

## **2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the institution are stated and displayed in website of the institution**

### **Web link:**

### **A) Medical Faculty:**

#### **➤ Program outcomes:**

Graduates of the Bachelor of Health Science, on completion of program will demonstrate command of the following learning outcomes. Graduates will be able to:

1. Develop critical skills in their practice and application of knowledge enabling them to make a valuable contribution to patient and health care as individuals and as responsible members of society.
2. Be Competent in diagnosis and management of common health problems of the individual and the community, depending on his/her position as a member of the health team at the primary, secondary or tertiary level.
3. Communicate effectively in writing on a variety of topics related to health care.
4. Demonstrate an awareness and appreciation of the delivery of culturally competent health care.
5. Appreciate the socio-psychological, cultural, economic and environmental factors affecting health.
6. Effectively communicate and acknowledge the impact of the legal, ethical, and political environment on health care policy and delivery.
7. Describe and demonstrate management / leadership skills.
8. Demonstrate knowledge of and effectively apply health care models, theories, and tools to issues impacting health care delivery.

#### **➤ Program specific Outcomes**

##### **❖ Faculty of Medical Sciences**

At the end of **undergraduate course (MBBS)**, the student should:

1. Be competent to practice preventive, promotive, curative and rehabilitative medicine in respect to the commonly encountered health problems.
2. Be able to use his/her clinical skills based on history, physical examination and relevant investigations.
3. Be able to understand rationale for different therapeutic modalities, be familiar with the administration of the "essential drugs" and their common side effects.
4. Develop humane attitude towards the patients in discharging one's professional responsibilities.
5. Be a lifelong learner and pursue research in any chosen area of medicine.
6. Know the basic factors which are essential for the implementation of the National Health Programs like: (i) Family Welfare and Maternal and Child Health (MCH); (ii) Sanitation and water supply; (iii) Prevention and control of communicable and non-communicable diseases; (iv) Immunization; (v) Health Education; (vi) Indian Public Health

- Standards (IPHS) at various level of service delivery; (vii) Bio-medical waste disposal; and (viii) Organizational and or institutional arrangements.
7. Acquire basic management skills in the area of health care delivery, General and hospital management.
  8. Be able to identify community health problems and learn to work to resolve these by, instituting corrective measures.
  9. Be able to work as a leading partner in health care teams and acquire proficiency in communication skills
  10. Have personal characteristics and attitudes required for professional life including personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

In conclusion, A Medical graduate should be a good Clinician, Communicator, Leader of healthcare team, a Lifelong learner and a Professional.

### ❖ **Course outcomes: I MBBS**

At the end of I<sup>st</sup> MBBS course students should be able to:

#### ➤ **Anatomy:**

1. Dissect and identify the organs and know the anatomical relations.
2. Identify normal histology slides.
3. Know development of organs.

#### ➤ **Physiology:**

1. Know physical and chemical factors that are responsible for the origin, development and progression of life.
2. Basic principles of homeostatic control of human body as a whole and Physiological mechanisms underlying disease status.
3. Perform clinical examinations of various human systems like central nervous system, cardiovascular system, respiratory system etc. on healthy subjects and perform various blood investigations like total red blood cell count, total white blood cell count, haemoglobin percentage etc.

#### ➤ **Biochemistry:**

1. Know the structure and functions of various biomolecules present in living cells and their metabolism and diseases process including inborn errors of metabolism.
2. Know the role of enzymes in diagnosis & prognosis of diseases and their therapeutic uses.
3. Know the details regarding nutrition ( Vitamins, minerals etc.) and malnutrition
4. Know the comprehension regarding genes, gene expression and genetic engineering
5. Perform routine and some special investigations and analyze and interpret the biochemical investigation data.
6. Integrate the biochemistry knowledge with other medical subjects for better understanding of health and Diseases

## ❖ II MBBS

At the end of second MBBS course, the student shall be able to : -

### ➤ **Pathology:**

1. Achieve complete understanding of the natural history and clinical manifestations of the disease.
2. Demonstrate ability to choose the appropriate diagnostic tests & interpret these tests based on scientific knowledge, cost effectiveness & clinical context. To describe the structure and ultra structure of a sick cell, the mechanisms of the cell degradation, cell death and repair.
3. Correlate the gross and microscopic alterations of different organ systems and their clinical significance..
4. Understand mechanisms of common haematological disorders and develop a logical approach in their diagnosis and management.
5. Describe the rationale and principles of technical procedures of diagnostic laboratory tests.
6. Interpret diagnostic laboratory tests and correlate with clinical and morphological features of diseases.

