

**UNIVERSITY OF JAMMU**  
**SYLLABUS OF STUDY FOR 2<sup>ND</sup> PROF. B.D.S**

**GENERAL PATHOLOGY INCLUDING MICROBIOLOGY**

Scheme of Examination is as under:-

Theory paper consisting of two parts:-

Part A 35 Marks (for Internal Examiner)

Part B 35 Marks (for External Examiner)

Duration of Examination 03 Hours

Part A 1 ½ Hours

Part B 1 ½ Hours

**AIM**

At the end of the course the student should be competent to:

Apply the scientific study of diseases processes, which result in morphological and functional alternation in cells, tissue and organs to the study of pathology in the practice of dentistry.

**OBJECTIVES:**

Enabling the students

1. To demonstrate and analyze pathological changes at macroscopic and microscopic levels and explain their observations in terms of diseases processes
2. To integrate knowledge from the basic sciences, clinical medicine and dentistry in the study of pathology.
3. To demonstrate understanding of the capabilities and limitations of morphological pathology in its contribution to medicine, dentistry and biological researches.
4. To demonstrate ability to consult resource materials outside lectures, laboratory and tutorial classes.

**COURSE CONTENT**

**A. General Pathology:-**

**1. Introduction to Pathology**

Terminologies  
The cell in health  
The normal cell structure  
The cellular functions

**2. Aetiology and Pathogenesis of Diseases**

Cell Injury  
Types – Congenital  
          Acquired  
Mainly Acquired cause of diseases  
(Hypoxic injury, chemical injury, physical injury, immunological injury)

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3. Degenerations  
Amyloidosis  
Fatty change  
Cloudy swelling  
Hyaline change, mucoid degeneration
4. Cell death & Necrosis  
Apoptosis  
Def, causes, features and types of necrosis  
Gangrene - Dry, wet, gas  
(Dystrophic and metastatic calcification)
5. Inflammation  
Definition, causes types and features  
Acute inflammation
  - a. The vascular response
  - b. The cellular response
  - c. Chemical mediators
  - d. The inflammatory cells
  - e. FateChronic inflammation  
Granulomatous inflammation
6. Healing  
Regeneration  
Repair
  - a. Mechanisms
  - b. Healing by primary intention
  - c. Healing by secondary intention
  - d. Fracture healing
  - e. Factors influencing healing process
  - f. Complications
7. Tuberculosis  
Epidemiology  
Pathogenesis (Formation of tubercle)  
Pathological features of primary and secondary TB  
Complications and fate
8. Syphilis  
Epidemiology  
Types and stages of syphilis  
Pathological Features  
Diagnostic criterias  
Oral Lesions
9. Typhoid  
Epidemiology  
Pathogenesis  
Pathological Features  
Diagnostic Features

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10. Thrombosis  
Definition, Pathophysiology
11. Embolism  
Definition  
Types  
Effects
12. Ischaemia and Infraction  
Definition, etiology, types  
Infraction of various organs
13. Derangements of body fluids  
Oedema – Pathogenesis  
Different Types
14. Disorders of circulation  
Hyperaemia  
Shock
15. Nutritional Disorders  
Common Vitamin Deficiencies
16. Immunological mechanisms in diseases  
Humoral & Cellular Immunity  
Hypersensitivity & autoimmunity
17. AIDS & Hepatitis
18. Hypertension  
Definition, classification  
Pathophysiology  
Effects in various organs
19. Diabetes Mellitus  
Definition, classification, Pathogenesis, Pathology in different organs
20. Adaptive disorders of growth  
Atrophy & Hypertrophy, Hyperplasia, Metaplasia and Dysplasia
21. General Aspects of neoplasia
  - a. Definition, terminology, classification
  - b. Differences between benign and malignant neoplasia
  - c. The neoplastic cell
  - d. Metastasis
  - e. Aetiology and pathogenesis of neoplasia, carcinogenesis
  - f. Tumour biology
  - g. Oncogenes and anti-oncogenes
  - h. Diagnosis
  - i. Precancerous Lesions

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- j. Common specific tumours, Squamous papilloma and Carcinoma, Basal cell carcinoma, Adenoma & Adenocarcinoma, Fibroma & Fibrosarcoma, Lipoma and Liposarcoma.

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## B. Systemic Pathology

### 22. Anaemias

Iron Deficiency anaemia, Megaloblastic anaemia

### 23. Leukaemias

Acute and chronic leukaemias, Diagnosis and clinical features

### 24. Diseases of Lymph nodes

Hodgkin's diseases, Non Hodgkin's Lymphoma, Metastatic carcinoma

### 25. Diseases of Oral Cavity

Lichen planus, stomatitis, leukoplakia, Squamous cell carcinoma, dental caries, Dentigerous cyst, Ameloblastoma

### 26. Diseases of Salivary glands

Normal Structures, Sialadenitis, Tumours

### 27. Common diseases of Bones

Osteomyelitis, Metabolic bone diseases, Bone Tumours, Osteosarcoma, Osteoclastoma, Giant cell Tumour, Ewing's sarcoma, Fibrous dysplasia, Aneurysmal bone cyst.

