spectroscopy - principle, instrumentation and applications.

b) Molecular spectroscopy: -

i. Visible spectroscopy (10 hrs) -

Introduction, theory of spectrophotometry and colorimetry - Lambert's law, Deviations from Beer's Law, Colorimeters and spectrophotometers - Instrumentation and applications

ii. Ultraviolet spectroscopy (10 hrs)

Introduction, origin of UV absorption spectra, absorption by organic molecules, chromophores, absorption by inorganic systems, UV spectrophotometer - Instrumentation & applications

iii. Infrared spectroscopy (10 hrs)

Introduction, requirements-for IR absorption, Rotational spectra, Vibrational spectra and vibrational - Rotational spectra of diatomic molecules, vibrations of polyatomic molecules, factors influencing vibrational frequencies, IR spectrophotometer-instrumentation and applications. Fourier transform spectrophotometer.

iv. Raman spectroscopy (15 hrs)

Introduction, theory of Raman effect, rotational Raman spectra, vibrational Raman spectra, polarization of light and Raman effect, Raman spectrometer-Instrumentation and applications, comparison of Raman with IR spectroscopy, Advantages and Limitations of Raman Spectroscopy.

v. NMR spectroscopy (10 hrs)

Introduction, proton NMR spectroscopy - Nuclear spin and magnetic moment, theory of NMR spectroscopy-chemical shift, NMR spectrometer-Instrumentation, factors influencing chemical shift, spin - spin coupling- factors influencing the coupling constant, Applications of NMR spectroscopy, F.T - NMR, MR1 and C-6 NMR spectroscopy.

2. X-RAY METHODS: -(10 hrs)

Introduction, production of x-rays and x-ray spectra, x-ray spectrometer-instrumentation; Direct x-ray methods, x-ray absorption methods, x-ray fluorescence methods, x-ray diffraction methods; instrumentation and applications.

3. CHROMATOGRAPHY -(10 hrs)

Introduction, Paper chromatography, Thin-layer chromatography, column chromatography, Liquid chromatography, Ion-exchange chromatography, Gel chromatography, Gas Chromatography, High-pressure liquid Chromatography- principle, Instrumentation and applications.

4. THERMAL METHODS: -(10 hrs)

Introduction, thermogravimetry-principle, Instrumentation and application. Differential Thermal Analysis - Principle, Instrumentation and Applications.

5. NON-DESTRUCTIVE TESTING OF MATERIALS: -(10 hrs)

Ultrasonics - Principle - Receivers, Oscillators, Transducers and Probes. Reference and calibration blocks, Identification & Sizing of defects.

X-ray radiography.

Neutron radiography: Neutron sources and detectors, Neutron radiography methods. Flaw detection methods, Comparison of Neutron & X-ray radiography.

6. CHARACTERIZATION OF MATERIALS BY SOPHISTICATED METHODS:- (10 hrs)

Quantitative metallography, S.E.M., TEM, STEM, EED, EPMA, EDAX.

7. CAD/CAM (5 hrs)**REFERENCE BOOKS:**

1. Instrumental methods of analysis - B.K. Sharma
2. Instrumental methods of analysis - G. Chatwal & S.A. Anand
3. Instrumental methods of analysis - Williard, Merritt & Dean
4. Instrumental methods of analysis - E. Wing
5. Hand book on ultrasonic testing of- Ramesh B. Parikh materials (Electronic & Engineering company, 1984)
6. Ultrasonics - B. Carlin (Mc Grow Hill, 1960)
7. Principles of Neutron Radiography - N.D. Tyufyakav AS Shtan (Amerind 1978)
8. Modern Metallographic Techniques & their applications - Va. Philips (Wiley interscience, 1971)
9. Testing of Metallic materials - A.V.K. Suryanarayana (Prentice Hall India, 1990)
10. Physical Metallurgy Part I - R.W. Calm & haasen (North Holland, 1983)

FOURTH SEMESTER: THEORY & PRACTICALS**1. BASIC EXERCISES:-**

1. Compressive strengths of gypsum products with respect to time and water/powder ratios.
2. Compressive strengths of heat and cold cure acrylics.
3. Manipulation of cements and silver amalgam alloys.
4. Strength and consistencies of cements.
5. Solubilities of cements.
6. Preparation of dentifrice.

2. PROSTHODONTICS:-**A) THEORY:-**

1. Introduction to removable partial dentures.
2. Classification of partial edentulous arches.
3. Special impression procedures for distal extension cases in particular emphasis on special tray fabrication.
4. Introduction to surveyor & its uses.
5. Surviving procedure.
6. Components of removable partial denture.
7. Brief outline of partial denture design.
8. Relief & Blockout procedure.
9. Duplication & Refractory cast.
10. Waxing the partial denture frame work.
11. Spruing, investing & casting procedures.
12. Finishing the metal frame work & fitting to master cast.
13. Fabrication of acrylic denture base.
14. introduction to fixed prosthodontics.
15. components of fixed partial denture.
16. Retainers used in fixed prosthesis.
17. pontics used in fixed prosthesis.
18. cast & soldered connectors.
19. Impression procedures in brief & special tray.
20. Die systems used in fixed prosthodontics.
21. wax patterns for different types of retainers & pontics.
22. spruing, investing & easting procedures.
23. Metal ceramic restoration.

B) PRACTICALS LABORATORY EXERCISES: PROSTHODONTICS**1. REMOVABLE PARTIAL DENTURE: -**

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- > Surveying of U/L master casts. (Kennedy's class I, II, III, IV)
- > Blackout of master cast.
- > Duplication of master cast and preparation of refractory cast.
- > Designing (Wax pattern) of cast partial denture (Kennedy's class I, II, III & IV).
- > Casting of metal framework for cast partial denture. -
- > Processing of acrylic denture base for cast partial denture.