### ➤ **Pharmacology:**

1. Describe the pharmacokinetics and pharmacodynamics, indications, contraindications, interactions and adverse reactions of essential and commonly used drugs.
2. Explain the concept of rational drug therapy in clinical pharmacology, the use of appropriate drug/ drugs in a particular disease with consideration of its/ their cost, efficacy and safety for individual needs and for mass therapy under national health programmes.
3. Explain pharmacological basis of prescribing drugs in special medical situations such as pregnancy, lactation, infancy and old age.
4. Prescribe drugs for common ailments and identify adverse drug reactions and their reporting.
5. Interpret the data of experiments designed for the study of effects of drugs and bioassays, which are observed during the study.
6. Critically appraise the promotional drug literature.

### ➤ **Forensic Medicine and Toxicology:**

1. Identify, examine and prepare report or certificate in medico-legal cases/situations in accordance with the law of land.
2. Observe medico-legal postmortem examination and interpret autopsy findings and results of other relevant investigations to logically conclude the cause, manner and time since death.
3. Be conversant with medical ethics, etiquette, duties, rights, medical negligence and legal responsibilities of the physicians towards patients, profession, society, state and humanity at large.
4. Be aware of relevant legal/court procedures applicable to the medico legal/medical practice.
5. Manage medico-legal implications, diagnosis and principles of therapy of common poisons.

6. Be aware of general principles of environmental, occupational and preventive aspects of toxicology.

➤ **Microbiology:**

1. Know the classification of micro organisms as bacteria, virus, fungi, parasites, the pathogenicity of the organisms and the methods of detection or isolation of these organisms from human body.
2. Know the morphology, cultural characteristics of the bacterial agents causing diseases and also the pathogenesis and laboratory diagnosis of various infectious diseases caused by the pathogenic organisms.
3. Know the structure, antigenic pattern, resistance, pathogenicity of viruses and appropriate laboratory tests used to diagnose the viral infections.
4. Know the morphology life cycle, pathogenicity of parasites and the laboratory diagnosis of parasitic infections
5. Know role of Microbiology in the management of infectious diseases and determining the appropriate laboratory tests to be used for diagnosis based on possible etiologies.
6. Know various methods of sterilization and disinfection and biomedical waste management.
7. Know collecting and processing the appropriate clinical samples in various infectious diseases and also its methods of transportation to the laboratory.
8. Know the various mechanism of acquisition of drug resistance by micro organisms and methods of testing the resistance pattern.
9. Have sound knowledge of methods of antibiotic testing and their interpretation, so as to choose the appropriate antibiotics effectively.
10. Collect and send the correct clinical specimens and interpret correctly the results generated by laboratory tests for appropriate clinical management.
11. Perform Gram and Zeihl-Neelson stain.
12. Examine stool sample for parasitic infections.
13. Should be able to maintain the confidentiality of various laboratory reports.
14. Able to take informed consent of the patients/ relatives for various samples to be collected and tested in the laboratory.

❖ **III MBBS Part 1**

At the end of the III MBBS Part 1 course undergraduate student should be able to

❖ **Ophthalmology:**

1. Know everything about cataract [evaluation, surgical management], National programme for control of Blindness, Vision 2020, School Health (Ophthalmic) services – Refractive errors, squint and congenital anomalies.
2. Diagnose ocular emergencies.
3. Diabetes awareness programme.
4. Rehabilitation of the blind (Low vision aids, Eye Banking and Keratoplasty).
5. Early and effective referral for ophthalmic services?

❖ **ENT:**

1. Know common ailments related to ear, nose and throat like otitis media deafness, pharyngitis, tonsillitis, etc. their aetiology, clinical features and treatment.

