FOUNDATION-II MODULE

2nd Year BDS

Table 1: Themes

S#	Theme	Duration in Weeks
1	Cellular Response to Injury & Drugs	2
2	Health and Oral Well Being	1
3	Foundations of Pre-Clinical Skills	2

Teaching Hours Allocation

Table 2: Hours allocation for different subjects

S. No	Subject	Hours
1	Science of Dental Materials	41
2	Community and Preventive Dentistry	30
3	Pharmacology	26
4	General Pathology & Microbiology	17.5
5	Oral Pathology	1
7	Junior Operative	6
8	Junior Prosthodontics	8
9	Physiology	2
10	General Medicine	1
11	Oral Medicine	1
	Total	133.5

Learning Objectives

By the end of this Module, 2nd year BDS students will be able to:

1. Explain the various cellular adaptations to injury, including atrophy, hypertrophy, hyperplasia, and metaplasia.
2. Differentiate between reversible and irreversible cellular injuries, and describe their biochemical and morphological changes.
3. Compare and contrast apoptosis and necrosis, including their causes, processes, and roles in both health and disease.
4. Identify different types of necrosis and discuss the underlying mechanisms leading to these cellular outcomes.
5. Classify bacteria based on cell wall characteristics, oxygen requirements, and staining properties, and describe their growth patterns.
6. Explain the pathogenesis of bacterial infections, including syphilis, leprosy, tuberculosis, and gonorrhea, and outline their clinical management.
7. Define key pharmacological terms, such as pharmacokinetics, bioavailability, and drug interactions.
8. Explain the process of drug absorption, distribution, metabolism, and excretion, with emphasis on clinical applications like dosing and therapeutic index.
9. Identify and categorize various types of adverse drug reactions, including dose-related and non-dose-related effects.
10. Classify autonomic nervous system drugs and anti-asthmatic drugs, their mechanisim of action, uses, adverse effects and drugs interactions and other pharmacological aspects.
11. Perform essential lab techniques such as gram staining and culture media preparation, interpreting results to identify bacterial infections.
12. Perform and Practice self-protection protocol during laboratory sessions.
13. Perform and practice the self-protection protocol in the clinical skill laboratory.
14. Establish the importance of empathic communication in clinical practice during discussion sessions.
15. Define health and wellbeing, and explain their changing concepts and dimensions.

16. Identify responsibilities and indicators of health, and describe their significance.
17. Define disease and describe the epidemiological triad, risk factors, and prevention levels.
18. Discuss global health goals (MDGs, SDGs) and the application of epidemiology in dental care.
19. Classify dental materials and discuss their properties and selection criteria.
20. Discuss the basics, procedures, and future prospects of operative dentistry and endodontics.
21. Identify and demonstrate the use of dental equipment and instruments.
22. Describe mechanical, physical, chemical, and biological properties of dental materials.
23. Classify and explain composition, properties, and applications of dental impression materials.
24. Identify components and fabrication steps of complete dentures.
25. Recognize and utilize essential dental instruments and equipment.
26. Demonstrate proper chair positioning and instrument handling in operative dentistry and Phantom Head Lab.
27. Classify and describe the principles of epidemiology and the various epidemiological study designs
28. Describe the principles of health promotion and health education and oral education
29. Deliver health education

Table 1: Learning Objectives Theme Wise

Theme I: Cellular Response to Injury & Drugs			
SNo	**Topic**	**Hours**	**Learning objectives**
Physiology			
1.	Functional system of cell	2	1.1 Discuss the function of cellular organelles (endoplasmic reticulum, golgi bodies, mitochondria, lysosomes, peroxisomes, cytoskeleton). 1.2 Describe the mechanism of endocytosis. 1.3 Differentiate between pinocytosis and phagocytosis. 1.4 Explain the steps of phagocytosis. 1.5 Discuss the regression and autolysis mechanism damaged cells by the lysosomes.
General Pathology			
2.	Introduction to the subject	1	2.1 Define Pathology and its different branches. 2.2 Define etiology, disease, pathogenesis, morphology, cell adaptation, cell injury and homeostasis.
3.	Cellular adaptation	1	3.1 Define atrophy, hypertrophy, hyperplasia, and metaplasia with examples. 3.2 Discuss causes of different types of cellular adaptations. 3.3 Describe mechanism of Hypertrophy, Hyperplasia, and atrophy. 3.4 Discuss difference between physiologic and pathologic cellular adaptation.
4.	Cellular injury, cell death	1	4.1 Define cell injury. 4.2 Differentiate between reversible and irreversible cell injury.