### 28. Diseases of Cardiovascular system

Cardiac Failure  
Congenital heart disease – ASD, VSD, PDA  
Fallot's Tetralogy  
Infective Endocarditis  
Atherosclerosis  
Ischaemic heart diseases

### 29. Haemorrhagic Disorders

Coagulation Cascade  
Coagulation disorders  
Platelet Function  
Platelet disorders

## PRACTICALS

1. Urine – Abnormal Constituents  
Sugar, albumin, ketone bodies
2. Urine – Abnormal constituents  
Blood, bile salts, bile pigments
3. Haemoglobin (Hb) estimation
4. Total WBC Count
5. Differential WBC Count
6. Packed cell volume (PCV), Erythrocyte Sedimentation Rate (ESR)
7. Bleeding Time & Clotting Time
8. Histopathology

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Tissue Processing  
Staining

9. Histopathology slides  
Acute appendicitis, Granulation tissue, fatty liver
10. Histopathology slides  
CVC Lung, CVC Liver, Kidney amyloidosis
11. Histopathology slides  
Tuberculosis, Actinomycosis, Rhinoporiidiosis
12. Histopathology slides  
Papilloma, Basal cell Ca, Sq cell Ca
13. Histopathology Slides  
Osteosarcoma, osteoclastoma, fibrosarcoma
14. Histopathology slides  
Malignant melanoma, Ameloblastoma, Adenoma
15. Histopathology slides  
Mixed parotis tumour, metastatic carcinoma in lymph node.

LIST OF TEXTBOOKS

1. Robbins - Pathologic Basis of Disease Cortan, Kumar, Robbins
2. Anderson's Pathology Vol 1 & 2 Editions- Ivan Damjanov & James Linder
3. Wintrobe's clinical Haematology Lee, Bithell, Foerster, Athlens, Lukens

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MICROBIOLOGYA. AVE

To introduce the students to the exciting world of microbes. To make the students aware of various branches of microbiology, importance, significance and contribution and contribution of each branch to mankind and other fields of medicine. The objectives of teaching microbiology can be achieved by various teaching techniques such as:-

- a) Lectures
- b) Lecture Demonstrations
- c) Practical exercises
- d) Audio visual aids
- e) Small group discussions with regular feedback from the students.

OBJECTIVESA. KNOWLEDGE AND UNDERSTANDING

At the end of the Microbiology course the student is expected to

1. Understand the basis of various branches of microbiology and be able to apply the knowledge relevantly.
2. Apply the knowledge gained in related medical subjects like General Medicine, General Surgery and Dental subjects like Oral Pathology, Community Dentistry, Periodontics, Oral Surgery, Pedodontics, Conservative Dentistry and Oral Medicine in higher classes.
3. Understand and practice various methods of sterilization and disinfection in dental clinics.
4. Have a sound understanding of various infectious diseases and lesions in the oral cavity.

B. SKILLS

1. Student should have acquired the skill to diagnose and differentiate various oral lesions.
2. Should be able to select, collect and transport clinical specimens to the laboratory.
3. Should be able to carry out proper aseptic procedures in the dental clinic.

A. GENERAL MICROBIOLOGY

1. History, Introduction, Scope, Aims and objectives
2. Morphology and Physiology of bacteria
3. Detail account of Sterilization and disinfection.
4. Brief account of cultural media and cultural techniques.
5. Basic knowledge of selection, collection, transport, processing of clinical specimens and identifications of bacteria.
6. Bacterial genetics and drug resistance in bacteria.

B. IMMUNOLOGY

1. Infection - Definition, classification, source, mode of transmission and types of infectious diseases.
2. Immunity
3. Structure and functions of Immune system
4. The complement system
5. Antigen
6. Immunoglobulins - Antibodies - General structure and the role played in defense mechanism of the body.
7. Immune response.
8. Antigen - Antibody reactions - with reference to clinical utility.