2. Know about Sleep apnea syndrome and advice further management to the patient.
3. Detect neonatal deafness and role of cochlear implant in attempt to prevent deaf- mutism.
4. Demonstrate the correct technique of examination of the ear including Otoscopy.
5. Demonstrate the correct technique of performance and interpret tuning fork tests.
6. Demonstrate the correct technique of examination of the nose & paranasal sinuses including the use of nasal speculum.
7. Demonstrate the correct technique of examining the throat including the use of a tongue depressor.
8. Demonstrate the correct technique of examination of neck including elicitation of laryngeal crepitus.

❖ **Community Medicine**

1. Become a competent community physician who will be able to organize epidemiological studies for community diagnosis of health problems with risk factors associated & to plan remedial measures & implement.
2. Identify community behaviours associated with common health problems.
3. Implement various national health programmes, and study various occupational hazards & their prevention.
4. Organize health awareness & diagnostic camps in periphery.

❖ **III MBBS part II**

At the end of the III MBBS Part 2 course undergraduate student should be able to

❖ **Medicine**

1. Provide preventive, promotive, curative, palliative and holistic care with compassion.
2. Elicit and record history from the patient for disease identification.
3. Perform a physical examination and able to choose the appropriate diagnostic tests.
4. Prescribe and safely administer appropriate medicines for common disease conditions to the patients.
5. Demonstrate ability to appropriately identify and refer patients who may require specialized or advanced tertiary care.

A list of certifiable skills that the learner has to acquire as Bachelor of Medicine and Bachelor of Surgery (MBBS).

I- Independently performed on patients	O- Observed in patients or on simulations	D- Demonstration on patients or simulations and performance under supervision in patients
<ol style="list-style-type: none"> <li>1. Venipuncture</li> <li>2. Intramuscular injection</li> <li>3. Subcutaneous injection</li> <li>4. IV injection</li> <li>5. Oxygen therapy</li> <li>6. Nebulization therapy</li> </ol>	<ol style="list-style-type: none"> <li>1. Blood transfusion</li> <li>2. Lumbar puncture</li> <li>3. Pleural and ascitic aspiration</li> </ol>	<ol style="list-style-type: none"> <li>1. Intradermal injection</li> <li>2. Urinary catheterization</li> <li>3. Basic life support</li> <li>4. Ryle's tube insertion</li> <li>5. Cardiac resuscitation</li> <li>6. Bedside urine analysis</li> </ol>

❖ **Pediatrics:**

1. Acquire adequate knowledge and appropriate skills for optimal dealing with major health problems of children, to ensure their optimal growth and development.
2. Be a competent paediatrician who recognizes the health needs of infants, children and adolescents and carries out professional obligation in keeping with principles of national health policy and professional ethics.

❖ **Dermatology:**

1. Describe the etiology, pathogenesis and diagnostic features of common skin conditions like pediculosis, dermatophytes, viral infections of the skin, fixed drug eruptions and Steven Johnson syndrome
2. Describe the pharmacology and action of antifungal (systemic and topical) agents. Enumerate side effects of antifungal therapy
3. Classify, describe the epidemiology, etiology, microbiology, pathogenesis and clinical presentations and diagnostic features of Leprosy, HIV, nonsyphilitic sexually transmitted diseases (chancroid, donovanosis and LGV)
4. Identify spirochete in a dark ground microscopy and staphylococcus on gram stain

❖ **Psychiatry:**

1. Comprehend nature and development of different aspects of normal human behavior like learning, memory, motivation, personality and intelligence;
2. Recognize differences between normal and abnormal behavior;
3. Classify psychiatric disorders and recognize clinical manifestations of the common syndromes and plan their appropriate management.
4. Describe rational use of different modes of treatment in psychiatric disorders.
5. Define, elicit and interpret psycho-pathological symptoms and signs;
6. Identify and manage psychological reactions and psychiatric disorders in medical and surgical patients in clinical practice and in community setting.