2. FIXED PARTIAL DENTURE: -

Preparation of wax patterns (on prepared stone teeth models) for

- a) Complete veneer crown with acrylic facing on maxillary central incisor.
 - b) Complete veneer crown with ceramic facing on maxillary central incisor.
 - c) Partial veneer (3/4) crown on maxillary canine.
 - d) Complete veneer crown on maxillary and mandibular molar.
- > Preparation of master cast with separable dies from an elastomeric impression.
 - > Preparation of wax pattern for FPD :-
- a) 345 Partial veneer crown retainer on 3 and complete veneer crown retainer with acrylic facing on 5 and pontic 4 with acrylic facing.
 - b) 456 Complete veneer crown with porcelain facing on 4 complete veneer crown retainer on 6 and pontic 5 with ceramic facing.
- > Casting of fixed partial denture.
 - > Processing of acrylic facing for FPD.
 - > Processing of porcelain facing for FPD.
 - > Acrylic crowns.
 - > Porcelain jacket crowns
 - > Castable ceramics and ceramming.

3. ORTHODONTICS

1. Wire bending
2. Preparations of simple removable appliances like space - maintainers, retainers, clasps, springs, etc.

3. GENERAL EXPERIMENTS:-

A) MEASUREMENT AND TESTING: -

1. Stress-Strain relationship - Proportional Limit, Yield strength, Compressive strength, Modulus of elasticity, Modulus of resilience.
2. Tensile strength.
3. Shear strength
4. Impact strength (IZOID and CHARPY)
5. Fatigue
6. Surface hardness. (Brinell and Rockwell's Method)
7. Microhardness. (Vickers and Knoop's Method)
8. Study of different types of fracture
9. Microstructure study of dental alloys
10. Grain size measurement of
 - a) Stainless steel b) Ni-Cr c) Co-Cr
11. Measurement of bond strength of various Dental Materials
12. Commonly used experimental methods to measure microleakage or marginal percolation by die penetration and fluorescent methods

B) CHEMICAL METHODS OF ANALYSIS AND TESTING OF POLYMERS.

C) SPECTROSCOPIC ANALYSIS OF DENTAL MATERIALS

CLINICAL POSTING

OPERATIVE DENTISTRY: -

1. Introduction to operative dentistry
2. Introduction to endodontics.
3. Dental caries - classification and prevention
4. Cavity nomenclature & classification.
5. Introduction to instruments - hand cutting and rotary.
6. Brief about cavity preparation using models

- Cavity preparation for - Amalgam, Cast restorations, Tooth colored restorations, Amalgam-clinical considerations, technical considerations and failures
7. Clinical consideration and manipulation of subbase, base cavity varnish and liners.
 8. Temporization and clinical demonstration of using $\text{Ca}(\text{OH})_2$ and temporary filling materials.
 9. Clinical demonstration of manipulation of composite and students should try on various steps of composite manipulation.
 10. Brief discussion on dentinal hypersensitivity and methods of control.
 10. Importance of moisture control in operative dentistry and its relation with Dental Materials.
 12. Brief discussion on diseases of the pulp.
 13. Clinical demonstration of rubber dam application.
 14. Discussion and clinical demonstration of materials used for R.C.T

VISIT TO RESEARCH AND DEVELOPMENT INSTITUTIONS:-

PURPOSE:-

To expose the students to various research activities and instrumentation involved in the field polymers, composites, metallurgy, ceramics & toxicology for a period of 30 days

GENERAL MICROBIOLOGY

1. Landmarks in the development of microbiology. Contributions of Louis Pasteur, Robert Koch, Joseph Lister, Antony van Leeuwenhoek.
2. General Microbiology including the preventive aspects of infection.
3. Oral Microbiology, including the beneficial and harmful effects of oral Microflora. Bacterial classification: Differences between prokaryotes and eukaryotes Morphological classification in detail, systemic, phylogenetic, Adansonian, Molecular and intraspecies classification in brief.
4. Bacterial anatomy: Structure including the integral and variable parts, and measurement of bacterial cell.
5. Bacterial nutrition - Classification based on energy requirement, factors influencing bacterial growth, bacterial growth curve and bacterial reproduction.
6. Different types of staining techniques in bacteriology with special emphasis on Gram's, Zeihl-Neelsen's and Albert's techniques.
7. Bacterial cultivation - culture media, culture methods including anaerobic culture.
8. Antibiotic sensitivity tests: Diffusion methods - Kirby - Bauer's in detail, Dilution methods in brief.
9. Sterilization, disinfections and filtration.
10. Fungi: Salient features and their morphological classification. ...
Overview of laboratory diagnosis of fungal infections.
11. Viruses: Salient features, structure, replication and classification.
Overview of laboratory diagnosis of viral infections.
12. Protozoa: General features and classification.

ORAL MICROBIOLOGY

1. Oral microflora - its beneficial and harmful effects.
2. Dental caries: Definition, etiology, mechanism, and prevention.
3. Periodontal diseases: Definition, principal features, types, associated organisms, pathogenesis, predisposing factors. Short note on dental calculus.
4. Biocompatibility of Dental Materials
5. Endodontic diseases: Introduction, Bacterial pathways to and from pulp, associated microbes and their pathogenesis.
6. Bacterial infections of oral soft tissues.
7. Fungal infections of oral soft tissues.
8. Viral infections of oral soft tissues.

[ADVT-III/IV/Exty/98/2008]

MAJ. GEN. (Retd.) P. N. AWASTHI, Secy.