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9. Immunodeficiency disorders – a brief knowledge of various types of immunodeficiency disorders – A sound knowledge of immunodeficiency disorders relevant to dentistry.
10. Hypersensitivity reactions
11. Autoimmune disorders- basic knowledge of various types – sound knowledge of autoimmune disorders of oral cavity and related structures.
12. Immunology of transplantation and Malignancy
13. Immunohaematology

#### C. SYSTEMATIC BACTERIOLOGY

1. Pyogenic cocci – Staphylococcus, Streptococcus, Pneumococcus, Gonococcus, Meningococcus – brief account of each coccus – detailed account of mode of spread, laboratory diagnosis, chemo therapy and prevention – detailed account of cariogenic streptococci.
2. Corynebacterium diphtheriae – mode of spread, important clinical feature, laboratory diagnosis, Chemotherapy and active immunization.
3. Mycobacteria – Tuberculosis and Leprosy.
4. Clostridium – Gas gangrene, Food poisoning and tetanus.
5. Non-sporing Anaerobes – in brief about classification and morphology, in detail about dental pathogens- mechanism of disease production and prevention.
6. Spirochaetes – Treponema pallidum – detailed account of Oral Lesions of Syphilis, Borrelia vincentii
7. Actinomycetes.

#### D. VIROLOGY

1. Introduction
2. General Properties, cultivation, host – virus interaction with special reference to interferon.
3. Brief account of laboratory diagnosis, Chemotherapy and immuno prophylaxis in general.
4. A few viruses of relevance to dentistry
  - Herpes Virus
  - Hepatitis B virus – brief about other types
  - Human Immunodeficiency Virus (HIV)
  - Mumps Virus
  - Brief – Measles and Rubella Virus
5. Bacteriophage – structure and significance.

#### E. MYCOLOGY

1. Brief Introduction
2. Candidosis – in detail
3. Briefly on oral lesions of systemic mycoses

#### F. PARASITOLOGY

1. Brief introduction – protozoans and helminthes
2. Brief knowledge about the mode of transmission and prevention of commonly seen parasitic infection in the region.

#### RECOMMENDED BOOKS FOR REGULAR READING

1. Text book of Microbiology – R. Anantha Narayan & C.K. Jayaram Paniker

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2. Medical Microbiology – David Greenwood et al.

BOOKS FOR FURTHER READING / REFERENCE

1. Microbiology – Prescott, et al.
2. Microbiology – Bernard D. Davis, et al.
3. Clinical & Pathogenic Microbiology – Barbara J Howard, et al.
4. Mechanism of Microbial diseases – Moselio Schaechter, et al.
5. Immunology an Introduction – Tizard
6. Immunology 3<sup>rd</sup> edition – Evan Roitt, et al.

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**UNIVERSITY OF JAMMU**  
**SYLLABUS OF STUDY FOR 2<sup>ND</sup> PROF. B.D.S**

**GENERAL & DENTAL PHARMACOLOGY AND THERAPEUTICS**

Scheme of Examination is as under:-

Theory paper consisting of two parts:-

Part A 35 Marks (for Internal Examiner)

Part B 35 Marks (for External Examiner)

Duration of Examination 03 Hours

Part A 1 ½ Hours

Part B 1 ½ Hours

**GOAL**

The broad goal of teaching undergraduate students in pharmacology is to inculcate rational and scientific basis of therapeutics keeping in view of dental curriculum and profession.

**OBJECTIVES**

At the end of the course the student shall be able to:

1. Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular.
2. List the indications, contraindications, interactions, and adverse reactions of commonly used drugs with reason.
3. Tailor the use of appropriate drugs in disease with consideration to its cost, efficacy, safety for individual and mass therapy needs.
4. Indicate special care in prescribing common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal, hepatic damage and immuno compromised patients.
5. Integrate the rational drug therapy in clinical pharmacology.
6. Indicate the principles underlying the concepts of "Essential drugs".

**SKILLS**

At the end of the course the student shall be able

1. Prescribed drugs for common dental and medical ailments.
2. Appreciate adverse reactions and drug interactions of commonly used drugs.
3. Observe experiments designed for study of effects of drugs.
4. Critically evaluate drug formulations and be able to interpret the clinical pharmacology of marketed preparations commonly used in dentistry.
5. INTEGRATION: Practical knowledge of use of drugs in clinical practice will be acquired through integrated teaching with clinical departments.

**LECTURES**

**PART A**

**A. GENERAL PHARMACOLOGY**

1. General Principles of Pharmacology; sources and nature of drugs dosage forms; prescription writing; pharmacokinetics (absorption, distribution, metabolism and excretion of drugs), mode of action of drugs, combined effects of drugs, receptor mechanism of drug action, factors modifying drug response, adverse drug reactions, drug interactions, implications of General Principles in clinical dentistry.