			4.3 Discuss the mechanism, morphological, biochemical, and functional alteration in reversible and irreversible cell injury. 4.4 Describe the nature and severity of cell injury with cellular responses. 4.5 Describe the subcellular responses to injury including heterophagy and lysosomal catabolism. 4.6 Discuss process of autophagy.
5.	Necrosis	1	5.1 Define necrosis. 5.2 Discuss different types of necrosis with examples. 5.3 Discuss the mechanism and morphological changes of different types of necrosis. 5.4 Describe morphologically different patterns of necrosis in coagulative necrosis, liquefactive necrosis, gangrenous necrosis, caseous necrosis, Fat necrosis, and fibrinoid necrosis
6.	Apoptosis	1	6.1 Define Apoptosis. 6.2 Discuss cell cycle. 6.3 Enumerate causes of apoptosis 6.4 Enlist the examples of Apoptosis. 6.5 Discuss pathophysiology, morphology, and biochemical features of Apoptosis. 6.6 Describe the intrinsic and extrinsic pathways of apoptosis. 6.7 Discuss difference between apoptosis and necrosis. 6.8 Describe role of apoptosis in health and disease. 6.9 Identify the role of nutritional deficiencies in the process of cell apoptosis.

7.	Pathologic calcification	1.5	7.1 Define Pathologic calcification 7.2 Describe types, morphology, and functional alterations of pathologic calcification with examples. 7.3 Differentiate between dystrophic and metastatic calcification.
8.	Intracellular accumulations		8.1 Discuss all the pathways for abnormal intracellular accumulations. 8.2 Describe causes, morphology mechanism and consequences and nutrition aspects of protein accumulation, glycogen accumulation and lipid accumulation.
9.	Pigmentation	1	9.1 Describe types of pigments. 9.2 Differentiate between endogenous and exogenous pigments. 9.3 Enlist the nutrients causing oral pigmentation.
Oral Pathology			
10.	Oral pigmentation	1	10.1 Classify oral pigmentation. 10.2 Describe the clinical and histological features of oral lesions caused by exogenous and endogenous pigmentation.
General Medicine			
11.	Syphilis, Leprosy, Tuberculosis and Gonorrhea diseases	1	11.1 Define Syphilis, Leprosy, Tuberculosis and Gonorrhea diseases. 11.2 Discuss sign and symptoms of bacterial diseases. 11.3 Discuss management of patients.
General Pathology & Microbiology			
12.	Classification of Bacteria	1	12.1 Classify aerobic and anaerobic bacteria with examples.

			12.2 Discuss classification of bacteria on the basis of nature of cell wall, staining characteristics, spore formation and ability to grow in the presence of oxygen.
13.	Structure of bacterial cell	1	13.1 Describe specialized structures outside the cell wall including capsule, glycocalyx, flagella and pilli. 13.2 Describe structure and function of various parts of the bacterial cell. 13.3 Enlist the differences between Gram Positive and Gram-Negative Bacteria. 13.4 Describe classification and important functions of plasmids 13.5 Describe structure, functions, and medical importance of bacterial spores with examples. 13.6 Describe functions and arrangement of transposons.
14.	Normal Flora and Bacterial growth curve	2	14.1 Describe medically important members of normal flora and their anatomic location. 14.2 Describe various phases of bacterial growth curve. 14.3 Describe the role of probiotics and prebiotics in maintaining gastrointestinal health.
15.	Bacterial genetics	1	15.1 Define mutation 15.2 Discuss causes of mutation. 15.3 Classify different types of mutations. 15.4 Discuss conjugation, transduction, recombination, and transformation in bacteria.

16.	Bacterial pathogenesis	1	16.1 Define the term pathogen, infection, virulence, communicable, endemic, epidemic and pandemic diseases, carrier, pathogens, opportunists, commensals, and colonizers. 16.2 Describe stages/determinants of bacterial pathogenesis 16.3 Describe colonization, invasion, toxins, immune pathogenesis. 16.4 Differentiate between exotoxins and endotoxins. 16.5 Describe the various modes of action of endotoxins and endotoxins produced by gram positive and gram-negative bacteria. 16.6 Describe the four stages of a typical infectious disease and Koch's postulates for establishing the causal role of an organism in the disease.
Pharmacology			
17.	Introduction to basic pharmacology terms	1	17.1 Define basic terms pharmacokinetics, pharmacodynamics, excipient, compounding, and Dispensing. 17.2 Define basic terms like Pharmacology, Clinical Pharmacology, Therapeutics, drug, medicine, pro-drugs, prototype drugs, Materia medica, pharmacopoeia, formulary, national formulary. 17.3 Describe the branches of Pharmacology like Pharmacy, Pharmacognosy, pharmacogenetics, pharmacogenomics, toxicology, and posology. 17.4 Define prescription drugs, OTC drugs, WHO essential drugs, and Orphan drugs with examples.