❖ **Surgery:**

1. Know the etiology, clinical features and principles of management of common surgical conditions like ulcer, various types of swellings, hernia, burns, varicose veins, anal fissures and hemorrhoids, wound healing
2. Know the etiology, clinical features and principles of management of acute abdomen in all age groups
3. Demonstrate the correct technique to palpate the breast for breast swelling in a mannequin or equivalent
4. Demonstrate the correct technique to examine the patient of hernia
5. Perform basic surgical Skills such as First aid including suturing and minor surgical procedures in simulated environment
6. Demonstrate Airway maintenance. Recognize and manage tension pneumothorax, hemothorax and flail chest in simulated environment.
7. Communicate and counsel patients and families about the treatment and prognosis of shock demonstrating empathy and care

❖ **Obstetrics and Gynaecology:**

1. Have knowledge of Anatomy, Physiology & Pathology of female reproductive system
2. Have knowledge of conducting normal delivery and resuscitating the newborn.
3. Assist in IUCD insertion and removal.
4. Have knowledge of genital malignancy and referring them to higher centre.

### ❖ **Orthopedics:**

1. Recognize bone injuries and dislocations, and method to detect and manage common infection of bone and joints.
2. Identify congenital skeletal anomalies, metabolic bone diseases and neoplasm.
3. Offer primary treatment for common fractures, soft tissue injuries involving splinting, plaster and immobilization.
4. Offer primary treatment of bone and joint infections and advisory aspect of rehabilitation.

### ❖ **Program outcomes: PG Degree(MD/MS)**

At the end of post-graduation the students should be able to:

#### ❖ **M.D. Anatomy:**

1. Develop Histology Laboratory
2. Preserve the cadavers.
3. Prepare Museum Models.
4. Take Lectures for Under Graduate students.

#### ❖ **M.D. Physiology:**

1. Be a competent Physiologist and have thorough knowledge of the body with respect to all the systems of the body including historical aspect, Evolution and development, Comparative physiology, body regulating mechanisms, applied physiology and recent advances
2. Teach undergraduate medical (and Paramedical) students, the basic physiological processes occurring in the human body, and its clinical implications, patho physiology and the physiological basis of management.
3. Conduct research and publish the articles in indexed journals.
4. Acquire skills in conducting and demonstrating the clinical practicals, human experiments, hematology practicals and experiments based on biophysical principles.
5. Encourage the student to participate in various workshops / seminars /journal clubs / demonstration and collaborative research.
6. Develop communication skills to interact with students, colleagues, superiors and other staff members.
7. Have right attitude toward teaching profession.

#### ❖ **M.D. Biochemistry:**

1. Know the structure and functions of various biomolecules.
2. Handle various instruments - autoanalyzers, blood gas analyzers, spectrophotometer etc.
3. Know details regarding molecular biology, biotechnology and recent advances in clinical biochemistry.
4. Perform and interpret liver, kidney, thyroid and adrenal function tests.
5. Perform and interpret hormone assays and tumor markers.
6. Have knowledge regarding internal & external quality control and accreditation procedures.
7. Handle the clinical laboratory efficiently with proper counseling of patients.

#### ❖ **M.D. Pathology:**

1. Achieve competencies pertaining to Pathology and be aware of contemporary advances and developments in the discipline of Laboratory Medicine.
2. Acquire the basic skills in teaching of the medical and paramedical professionals.
3. Describe the factors in causation of disease.
4. Describe processes involved in the gross and microscopic changes of organs and tissues and explain the reasons or causes for the same.
5. Explain the basis of evolution of clinical signs and symptoms.
6. Perform procedures designated for laboratory detection of diseases and to process and interpret the representative materials obtained from the patients in order to arrive at a correct diagnosis.
7. Recognize and report morphological changes in cells, tissues and organs.
8. Perform clinical autopsy and present CPC (Clinico Pathological Correlation)

❖ **M.D. Pharmacology:**

1. Take up challenges in medical education, pharmaceutical industry, new drug development and basic research.
2. Conduct teaching for undergraduates, both lectures and practicals.
3. Demonstrate and conduct animal experiments permitted by animal ethical committee.
4. Prepare a format for clinical trial of the drug.