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2. CNS drugs, General anesthetics, hypnotics, analgesics psychotropic drugs, antiepileptics, muscle relaxants, local anesthetics, Implications of these drugs in clinical dentistry.
3. Autonomic drugs; sympathomimetics, antiadrenergic drugs parasympathomimetics and parasympatholytic, Implications of Autonomic drugs in clinical dentistry.
4. Autocoids: Histamine, antihistamines, prostaglandins, leukotriens and bronchodilators, Implications of Autocoids in clinical dentistry.
5. Chemotherapy: Antimicrobial agents (against bacteria, anaerobic infections, fungi, virus and broad spectrum). Infection management in dentistry. Pharmacotherapy of Tuberculosis, leprosy and chemotherapy of malignancy in general. Implications of chemotherapy in clinical dentistry.
6. Chelating agents - BAL, EDTA and desferrioxamine.
7. GIT drugs, Purgatives, anti-diarrhoeal, antacids, anti-emetics, Implications of these drugs in clinical dentistry.

#### **PART B**

1. Endocrines, Emphasis on treatment of diabetes and glucocorticoids, thyroid and antithyroid agents, drugs affecting calcium balance and anabolic steroids, implications of these drugs in clinical dentistry.
2. Cardiovascular drugs, Cardiac stimulants, antihypertensive drugs, vasopressor agents, treatment of shock, Antianginal agents and diuretics, Implications of these drugs in clinical dentistry.
3. Drugs acting on blood: coagulants and anticoagulants, hematinics, Implications of these drugs in clinical dentistry.
4. Vitamins: Water Soluble vitamins, Vit. D, Vit. K, and Vit. E, Implications of vitamins in clinical dentistry.
5. Pharmacotherapy of emergencies in dental office and emergency drugs tray Implications of Pharmacotherapy in clinical dentistry.

#### DENTAL PHARMACOLOGY

#### PART B

1. Anti-Septics, astringents, obtundents, mummifying agents, bleaching agents, styptics, disclosing agents, dentifrices, mouth washes, caries and fluorides.
  2. Pharmacotherapy of common oral conditions in dentistry.
- Practical and Demonstrations:  
To familiarize the student with the methodology: prescription writing and dispensing.  
Rationale of drug combinations of marketed drugs.

#### LIST OF BOOKS RECOMMENDED FOR READING AND REFERENCE

1. R.S. Satoskar, Kale Bhandarkar's Pharmacology and Pharmacotherapeutics, 10<sup>th</sup> Edition, Bombay Popular Prakashan 1991.
2. Bertam G Katzung, Basic and Clinical Pharmacology 6<sup>th</sup> Edition Appleton and Lange 1997.
3. Lawrence D.R. Clinical Pharmacology 8<sup>th</sup> Edition Churchill Livingstone 1997.
4. Satoskar R.S & Bhandarkar S.D., Pharmacology and Pharmacotherapeutics part I & part II, 13<sup>th</sup> Popular Prakashan Bombay 1993.
5. Tripathi K.D., Essentials of Medical Pharmacology 4<sup>th</sup> Edition Jaypee Brothers 1999.

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UNIVERSITY OF JAMMU  
SYLLABUS OF STUDY FOR 2<sup>ND</sup> PROF. B.D.S

DENTAL MATERIALS

Scheme of Examination is as under:-

Theory paper consisting of two parts:-

Part A 35 Marks (for Internal Examiner)

Part B 35 Marks (for External Examiner)

Duration of Examination 03 Hours

Part A 1 ½ Hours

Part B 1 ½ Hours

The sciences of Dental Material has undergone tremendous changes over the years. Continued research has led to new material systems and changing concepts in the dental field. Interlinked with various specialized branches of chemistry, practically all engineering applied sciences and biological characteristics, the science of dental material emerged as a basic sciences in itself with its own values and principles.

INTRODUCTION

AIMS

Aim of the course is to present basic chemical and physical properties of Dental Materials as they are related to its manipulation to give a sound educational background so that the practice of the dentistry emerged from art to empirical status of science as more information through further research becomes available. It is also the aim of the course of Dental materials to provide with certain criteria of selection and which will enable to discriminate between facts and propaganda with regards to claims of manufactures.

OBJECTIVES

To understand the evolution and development of science of dental materials.

To explain purpose of course in dental materials to personnel concerned with the profession of dentistry. Knowledge of physical and chemical properties. Knowledge of biomechanical requirements of particular restorative procedure. An intelligent compromise of the conflicting as well as co-ordinating factors into the desired earnest. Laying down standards or specifications of various materials to guide to manufacturers as well as to help professionals.

Search for newer and better materials which may answer our requirements with greater satisfaction. To understand and evaluate the claims made by manufacturers of dental material.

NEED FOR THE COURSE

The profession has to rise from an art to a science, the need for the dentist to possess adequate knowledge of materials to exercise his best through knowledge of properties of different types of materials. The growing concern of health hazards due to mercury toxicity, inhalation of certain vapour or dust materials, irritations and allergic reaction to skin due to contact of materials. Materials causing irritation of oral tissues, pH of restorative materials causing inflammation and necrosis of pulp which is a cause for the dentist to possess wider knowledge of physical, chemical and biological properties of materials being used. For the protection of the patient and his own protection certain criteria of selection are provided that will enable the

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dentist to discriminate between facts and propaganda, which will make a material biologically accepted.