18.	Nomenclature of drugs	1	18.1 Describe how drugs are named, i.e., chemical, generic, approved, official, and trade names of drugs with examples.
19.	Sources of drugs		19.1 Enlist various sources of drugs. 19.2 Describe the genetic engineering source of drugs with examples
20.	Active principles of drugs		20.1 Enlist important principles of drugs with examples.
21.	Absorption of drugs	1	21.1 Define drug absorption. 21.2 Describe various mechanisms of drug absorption with examples. 21.3 Describe the concept of ionization of drug molecules. 21.4 Discuss clinical significance of ion trapping. 21.5 Enlist factors affecting drug absorption.
22.	Bioavailability	1	22.1 Define bioavailability, bioequivalence, and pharmaceutical equivalence.
23.	Distribution of drugs Volume of Distribution		23.1 Define distribution, redistribution, and volume of distribution drugs. 23.2 Discuss factors affecting drug distribution. 23.3 Enlist drugs with small volume of distribution. 23.4 Enlist drugs with large volume of distribution. 23.5 Describe formula for calculation of volume of distribution. 23.6 Discuss plasma protein binding. 23.7 Discuss its clinical significance in diseased conditions. 23.8 Discuss volume of distribution of drug with its clinical significance. 23.9 Enlist some drugs whereby loading dose is administered.

24.	Pro-drug Biotransformation (metabolism) of drugs	1	24.1 Define biotransformation/Pro-drug. 24.2 Describe the objectives of biotransformation and the fate of drugs after biotransformation. 24.3 Name major sites of biotransformation. 24.4 Describe major drug-metabolizing enzymes, i.e., microsomal (P450) and non-microsomal enzymes. 24.5 Describe phases and reactions of biotransformation. 24.6 Define idiosyncrasy with examples.
25.	Dose and Loading dose	1	25.1 Define dose. 25.2 Classify dose. 25.3 Discuss its significance. 25.4 Discuss loading of dose. 25.5 Discuss its significance. 25.6 Explain calculation of loading dose. 25.7 Describe maintenance dose. 25.8 Describe calculation of maintenance dose. 25.9 Discuss Paediatric dose. 25.10 Describe significance of Paediatric dose. 25.11 Describe calculation of Paediatric dose.
26.	Physiological barriers to transport of drugs	1	26.1 Enlist important physiological barriers to transport of drugs. 26.2 Describe important physiological barriers to transport of drugs and their clinical significance.

27.	Hepatic first-pass effect		27.1 Describe hepatic first-pass effect (Pre-systemic elimination) and its clinical significance.
28.	Enterohepatic circulation		28.1 Define enterohepatic circulation. Describe enterohepatic circulation with examples and its clinical significance.
29.	Excretion of drugs, Steady State Concentration (Css) and Kinetics of Drug Elimination	1	29.1 Define drug excretion and clearance. 29.2 Enlist different routes of drug excretion. 29.3 Discuss different factors affecting excretion of drug. 29.4 Discuss drug clearance and elimination and explain their kinetics 29.5 Explain Css and its clinical application. 29.6 Differentiate between excretion, elimination, and clearance. 29.7 Apply the formula for calculating drug clearance.
30.	Excretion of drug, renal, biliary excretion, lung excretion, drug excreted in milk and saliva		30.1 Define excretion of drug. 30.2 Enumerate different routes of excretion of drug. 30.3 Differentiate between clearance, elimination, and excretion of drug. 30.4 Discuss renal excretion renal, biliary excretion, lung excretion, drug excreted in milk and saliva. 30.5 Define zero order and first order excretion of drug. 30.6 Enumerate drug elimination through first order kinetics. 30.7 Enumerate drug elimination through zero order kinetics. 30.8 Discuss the clinical significance of first- and zero-order kinetics
31.	Plasma half life		31.1 Define plasma half-life. 31.2 Enlist drugs with short half-life and long half-life.

			31.3 Discuss formula for calculation of plasma half-life. 31.4 Describe the clinical significance of half-life.
32.	Pharmacodynamics	2	32.1 Describe intracellular Second-messenger systems and enlist some important second messengers.
33.	Agonist and antagonist		33.1 Discuss agonist. 33.2 Classify agonist. 33.3 Describe clinical use of agonist. 33.4 Discuss antagonist. 33.5 Classify antagonist. 33.6 Describe clinical uses of antagonist.
34.	Drug antagonism		34.1 Define drug antagonism. 34.2 Enlist types of antagonism. 34.3 Describe chemical, physiological (functional), and pharmacological (competitive/surmountable and non-competitive) antagonisms with examples.
35.	Drug interactions	1	35.1 Define drug interaction. 35.2 Define drug incompatibilities with examples. 35.3 Describe pharmacokinetic drug interactions with examples and its clinical significance. 35.4 Define summation, synergism, and potentiation with examples 35.5 Describe pharmacodynamics drug interactions with examples and its clinical significance.