❖ **M.D. Microbiology:**

1. Identify the microorganism isolated from patient's sample by using various media and biochemical tests.
2. Interpret the Antibiotic Susceptibility report.
3. Report the smears using Gram stain, Zeihl-Neelson stain and other stains used for identification of organisms.
4. Identify the fungi grown in the laboratory from patient's sample.
5. Perform various serological tests including ELISA used for the diagnosis of infections.

❖ **M.D. Community Medicine:**

1. Know the structure and functioning of the health system at the National and International levels and its historical perspectives
2. Plan and conduct an educational session/programme. He/ She will be able to draw up lesson plan with details of educational objectives.
3. Know the principles of nutrition, maternal health, and family welfare and put the same into practice.
4. Apply the principles of Epidemiology and Biostatistics to health practice including the design and implementation of health related research studies and clinical preventive medicine trails.
5. Know the principles of Communicable and Non-communicable diseases control and assist in the implementation of National Health programmes at a peripheral level.
6. Identify the socio-cultural dimension in Health and disease and apply this knowledge in the design and implementation of an integrated Health and development program.

❖ **M.D. General Medicine:**

1. Have prerequisite knowledge, skill and communication skill to diagnose and treat diseases.



2. Elicit and record history (OPD/IPD/Consent/Death certificate), do meticulous physical examination, choose the appropriate diagnostic tests and interpret tests based on scientific validity, cost effectiveness and clinical context.
3. Perform procedural skills (independently): central venous catheterisation, lumbar puncture, bone marrow aspiration, endotracheal intubation, pleural tapping, ascetic, artificial ventilation, BLS/ACLS etc.)
4. Prescribe and safely administer appropriate therapies, pharmacotherapy and interventions based on the principles of rational drug therapy and scientific validity.
5. Have knowledge of national and regional health programmes and policies (RNTCP, malaria, AIDS etc).
6. Have knowledge and skills to manage communicable and non communicable disease (Critical illness, infectious, CVS, RS, abdominal, CNS, toxin etc.)
7. Participate in research activity, CME, Workshops, conferences etc.
8. Have significant knowledge of principles of Bioethics and Medicolegal aspects and its importance.
9. Have knowledge and able to prescribe Post exposure prophylaxis for various diseases (HIV, HbsAg, Rabies etc.)

❖ **M.D. Pediatrics:**

1. Possess detailed knowledge of bodily functions and disease processes.
2. Perform thorough history taking, complete physical examination and ability to arrive at probable diagnosis.
3. Quickly perform triage on arrival of patient – address patients on priority basis, identify critically ill patients, refer patients to higher centre if required.
4. Initiate emergency treatment and stabilize patient followed by definitive treatment.
5. Perform of emergency and planned procedures – i.e. cannula insertion, intubation, intercostal drainage, central line insertions, biopsy, etc.
6. Perform neonatal and paediatric resuscitation. In neonatology, they must know about care of preterm, breast feeding awareness and counselling.
7. Manage pediatric emergencies–status epilepticus, status asthmaticus, cardiac failure, shock, intoxications ,poisonings etc.
8. Diagnose malnutrition, plot Growth charts, and treat with dietary management and counselling
9. Follow protocols for rational use of antibiotics and other drugs
10. To be accustomed to good communication with patient and relatives especially in situations like explaining bad prognosis, declaring death etc.

❖ **M.S. General Surgery:**

1. Know etiology, clinical features and principles of management of common surgical conditions like ulcer, various types of swellings, hernia, burns, varicose veins, anal fissures and hemorrhoids, wound healing
2. Know etiology, clinical features and principles of management of acute abdomen in all age groups
3. Diagnose premalignant and malignant conditions and their staging
4. Perform surgical Skills such as First aid including suturing and minor surgical procedures in patients
5. Perform planned operative procedures like appendicectomy, hernia repair
6. Perform excision of lipoma, cysts etc
7. Assist various complicated procedures like breast, thyroid surgeries and transplant.

8. Perform limb amputation in patients
9. Communicate and counsel patients and families on the outcome and rehabilitation demonstrating empathy and care.