SCOPE

The dental materials are employed in mechanical procedures including restorative dentistry such as Prosthodontics, endodontics, periodontal, orthodontics and restorative materials. There is scarcely a dental procedure that does not make use of dental materials in one form or another and therefore the application of dental material is not limited to any one branch of dentistry. Branches such as minor surgery and periodontics require less use of materials but the physical and chemical characters of materials are important in these fields.

The toxic and tissue reaction of dental materials and their durability in the oral cavity where the temperature is between 32 & 37 degree centigrade, and the ingestion of hot or cold food ranges from 0 - 70 degree centigrade. The acid and alkalinity of fluid show pH varies from 4 to 8.5. The load on 1 sq.mm of tooth or restorative materials can reach to a level as high as many kilograms. Thus the biological properties of dental materials cannot be separated from their physical and chemical properties.

PART A

1. STRUCTURE OF MATTER AND PRINCIPLES OF ADHESION

Change of state, inter atomic primary bonds, inter atomic secondary bonds, inter atomic bond distance and bonding energy, thermal energy, crystalline structure, non crystalline structures, diffusion, adhesion and bonding and adhesion to tooth structures.

2. IMPORTANT PHYSICAL PROPERTIES APPLICABLE TO DENTAL MATERIALS

Physical properties are based on laws of mechanics, acoustics, optics, thermodynamics, electricity, magnetism radiation, atomic structure or nuclear phenomena. Hue, value, chroma and translucency physical properties based on laws of optics, dealing with phenomena of light, vision and sight. Thermal conductivity & coefficient of thermal expansion are physical properties based on laws of thermodynamics. Stress, strain, proportional limit, elastic limit yield strength, modulus of elasticity, flexibility, resilience, impact, impact strength, permanent deformation, strength, flexure strength fatigue, static fatigue, toughness, brittleness, ductility & malleability, hardness, abrasion resistance, relaxation, rheology, Thixotropic, creep, static creep, dynamic creep, flow, colour, three dimensional colour - hue, values, chroma, Munsell system, metamersim, fluorescence, physical properties of tooth, stress during mastication.

3. BIOLOGICAL CONSIDERATION IN USE OF DENTAL MATERIALS

Materials used are with the knowledge of appreciation of certain biological considerations for use in Oral cavity. Requirement of materials with biological compatibility. Classification of materials from prespective of biological compatibility, e.g. contact with soft tissues, affecting vitality of pulp, used for root canal fillings, affecting hard tissues of teeth, laboratory materials that could accidentally be inhaled or ingested during handling. Hazards associated with materials: pH effecting pulp, polymers causing chemical irritation, mercury toxicity, etc. Microleakage, Thermal changes, Galvanism, toxic effect of materials. Biological evaluation for systemic toxicity, skin irritation, mutagenecity and carcinogenicity. Disinfection of dental materials for infection control.

4. GYPSUM & GYPSUM PRODUCTS

Gypsum - its origin, chemical formula, products manufactures from gypsum. Dental plaster, dental stone, die stone, high strength, high expansion stone. Application and manufacturing procedure of each, macroscopic and microscopic structure of each. Supplied as and commercial names.

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Chemistry of setting, setting reaction, theories of setting, gauging water, microscopic structure of set material.

Setting time: working time and setting time, Measurement of setting time and factors controlling setting time.

Setting expansion, Hygroscopic setting expansion - factors affecting each

Strength; wet strength, dry strength, factors affecting strength, tensile strength

Slurry - need & use

Care of cast

ADA classification of gypsum products

Description of impression plaster and dental investment

Manipulation including control, liquids, sprays, radiation

Method of use of disinfectants

Storage of material- shelf life

## 5. IMPRESSION MATERIALS USED IN DENTISTRY

Impression plaster, Impression compound, Zinc oxide eugenol impression paste & bite registration paste incl., non eugenol paste, Hydrocolloids, reversible and irreversible, Elastomeric impression materials Polysulphide, condensation silicones, Addition silicones, Polyether, Visible light cure polyether urethane dimethacrylate, Historical background & development of each impression materials.

Definition of impression, purpose of making impression, ideal properties required and application of material, classification as per ADA specification, general & individual impression material.