			35.6 Define orphan receptors, serpentine receptors, and spare receptors. 35.8 Define drug selectivity and specificity. 35.9 Describe drug-food interactions and drug-disease interactions with examples. 35.10 Define summation, synergism, and potentiation with examples.
36.	Tolerance and Tachyphylaxis	2	36.1 Define Tolerance, cross tolerance, reverse tolerance (sensitization), innate tolerance, tachyphylaxis and drug resistance. 36.2 Describe the mechanisms of development of tolerance and tachyphylaxis. 36.3 Define drug holidays with example.
37.	Adverse drug reactions		37.1 Define adverse drug effect, secondary effect. 37.2 Define intolerance to a drug. 37.3 Classify adverse drug reactions. 37.4 Describe dose-related adverse effects (side effects and toxic effects) with examples. 37.5 Describe non-dose-related adverse effects with examples. 37.6 Describe causes of adverse drug reactions. 37.7 Enlist drugs causing hepatotoxicity, renal toxicity, and cardio toxic drugs. 37.8 Enlist drugs causing adverse effects on reproduction. 37.9 Describe non-dose-related adverse effects (idiosyncrasy and drug allergy) with examples
38.	Therapeutic index		38.1 Define therapeutic index. 38.2 Define median lethal dose, median toxic dose, and median effective dose.

			38.3 Enlist some drugs with a narrow therapeutic index. 38.4 Enlist some drugs with a broad therapeutic index.
39.	Therapeutic window		39.1 Define the therapeutic window.
40.	Potency and efficacy		40.1 Define potency and efficacy. 40.2 Describe potency and efficacy with examples. 40.3 Describe the clinical importance of efficacy compared to potency. 40.4 Describe graded and quantal dose response curve.
41.	ANS DRUGS (Introduction to autonomic nervous system drugs)	1	41.1 General organization of nervous system with differences between somatic and autonomic nervous system 41.2 Differences with sympathetic and parasympathetic nervous system 41.3 Neurochemical transmission and sites of drug action 41.4 Autonomic neurotransmitters and their receptors with their distribution 41.5 Presynaptic regulation with highlighting autoreceptors and heteroreceptors 41.6 Postsynaptic regulation
42.	Parasympathomimetic drugs	1	42.1. Enlist major autonomic neurotransmitters. 42.2 Describe the organ system distribution of autonomic receptors. Classify cholinomimetic drugs. 42.3 Describe the mechanism of action of directly acting and indirectly acting cholinomimetics. 42.4 Describe the organ system effects of directly acting and indirectly-acting cholinomimetics with special reference to their effects on receptors. 42.5 Describe the clinical uses of cholinomimetics. 42.6 Describe the adverse effects of cholinomimetics. 42.7 Describe the clinical manifestations of organophosphate poisoning.
43.	Parasympatholytic drugs	1	43.1 Classify anticholinergic drugs 43.2 Describe the pharmacokinetics of antimuscarinic drugs with emphasis on metabolism and duration of action. 43.3 Describe the mechanism of action of antimuscarinic drugs. 43.4 Describe the organ system effects of antimuscarinic drugs with special

			reference to their effects on receptors. 43.5 Describe the clinical uses of antimuscarinic drugs. 43.6 Describe atropine fever
44.	Sympathomimetics drugs	2	44.1. Classify sympathomimetic drugs according to the spectrum of adrenoceptors they affect 44.2 Define Catecholamines with examples. 44.3 Describe the pharmacokinetics of sympathomimetic drugs 44.4 Describe the mechanism of action of sympathomimetics. 44.5 Compare the effects of Adrenaline, Noradrenaline, Phenylephrine and Isoprenaline on heart rate and blood pressure. 44.6 Describe the clinical uses of sympathomimetics. 44.7 Describe the drug treatment of Anaphylactic shock. 44.8 Describe the pharmacotherapy of glaucoma 44.9 Describe the adverse effects of sympathomimetics
45.	Sympatholytic drugs	2	45.1 Classify sympatholytic drugs 45.2 classify α-blockers. 45.3 Describe the mechanism of action of α-blockers. 45.4 Describe the organ system effects of α-blockers 45.5 Describe the clinical uses of α- blockers. 45.6. Describe the adverse effects of α-blockers. 45.7 classify the ß-blockers based on receptor activity. 45.8. Enlist the ß-blockers which are relatively safe in chronic stable heart failure. 45.9 Enlist the ß-blockers which are relatively safe in asthmatic patients. 45.10 Describe the pharmacokinetics of propranolol. 45.11 Describe the mechanism of action of ß-blockers. 45.12 Describe the clinical uses of ß- blockers. 45.13 Describe the adverse effects of ß- blockers. 45.14 Describe the limitations of beta- blockers in patients with Diabetes Mellitus, Hyperlipidemias, Bronchial Asthma and peripheral arterial disease.