❖ **M.D. Radiology:**

1. Become proficient diagnostic Radiology, well versed with branches of imaging modalities, conventional, X-rays, CT, USG, MRI, Image guided procedure in ultrasound and CT
2. Imbibe practice of research of publications while pursuing the dissertation and extra research projects.
3. Use IT tools for preparing seminars, case presentations.

❖ **M.S Obstetrics and Gynaecology:**

1. Provide quality maternal care in the diagnosis and management of Antenatal, Intra-natal & Post natal period of normal and abnormal pregnancy.
2. Provide effective & adequate care to the obstetrical and early neonatal emergencies.
3. Provide counselling & knowledge regarding family planning methods & perform medical termination of pregnancy. Organize & implement maternal components in the “National Health Programs”.
4. Develop adequate surgical skills to manage common Obstetrical & Gynaecological problems.
5. Manage normal & abnormal pregnancy during Antenatal, Intra-natal & Post-natal period, gynaecological Endocrinological & Infertility knowledge.
6. Have knowledge of benign & malignant Gynaecological disorders, operative procedures including Endoscopy (Diagnostic & therapeutic) & its related complications.
7. Have knowledge of interpretation of various laboratory investigations & other diagnostic modalities in Obstetrics & Gynaecology.
8. Have knowledge of essentials of Pediatric & Adolescent Gynaecology, reproductive & child Health, family welfare & reproductive tract infections.
9. Have knowledge of STD & AIDS & Government of India perspective on women’s health related issues. Demonstrate skills in documentation of case details and of morbidity & mortality data relevant to the assigned situation.
10. Have knowledge of medico legal aspects in Obstetrics & Gynaecology.
11. Be familiar with research methodologies & use of newer information technologies.
12. Be up to date with advances in the field of Obstetrics & Gynaecology.
13. Facilitate learning of medical / nursing students, paramedical health workers as a teacher trainer.
14. Demonstrate empathy & humane approach towards patients and their families.
15. Function as a productive member of a team engaged in health care, research & education.

❖ **M.D. Anesthesia:**

1. Effectively and independently conduct a comprehensive perioperative assessment of a patient and formulate a comprehensive perioperative management plan and implement it.
2. Effectively prepare the operating room for any type of surgical procedure.
3. Efficiently perform regional anesthesia, place nerve blocks and invasive hemodynamic monitors.

4. Interpret and explain laboratory data and diagnostic tests relevant to the perioperative management of patients.
5. Recognize in a timely manner abnormal patterns of vital signs and life-threatening situations during the care of a patient.
6. Discuss pathophysiologic mechanisms of patients undergoing perioperative care.
7. Describe current evidence based guidelines in the management and assessment of perioperative patients.
8. Discuss the indications and management of patients requiring vasoactive drugs
9. Discuss the evidence base guidelines for transfusion medicine.
10. Describe the medications and mechanism of action of the most common drugs utilized in the perioperative management of patients.
11. Identify by accessing electronic databases and interpret medical literature as it applies to patient care in the perioperative setting.
12. Effectively communicate with the members of the operating room team and different healthcare services.

❖ **M.S. Orthopaedics:**

1. Basic sciences of locomotor system involving embryology, development, histology of bone, cartilage, muscle and nerve
2. Know anatomy, physiology, pathology of bones, cartilage, muscles, collagen, nerves with congenital affection, infections, tumour, metabolic affections , etc
3. Understand and offer treatment of metabolic bone diseases, bone infections, congenital anomalies, diseases of joint, tumour, amputations, etc
4. Have knowledge of healing of wound healing, fractures, dislocation, innervations, and management of the same
5. Offer advice, and after management of advanced treatment in spine diseases, arthroscopy and Arthroplasty, microsurgery, orthotics and protection