Application and their uses in different disciplines, Marketed as and their commercial names, Mode of supply & mode of application bulk / wash impression. Composition, chemistry of setting, control of setting time, type of impression trays required, Adhesion to tray, manipulation, instruments & equipments required. Techniques of impression, storage of impression, (compatibility with cast and die material). Any recent advancements in material and mixing devices, Study of properties: working time, setting time, flow, accuracy, strength, flexibility, tear strength, dimensional stability, compatibility with cast & die materials incl., electroplating biological properties: tissue reaction, shelf life & storage of material, infection control - disinfection, Advantages & disadvantages of each material.

## 6. SYNTHETIC RESINS USED IN DENTISTRY

Historical background and development of material; denture base materials and their classification and requirement.

Classification of resins

Dental resins - requirements of dental resins, applications, polymerization, polymerization mechanism stages in addition polymerization, inhibition of polymerisation, co-polymerisation, molecular weight, crosslinking, plasticizers, physical properties of polymers, polymer structures types of resins.

ACRYLIC RESINS:

Mode of polymerization: Heat activated, Chemically activated, Light activated, Mode of supply, application, composition, polymerisation reaction of each. Technical considerations:

Methods of manipulation for each type of resin. Physical properties of denture base resin. Miscellaneous resins & techniques. Repair resins, Relining and rebasing. Short term and long term soft liners, temporary crown & bridge resins, resin impression trays, tray materials, Resins teeth, materials in maxillofacial prosthesis, denture cleaners, infection control in detail, biological properties and allergic reactions.

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## RESTORATIVE RESINS:

Historical background. Resin based restorative materials, Unfilled & filled, composite restorative materials, mode of supply, composition, polymerization mechanism: Chemically activated, light activated, dual cure Degree of conversion, polymerization shrinkage Classification of Composites: application, composition and properties of each composites of posterior teeth, Prosthodontics resins for veneering. Biocompatibility - microleakage, pulpal reaction, pulpal protection manipulation of composites: Techniques of insertion of chemically activated, light activated, dual cure polymerisation, Finishing and polishing restoration, repair of composites direct bonding Bonding: Need for bonding. Acid etch technique, Enamel bonding, Dentin bonding agents. Mode of bonding, Bond strength, Sandwich techniques its indication and procedure. Extended application for composites: resins for restoring eroded teeth, Pit and fissure sealing, resin inlay system - Indirect & direct, core build up, Orthodontics applications.

## DENTAL CERAMICS

Historical background & general applications.

Dental ceramics: Definition, classification, application, mode of supply, manufacturing procedures, methods of strengthening, properties of fused ceramics: Strength and factors affecting, modulus of elasticity, surface hardness, wear resistance, thermal properties, specific gravity, chemical stability, esthetic properties, biocompatibility, technical considerations.

Metal Ceramics (PFM): Alloys - Types and composition of alloys. Ceramic - Type and composition.

Metal Ceramic Bond - Nature of bond. Bonding using electro deposition, foil copings, bonded platinum foil, swaged gold alloy foil coping. Technical considerations for porcelain and porcelain fused metal restorations. Recent advances - all porcelain restorations, Manganese Core, injection moulded, castable ceramics, glass infiltrated alumina core ceramics (In cream), ceramic veneers, inlays and onlays and CAD-Cam ceramic. Chemical attack of ceramic by fluoride. Porcelain furnace.

## PART B

### METAL AND ALLOYS

Structure and behaviour of metals, solidification of metals, mechanism of crystallization amorphous and crystalline. Classification of alloys: Solid solutions, constitues or equilibrium phase diagrams: Eutectic alloys, Physical properties, peritectic alloys, solid state reaction other binary systems Metallography & Heat treatment. Tarnish and corrosion. Definition: causes of corrosion, protection against corrosion, corrosion of dental restorations, clinical significance of galvanic current. Dental amalgam.

### HISTORY:

Definition of dental amalgam, application, alloy classification, manufacture of alloy powder composition- available as

Amalgamation: setting reaction & resulting structure, properties, microleakage, dimensional stability, strength, creep, clinical performance.

Manipulation: selection of alloy, proportioning, mechanism of trituration, condensation, carving & finishing. Effect of dimensional changes, Marginal deterioration, repair of amalgam, mercury toxicity, mercury hygiene.

### DIRECT FILLING GOLD

Properties of pure gold, mode of adhesion of gold for restoration forms of direct filling gold for using as restorative material.

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Classification: Gold foil, electrolytic precipitate, powdered gold  
Manipulation: Removal of surface impurities and compaction of direct filling gold.  
Physical properties of compacted gold, clinical performance.

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### DENTAL CASTING ALLOYS

Historical background, desirable properties of casting alloys.

Alternatives to cast metal technology: direct filling gold, amalgam, mercury free condensable intermetallic compound – an alternative to metal casting process, CAD-CAM process for metal & ceramic inlays – without need for impression of teeth or casting procedure, pure titanium, most bio compatible metal which are difficult to cast can be copings – by coping milling (without casting procedures)

Classification of casting alloys: By function & description.