46.	Anti asthmatic drugs	1	46.1 Discuss types, MOA, uses and S/E of anti asthmatics (Short and long acting beta2 agonists 46.2 Discuss types, MOA, uses and S/E of Antimuscarinics, leukotriene inhibitors and xanthines
Community Dentistry			
47.	Orientation to Community Dentistry	1hr	47.1 Define the scope and importance of community dentistry in improving public health. 47.2 Recognize the role of a dentist in community oral health initiatives. 47.3 Describe the association between community dentistry and public health policies. 47.4 Assess common challenges faced in delivering community dental services.
48.	Principles of Public Health	1hr	48.1 Define and explain the principles of public health 48.2 Identify and explain key principles of public health to dental care. 48.3 Describe how social, economic, and environmental factors affect oral health. 48.4 Compare different public health approaches to disease prevention and health promotion. 48.5 Discuss the role of public health in planning community-based dental care programs.
49.	Concepts of Health and Disease Prevention	4 hrs	49.1 Define health. 49.2 Define and identify the different types of changing concepts of health. 49.3 Explain the holistic concept of health. 49.4 Define and describe the dimensions of health. 49.5 Define the determinants of health. 49.6 Describe how these health determinants affect oral health. 49.7 Define and describe concepts of wellbeing. 49.8 Describe the indicators of health. 49.9 Define healthcare and levels of healthcare. 49.10 Discuss global health goals (MDG's and SDG's).

			49.11 Define and describe the concept of causation. 49.12 Define and describe the concept of disease, the Natural history of the disease. 49.13 Organize and explain the changing pattern of disease, community diagnosis and treatment. 49.14 Define and explain concepts of control. 49.15 Define the concept of prevention. 49.16 Identify the level of prevention and disease process. 49.17 Describe mode of prevention. 49.18 Describe preventive strategies in nutrition for improving community oral health outcomes.
50.	Health Promotion	3hrs	50.1 Explain health promotion 50.2 Discuss methods of public awareness. 50.3 Trace the historical evolution of health promotion 50.4 Recognize key milestones and shifts in health promotion strategies
51.	Health Education and oral Health education	5 hrs	51.1 Define health education. 51.2 Explain the principles of health education 51.3 Discuss the domains and nature of learning 51.4 Discuss the different approaches in dental health education 51.5 Describe different health education theories and models. 51.6 Discuss the methods of health education. 51.7 Enlist types of communication and barriers faces during communication in dental education.

LAB WORK			
Pharmacology			
52.	Lab protocols	1	52.1 Describe the general protocols for working safely and efficiently in lab. 52.2 Describe biosafety procedures and precautions taken in labs.
53.	Solutions (5% dextrose, normal saline)	2	53.1 Identify the ingredients of 5% dextrose solution and normal saline. 53.2 Prepare and dispense 50ml of 5% dextrose solution and normal saline. 53.3 Describe its uses.
54.	Rabbit eye experiments	2	54.1 Perform and observe the effects of parasympathetic / parasympatholytic drug effects on rabbit's eye. 54.2 Perform and observe the effects of sympathomimetic drug effects on rabbit's eye.
General Pathology			
55.	Gram staining	2	55.1 Perform gram staining. 55.2 Interpret the results of gram staining.
56.	Culture media	2	56.1 Identify different types of culture media.
57.	Coagulative necrosis		57.1 Identify the slide of coagulative necrosis under the microscope.
58.	Pathological calcification		58.1 Identify the slide of pathological calcification under the microscope.

59.	Hyperplasia		59.1 Identify the slide of hyperplasia under the microscope.
	Community Dentistry		
60.	Delivery of health education.	4 hrs	60.1 Deliver health education regarding general self-care advice, and for maintenance of oral health on simulated patients 60.2 Demonstrate effective interpersonal communication techniques (verbal, non-verbal, motivational interviewing basics). 60.3 Design Information, Education, and Communication Materials like posters, leaflets, infographics on health education
	Science of Dental Materials		
61.	Introduction to instruments that are used in dental materials laboratory	1	62.1 Identify • Wax knife • Wax carver • Plaster knife • Rubber Bowl (hard & soft) • Mixing spatula (For Plaster) • Mixing spatula (For Alginate) • Cement Spatula • Glass Slab • Dental Flask with Press • Oil Painting Brush • Plain Line Articulator • Round Pliers • Flat Pliers • Cutting Pliers (wire cutter) • Ruler • Spirit Lamp • Ceramic Cup with lid for acrylic mixing • Impression Trays (Plastic & Metal) • Glass Beaker
	Theme 2: Health and Oral Well Being		
S.No	**Topic**	**Hours**	**Learning objectives**
Community Dentistry			