❖ **M.S. ENT:**

1. Know aetiology, clinical features, diagnosis and management of common diseases of ENT.
2. Know benign and malignant conditions in ENT and their complications.
3. Know Clinical features, diagnosis and management of facial nerve palsy vertigo Meinere's disease, CSOM, otosclerosis etc.
4. Know Sialoendoscopy and Navigational endoscopic surgery in ENT as a part of recent advances in ENT and competency based curriculum.
5. Demonstrate the correct technique to perform and interpret pure tone audiogram & impedance audiogram.
6. Identify, resuscitate and manage ENT emergencies (including tracheostomy, anterior nasal packing, removal of foreign bodies in ear, nose, throat and upper respiratory tract).
7. Secure airway and perform cardio-pulmonary resuscitation (CPR) in emergency situation.
8. Perform ear syringing for retrieval of foreign body from ear.
9. Provide first aid in emergency cases of active Epistaxis by way of both anterior and posterior nasal packing.
10. Perform common ENT operations like tonsillectomy, DNS etc.
11. Assist in major surgeries like thyroidectomy removal of malignancies and others.
12. Inculcate care and skill while handling delicate equipments.

❖ **M.S. Ophthalmology:**

1. Diagnose and manage all ophthalmic diseases.
2. Perform cataract, glaucoma, squint and other minor ocular surgeries independently, manage ocular emergencies.
3. Know to refer critical cases to respective super specialties.
4. Be well versed in using basic and recent investigative and management instruments (e.g.:- Slitlamp, Tonometry, Perimetry, OCT and Lasers).

❖ **M.D. Dermatology:**

1. Describe the etiology, pathogenesis and diagnostic features of common skin conditions like pediculosis, dermatophytes, viral infections of the skin, fixed drug eruptions and Steven Johnson syndrome.
2. Identify and distinguish the dermatologic manifestations of HIV its complications, opportunistic infections and adverse reactions.
3. Enumerate the indications and describe the pharmacology, administration and adverse reaction of pharmacotherapies for dermatologic lesions in HIV.
4. Identify and distinguish fixed drug eruptions and Steven Johnson syndrome from other skin lesions.
5. Identify and classify syphilis based on the presentation and clinical manifestations and enumerate the indications and describe the pharmacology, administration and adverse reaction of pharmacotherapies for syphilis.
6. Describe the etiology, diagnostic and clinical features of nonsyphilitic sexually transmitted diseases (chancroid, donovanosis and LGV) and Identify and differentiate based on the clinical features non- syphilitic sexually transmitted diseases (chancroid, donovanosis and LGV).
7. Enumerate the indications, describe the pharmacology, indications and adverse reactions of drugs used in the non-syphilitic sexually transmitted diseases (chancroid, donovanosis and LGV)
8. Identify and distinguish the dermatologic manifestations of HIV its complications, opportunistic infections and adverse reactions
9. Enumerate the indications and describe the pharmacology, indications and adverse reactions of drugs used in pyoderma.

❖ **P.G. Diploma Program Outcomes**

At the end of P.G. Diploma the students should be able to:

❖ **Diploma in child health (DCH):**

1. Possess detailed knowledge of bodily functions and disease processes.
2. Perform thorough history taking, complete physical examination and ability to arrive at probable diagnosis.
3. Quickly perform triage on arrival of patient – address patients on priority basis, identify critically ill patients, refer patients to higher centre if required.
4. Initiate emergency treatment and stabilize patient followed by definitive treatment.
5. Perform of emergency and planned procedures – i.e. cannula insertion, intubation, intercostal drainage, central line insertions, biopsy, etc.
6. Perform neonatal and paediatric resuscitation. In neonatology, they must know about care of preterm, breast feeding awareness and counselling.
7. Manage pediatric emergencies–status epilepticus, status asthmaticus, cardiac failure, shock, intoxications, poisonings etc.
8. Diagnose malnutrition, plot Growth charts, and treat with dietary management and counselling

9. Follow protocols for rational use of antibiotics and other drugs
10. To be accustomed to good communication with patient and relatives especially in situations like explaining bad prognosis, declaring death etc.