Recent classification, high noble (HN), Noble (N) and predominantly base metal (PB).

Alloys for crown & bridge, metal ceramic & removable partial denture. Composition, function, constituents and application, each alloy both noble and base metal. Properties of alloys: Melting range, mechanical properties, hardness, elongation, modulus of elasticity, tarnish and corrosion.

Casting shrinkage and compensation of casting shrinkage. Bio-compatibility – Handling hazards & precautions of base metal alloys, casting investments used. Heat treatment: Softening & hardening heat. Recycling of metals. Titanium alloys & their application, properties & advantages. Technical consideration in casting. Heat source, furnaces.

### (I) DENTAL WAXES INCLUDING INLAY CASTING WAX

Introduction and importance of waxes. Sources of natural waxes and their chemical nature.

Classification of waxes:

Properties: melting range, thermal expansion, mechanical properties, flow & residual stresses, ductility. Dental wax: Inlay wax: Mode of supply: Classification & composition, Ideal requirements: Properties of inlay wax: Flow, thermal properties Wax distortion & its causes.

Manipulation of inlay waxes: Instruments & equipment required, including electrically heated instruments metal tips and thermostatically controlled wax baths.

Other Waxes: Applications, mode of supply & properties.

Casting wax, Base plate wax, Processing wax, Boxing wax, Utility wax, sticky wax, Impression wax for corrective impressions, bite registration wax.

### (II) DENTAL CASTING INVESTMENTS

Definition, requirements, classification

Gypsum bonded – classification, phosphate bonded, silica bonded

Mode of supply: composition, application, setting mechanism, setting time & factors controlling it.

Expansions: Setting expansion, Hygroscopic setting expansion & thermal expansion: factors affecting. Properties: Strength, porosity and fitness & storage. Technical considerations: For casting procedure, preparation of die, wax pattern, spruing, investing, control of shrinkage compensation, wax burnout and heating the invested ring, casting. Casting machines, source of heat for melting the alloy. Defects in casting.

### (III) SOLDERING, BRAZING AND WELDING

Need of joining dental appliances, terms & definition

Solders: definition, ideal requirement, types of solders – soft & hard and their fusion temperature, application. Mode of supply of solders, composition and selection, Properties.

Tarnish & corrosion resistance mechanical properties, microstructures of soldered joint. Fluxes & Antifluxes: Definition, Function, Types, commonly used fluxes & their selection

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techniques of soldering & brazing : free hand soldering and investment, steps and procedure. Welding: definition, application, requirements, procedures, weld decay – causes and how to avoid it. Laser welding.

#### WROUGHT BASE METAL ALLOYS

Applications and different alloys mainly for orthodontics purpose

1. Stainless steel
2. Cobalt-chromium nickel
3. Nickel titanium
4. Beta titanium

Properties required for orthodontic wires, working range, springiness, stiffness, resilience, formability, ductility, ease of joining, corrosion resistance, stability in oral environment, bio compatibility.

Stainless steels: description, type, composition & properties of each type. Sensitization & stabilization. Mechanical properties – strength, tensile, yield strength, KHN. Braided & twisted wires their need, solders for stainless steel, fluxes, welding.

1. Wrought cobalt chromium nickel alloys, composition, allocation, properties, heat treatment, physical properties.
2. Nickel – Titanium alloys, shape, memory & super elastic.
3. Titanium alloys, application, composition, properties, welding, corrosion resistance.

#### (IV) DENTAL CEMENTS

Definition & Ideal requirements.

Cements: Silicate, glass ionomer, metal modified glass ionomer, resin modified glass ionomer, zinc oxide eugenol, modified eugenol, zinc phosphate, zinc silico phosphate, zinc poly carboxylate, cavity liners and cement bases, Varnishes calcium hydroxide, gutta percha.

Application, classification (general & individual), setting mechanism, mode of supply, Properties, factors affecting setting, special emphasis on critical procedures of manipulation and protection of cement, mode of adhesion, Biomechanism of caries inhibition.

Agents for pulpal protection, modifications and recent advances, Principles of cementation. Special emphasis on cavity liners and cement bases and luting agents.

#### (V) ABRASION & POLISHING AGENTS

Definition of abrasion and polishing. Need of abrasion and polishing. Types of abrasives: Finishing, polishing & cleaning. Types of abrasives: Diamond, Emery, aluminum oxides, garnet, pumice, Kieselgurh, Tripoli, rouge, tin oxide, chalk, cerium oxide, sand, carbides, diamond, zirconium silicate, Zinc oxide.