62.	Introduction to Epidemiology	1hr	62.1 Define epidemiology. 62.2 Describe uses of epidemiology. 62.3 Classify epidemiological study designs
63.	Measurements of epidemiology	1hr	63.1 Discuss the measurements in epidemiology. 63.2 Differentiate between rate, ratio and proportion. 63.3 Differentiate between incidence and prevalence.
64.	Descriptive Study	2hrs	64.1 Explain the characteristics of a descriptive study and its role in oral health research. 64.2 Identify the strengths and limitations of descriptive studies. 64.3 Interpret findings from descriptive studies in a population 64.4 Discuss the features of case report and case series.

65.	Cross-sectional study design	1hr	65.1 Differentiate between descriptive and analytical study design. 65.2 Discuss the distinct features of cross-sectional study. 65.3 Discuss the steps in a cross-sectional study. 65.4 Discuss the strengths and weaknesses of cross-sectional studies.

66.	Case control study design	2 hrs	66.1 Discuss the distinct features of case-control study design. 66.2 Discuss the steps in a case-control study design. 66.3 Define matching and its concept in selection of cases and control. 66.4 Discuss the types of bias in a case-control study. 66.5 Discuss the strength and weaknesses of case-control studies. 66.6 Discuss the concept of confounding factor. Calculate odds ratio for a given 2×2 table.
67.	Cohort study design	2 hrs	67.1 Discuss the distinct features of cohort study design. 67.2 Discuss the steps in a cohort study design. 67.3 Differentiate the types of cohort studies. 67.4 Differentiate between case-control and cohort study design. 67.5 Discuss the types of bias in a cohort study. 67.6 Discuss the strength and weaknesses of analytical studies. 67.7 Differentiate between relative risk and attributable risk.
68.	Experimental studies	2 hrs	68.1 Classify experimental studies. 68.2 Define Randomized controlled trial (RCT). 68.3 Discuss the importance of randomization. 68.4 Discuss the steps carried out to conduct an RCT. 68.5 Explain types of blinding. 68.6 Discuss the strengths and weaknesses of a RCT. 68.7 Discuss the bias and ethical considerations in a RCT 68.8 Discuss non-randomized control trials.

69.	Evidence Based Dentistry	1hr	69.1 Define evidence-based dentistry. 69.2 Discuss the importance of evidence-based dentistry in making clinical decisions. 69.3 Describe the Stages of evidence-based dentistry. 69.4 Explain the hierarchy of evidence pyramid.
Science of Dental Materials			
70.	Introduction, Selection & Evaluation of dental materials	2 hrs	70.1 Define the science of dental materials. 70.2 Classify dental materials. 70.3 Describe preventive dental materials. 70.4 Describe Auxiliary Dental Materials. 70.5 Describe Restorative Dental Materials. 70.6 Discuss the criteria for dental material selection and evaluation.

71.	Introduction to the Properties used to Characterize Materials	1 hr	71.1 Discuss the following:- • Properties during storage • Properties during setting/manipulation 71.2 Properties of the set material
72.	Mechanical properties Stress strain graph	2 hrs	72. 1 Describe various properties that are manifested in stress strain graph
73.	Impact strength and fracture toughness	1 hr	73.1 Define impact strength and fracture toughness 73.2 Explain impact strength, fracture toughness and their significance in dental materials 73.3 Explain the test used to evaluate impact strength of dental materials
74.	Wear	1 hr	74.1 Discuss the following terms:- • Abrasion • Attrition 74.2 Discuss Erosion
75.	Hardness	1 hr	75.1 Define hardness of dental materials. 75.2 Discuss various tests used to evaluate the hardness of dental materials.
76.	Viscoelasticity	1 hr	76.1 Define & Discuss the following:- • Elasticity and viscoelasticity • Models used to represent elastic, plastic, viscoelastic materials 76.2 Discuss Creep
77.	Rheological properties of materials	1hr	77.1 Define the following terms:- • Shear stress • Shear rate 77.2 Discuss the following:- • Newtonian fluids • Dilatant

			• Pseudoplastic • Viscosity • Flow • Mixing time • Working time • Setting time

78.	Thermal properties of materials	1hr	78.1 Discuss • Thermal conductivity • Thermal diffusivity • Exothermic Reactions
79.	Adhesion	1	79.1 Discuss • Types of Adhesion a. Factors Affecting Adhesion
80.	Miscellaneous physical properties	1	80.1 Discuss • Dimensional changes • Density • Color
81.	Chemical Properties	1	81.1 Discuss • Solubility • Leaching of constituents • Tarnish and corrosion

82.	Biological Properties	1	82.1 Define biocompatibility, bioinert and bioactive 82.2 Enlist factors affecting biocompatibility of materials 82.3 Differentiate between allergy and toxicity 82.4 Differentiate between carcinogenic and mutagenic 82.5 Identify materials in dentistry which have hazardous ingredients 82.6 Enlist different tests used to evaluate biocompatibility
83.	Synthetic Polymers	1	83.1 Define • Monomer • Polymer • Polymerization 83.2 Classify Polymerization 83.3 Describe various steps of Addition polymerization 83.4 Discuss Factors affecting properties of resulting polymer) 83.5 Describe Chain branching or crosslinking (Factors affecting properties of resulting polymer) 83.6 Describe Condensation polymerization 83.7 Differentiate between thermosetting and thermoplastic polymers

84.	Structure and properties of synthetic polymers	1	84.1 Discuss physical changes occurring during polymerization • Phase changes • Temperature changes • Dimensional changes • Factors which control properties of polymers • Glass transition temperature • Softening temperature 84.2 Discuss • Methods of fabricating polymers • Dough moulding • Injection moulding • Thermoplastic polymers 84.3 Enlist advantages and disadvantages of synthetic polymers

Junior Operative (Operative Dentistry and Endodontics)				
85.	Introduction to Operative Dentistry	1	85.1	Discuss operative dentistry and its historical background.
			85.2	Discuss the indications, considerations, dynamics of operative dentistry.
			85.3	Discuss the future prospects in operative dentistry.
			85.4	Discuss about endodontics.
86.	Isolation	3	86.1	Define isolation in operative procedures and explain its rationale in terms of moisture control, cross-infection prevention, operator efficiency and patient safety.
			86.2	Discuss different isolation methods for operative procedures.
			86.3	Describe the components, indications and contraindications of commonly used isolation methods: rubber dam, cotton rolls, saliva ejectors and high-volume suction, gingival retraction chords.
			86.4	Explain the effects of inadequate isolation on operative procedures with specific reference to rubber dam its placement in maxillary and mandibular teeth via direct and indirect method.
87.	Introduction to equipment and instruments used in operative procedures	2	87.1	Identify the equipment used in a dental operatory.
			87.2	Identify hand instruments used in restorative procedures.
			87.3	Identify rotary cutting instruments used in restorative procedures.
			87.4	Identify different parts of the dental chair.
			87.5	Demonstrate how to operate the dental chair.
Junior Prosthodontics				

88.	Deteriorating adult dentition	1hr	88.1 88.2 88.3	Discuss the causes of deteriorating dentition. Discuss the sequelae of tooth loss. Define the partially dentate and complete edentulous conditions.
89.	Introduction to Prosthodontics	1hr	89.1 89.2 89.3 89.4	Define Prosthodontics. Define Pre- Clinical Prosthodontics. Discuss branches of Prosthodontics. Explain the choice of treatment options according to patient-specific needs
90.	Complete Dentures	1hr	90.1 90.2 90.3 90.4	Define Complete Denture. Discuss its role in rehabilitation of edentulous patients. Enlist the parts and surfaces of complete dentures. Enlist the fabrication steps of complete dentures.
Lab work Dental Materials				
91.	Wire bending exercise	3hrs	91.1	Perform stainless steel wire bending according to the alphabetical shapes of A, B, F, G, S and K.
Theme 3: Foundations of Pre-Clinical Skills				
S.No	**Topic**	**Hours**	**Learning objectives**	
Oral Medicine				
92.	Approach to patient management	1hr	92.1 Discuss the approach to patient management in dentistry. 92.2 Describe the overall process of patient management with a brief explanation of each component, i.e., history, examination, laboratory investigation, imaging, diagnosis, treatment plan and counselling.	
Science of Dental Materials				

93.	Impression material requirements	1	93.1	Define dental impression.
			93.2	Describe significance of impression.
			93.3	Discuss ideal requirements of dental impression materials.
			93.4	Identify various types of impression trays
			93.5	Explain the uses of different impression trays
			93.6	Describe various impression making techniques

94.	Dental impression materials classification	1	94.1 Classify impression materials on the basis of • Elasticity/rigidity • Viscosity • Setting reaction • Uses • Applied stress
95.	Non-elastic impression materials - Impression Compound	1	95.1 Describe the composition of impression Compound. 95.2 Describe the manipulation of impression Compound 95.3 Describe the setting reaction of impression Compound 95.4 Describe the properties of impression Compound 95.5 Describe the application of impression Compound 95.6 Describe the advantages and disadvantages of impression Compound
96.	Non-elastic impression materials - Zinc Oxide eugenol Impression	1	96.1 Describe the composition of Zinc Oxide eugenol Impression material. 96.2 Describe the manipulation of Zinc Oxide eugenol Impression material. 96.3 Describe the setting reaction of Zinc Oxide eugenol Impression material. 96.4 Describe the properties of Zinc Oxide eugenol Impression material. 96.5 Describe the application of Zinc Oxide eugenol Impression material. 96.6 Describe the advantages and disadvantages of Zinc Oxide eugenol Impression material.
97.	Elastic impression materials – Hydrocolloids – Agar	1	97.1 Describe hydrocolloid. 97.2 Describe the composition of Agar.