##### ABRASIVE ACTION

Desirable characteristics of an abrasive, rate of abrasion, size of particle, pressure and speed. Grading of abrasive & polishing agents. Binder, Polishing materials & procedures used. Technical consideration – Material and procedure used for abrasion and polishing. Electrolytic polishing and burnishing.

#### (VI) DIE AND COUNTER DIE MATERIALS INCLUDING ELECTROFORMING AND ELECTROPOLISHING

Types – Gypsum products, Electroforming, Epoxy resin, Amalgam.

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*Handwritten note: 1. High yield strength*

(VII) DENTAL IMPLANTS

### Evolution of dental implants, types and materials

## (VIII) MECHANICS OF CUTTING

### Bars & points

At the end of the course the students should have the knowledge about the composition, properties, manipulative techniques and their various commercial names. The students should also acquire skills to select and use the materials appropriately for laboratory and clinical use.

### RECOMMENDED BOOKS

1. Phillips Science of Dental Materials – 10<sup>th</sup> Edition - Kenneth J. Anusavice
2. Restorative Dental Materials – 10<sup>th</sup> edn. Robert G. Craig
3. Notes on Dental Materials – E.C. Combe

# UNIVERSITY OF JAMMU

## SYLLABUS OF STUDY FOR 2<sup>ND</sup> PROF. B.D.S

### PRE-CLINICAL CONSERVATIVE DENTISTRY

Scheme of Examination is as under:-

Practical and Viva Voce only in University Examinations

Internal Assessment:-

20 Marks

Practical:-

60 Marks

Viva-Voce:-

20 Marks

### LABORATORY EXERCISE

1. Identification and study of handcutting instruments chisels, gingival margin trimmers, excavators and hatchet.
2. Identification and use of rotary cutting instruments in contra angle hand pieces burs (Micromotor).
3. Preparation class I and extended Class I and Class II and MOD's and Class V amounting to 10 exercises in plaster models.
4. Ten exercises in mounted extracted teeth of following: class I, 4 in number, class I extended cavities 2, class II 4 in number and class V 2 in number, cavity preparation base application, matrix and wedge placement restoration with amalgam.
5. Exercises on phantom head models which includes cavity preparation base and varnish application matrix and wedge placement followed by amalgam restoration.
 

Class I	5
Class I with extension	2
Class II	10
Class II Mods	2
Class V and III for glass ionomers	4
Class V for amalgam	2
6. Polishing of above restorations.
7. Demonstration of Class III and Class V cavity preparation. For composites on extracted tooth completing the restoration.
8. Polishing and Finishing of the restoration of composites.
9. Identification and manipulation of varnish bases like Zinc Phosphate, Poly carboxylate, glass ionomers, Zinc Oxide, Eugenol cements.
10. Identification and manipulation of various matrices, tooth separators and materials like composites and modified glass ionomers cements.
11. Cast Restoration
  - a. Preparation of class II inlay cavity.
  - b. Fabrication of wax pattern
  - c. Sprue for inner attachment investing
  - d. Investing of wax pattern
  - e. Finishing and cementing of class II inlay in extracted tooth.
12. Endodontics
  - a. Identification of basic endodontic instruments
  - b. Coronal access cavity preparation on extracted upper central incisors

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- c. Determination of working length.
- d. Biomechanical preparation of root canal space of central incisor.
- e. Obturation of root canal spaces. Absence of coronal access cavity.
- f. Closure of access cavity.



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UNIVERSITY OF JAMMU  
SYLLABUS OF STUDY FOR 2<sup>ND</sup> PROF. B.D.S

**PRE-CLINICAL PROSTHODONTICS**

Scheme of Examination is as under:-

Practical and Viva Voce only in University Examinations

Internal Assessment:-

20 Marks

Practical:

60 Marks

Viva-Voce:-

20 Marks

**LABORATORY EXERCISE UPTO 2<sup>ND</sup> PROFESSIONAL BDS.**

- |                                                             |    |
|-------------------------------------------------------------|----|
| 1. Anatomical landmark marking.                             |    |
| 2. Shellac base plate adaptation                            | -1 |
| 3. Temporary denture base fabrication using self cure resin | -1 |
| 4. Occlusal rim fabrication                                 |    |
| 5. Class-I teeth arrangement                                | -2 |
| 6. Class-II teeth arrangement                               | -1 |
| 7. Acrylisation of Class-I and II teeth arrangement         | -1 |
| 8. Repair of Denture                                        | -1 |
| 9. Components marking of RPD + RPD fabrication (anyone)     | -1 |

**DESIGN:-**

- |                             |    |
|-----------------------------|----|
| 1. Special Trays            |    |
| 2. Coats (beeding & Boxing) |    |
| 3. Articulation             |    |
| 4. Class-III arrangement    | -1 |



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