			97.3	Describe the manipulation of Agar.
			97.4	Describe the setting reaction of Agar.
			97.5	Describe the properties of Agar.
			97.6	Describe the application of Agar.
			97.7	Describe the advantages and disadvantages of Agar.

98.	Elastic impression materials – Hydrocolloids – Alginate	2	98.1	Describe the composition of Alginate.
			98.2	Describe the manipulation of Alginate.
			98.3	Describe the setting reaction of Alginate.
			98.4	Describe the properties of Alginate.
			98.5	Describe the application of Alginate.
			98.6	Describe the advantages and disadvantages of Alginate.
99.	Synthetic elastomers – Polysulphides	1	99.1	Discuss synthetic elastomers.
			99.2	Describe the composition of Polysulphides.
			99.3	Describe the manipulation of Polysulphides.
			99.4	Describe the setting reaction of Polysulphides.
			99.5	Describe the properties of Polysulphides.
			99.6	Describe the application of Polysulphides.
			99.7	Describe the advantages and disadvantages of Polysulphides.
100.	Synthetic elastomers – Condensation silicones	1	100.1	Describe the composition of Condensation silicones.
			100.2	Describe the manipulation of Condensation silicones.
			100.3	Describe the setting reaction of Condensation silicones.
			100.4	Describe the properties of Condensation silicones.
			100.5	Describe the application of Condensation silicones.
			100.6	Describe the advantages and disadvantages of Condensation silicones

101.	Synthetic elastomers – Addition silicones	1	101.1	Describe the composition of Addition silicones.
			101.2	Describe the manipulation of Addition silicones.
			101.3	Describe the setting reaction of Addition silicones.
			101.4	Describe the properties of Addition silicones.
			101.5	Describe the application of Addition silicones.
			101.6	Describe the advantages and disadvantages of Addition silicones.
102.	Synthetic elastomers – Polyether	1	102.1	Describe the composition of Polyether.
			102.2	Describe the manipulation of Polyether.
			102.3	Describe the setting reaction of Polyether.
			102.4	Describe the properties of Polyether.
			102.5	Describe the application of Polyether.
			102.6	Describe the advantages and disadvantages of Polyether.
103.	Clinical considerations of dental materials regarding cross infection control	1	103.1	Define cross-infection
			103.2	Define disinfection and sterilization
			103.3	Discuss various methods of disinfection and sterilization used in dentistry.
Lab work of Dental Materials				

104.	Manipulation of Impression materials	8	104.1 Manipulations of various impression materials as per practical logbook (8 hours). 104.2 Perform Impression taking with alginate and model pouring with gypsum products (4 hours). 104.3 Perform Manipulation of impression compound (2 hours). 104.4 Demonstrate manipulation of zinc oxide eugenol and silicone impression materials (2 hours).

Junior Prosthodontics LGF				
105.	Dental Impressions and tray selection	1hr	104.1	Define a dental impression and related key terms. (impression material, impression tray)
			104.2	Explain the principles of impression making (accuracy, retention, stability, support and extension)
			104.3	Classify impression trays based on materials, design and clinical use.
			104.4	Identify clinical situations requiring special tray.
			104.5	Explain the significance of choosing an appropriate impression tray in fabrication of CD.
106.	Denture bearing areas	2hrs	105.1	List the major anatomical landmarks of the maxillary and mandibular arches relevant to complete dentures. (STRESS BEARING AREAS, LIMITING AREAS AND RELIEF AREAS).
			105.2	Define stress bearing area, relief area and limiting area.
			105.3	Describe the functional significance of maxillary landmarks (e.g., hamular notch, incisive papilla, vibrating line) in denture extension and retention.
			105.4	Describe the functional significance of mandibular landmarks (e.g., retromolar pad, buccal shelf, lingual flange area) in denture support and stability
107.	Impressions for complete denture	2hrs	107.1	Define initial (primary) and final (secondary) impressions and their purpose in complete denture fabrication.
			107.2	Discuss the clinical steps involved in making an initial impression and the rationale behind each step.
			107.3	Discuss how initial impressions are used to fabricate custom trays.
			107.4	Discuss the clinical steps involved in making a final impression and the rationale behind each step.
			107.5	Explain the importance of final impression