❖ **Diploma in Obs./Gyn. (DGO):**

1. Provide quality maternal care in the diagnosis and management of Antenatal, Intra-natal & Post natal period of normal and abnormal pregnancy.
2. Provide effective & adequate care to the obstetrical and early neonatal emergencies.
3. Provide counselling & knowledge regarding family planning methods & perform medical termination of pregnancy. Organize & implement maternal components in the “National Health Programs”.
4. Develop adequate surgical skills to manage common Obstetrical & Gynaecological problems.
5. Manage normal & abnormal pregnancy during Antenatal, Intra-natal & Post-natal period, gynaecological Endocrinological & Infertility knowledge.
6. Have knowledge of benign & malignant Gynaecological disorders, operative procedures including Endoscopy (Diagnostic & therapeutic) & its related complications.
7. Have knowledge of interpretation of various laboratory investigations & other diagnostic modalities in Obstetrics & Gynaecology.
8. Have knowledge of essentials of Pediatric & Adolescent Gynaecology, reproductive & child Health, family welfare & reproductive tract infections.
9. Have knowledge of STD & AIDS & Government of India perspective on women’s health related issues. Demonstrate skills in documentation of case details and of morbidity & mortality data relevant to the assigned situation.
10. Have knowledge of medico legal aspects in Obstetrics & Gynaecology.
11. Be familiar with research methodologies & use of newer information technologies.
12. Be up to date with advances in the field of Obstetrics & Gynaecology.
13. Facilitate learning of medical / nursing students, paramedical health workers as a teacher trainer.
14. Demonstrate empathy & humane approach towards patients and their families.
15. Function as a productive member of a team engaged in health care, research & education.

❖ **Diploma in radio Diagnosis (DMRD):**

1. Become proficient diagnostic Radiology, well versed with branches of imaging modalities, conventional, X-rays, CT, USG, MRI, Image guided procedure in ultrasound and CT.
2. Imbibe practice of research of publications while pursuing the dissertation and extra research projects.
3. Use IT tools for preparing seminars, case presentations.

❖ **Diploma in orthopedics (D. Orth):**

1. Basic sciences of locomotor system involving embryology, development, histology of bone, cartilage, muscle and nerve.
2. Know anatomy, physiology, pathology of bones, cartilage, muscles, collagen, nerves with congenital affection, infections, tumour, metabolic affections, etc.
3. Understand and offer treatment of metabolic bone diseases, bone infections, congenital anomalies, diseases of joint, tumour, amputations, etc.
4. Have knowledge of healing of wound healing, fractures, dislocation, innervations, and management of the same.

5. Offer advice, and after management of advanced treatment in spine diseases, arthroscopy and Arthroplasty, microsurgery, orthotics and protection.

❖ **Diploma in Anesthesiology (DA):**

1. Effectively and independently conduct a comprehensive perioperative assessment of a patient and formulate a comprehensive perioperative management plan and implement it.
2. Effectively prepare the operating room for any type of surgical procedure.
3. Efficiently perform regional anesthesia, place nerve blocks and invasive hemodynamic monitors.
4. Interpret and explain laboratory data and diagnostic tests relevant to the perioperative management of patients.
5. Recognize in a timely manner abnormal patterns of vital signs and life-threatening situations during the care of a patient.
6. Discuss pathophysiologic mechanisms of patients undergoing perioperative care.
7. Describe current evidence based guidelines in the management and assessment of perioperative patients.
8. Discuss the indications and management of patients requiring vasoactive drugs.
9. Discuss the evidence base guidelines for transfusion medicine.
10. Describe the medications and mechanism of action of the most common drugs utilized in the perioperative management of patients.
11. Identify by accessing electronic databases and interpret medical literature as it applies to patient care in the perioperative setting.
12. Effectively communicate with the members of the operating room team and different healthcare services.

**M.Sc. Programs**

➤ **M.Sc. Medical Anatomy:**

Develop Histology Laboratory

2. Preserve the cadavers.
3. Prepare Museum Models.
4. Take Lectures for Under Graduate students.

❖ **M.Sc. Medical Physiology**

After passing M.Sc. Physiology course the student should be able to: -

1. Teach undergraduate medical (and Paramedical) students, physiology of the human body, and its clinical implications.
2. Perform and demonstrate clinical, human and hematology practicals, experiments based on biophysical principles.
3. Develop communication skills and work as a member of a team and they should have right attitude toward teaching profession.

❖ **M.Sc. Medical Microbiology**

1. Identify the microorganism isolated from patient's sample by using various media and biochemical tests.
2. Interpret the Antibiotic Susceptibility report.
3. Report the smears using Gram stain, Zeihl-Neelson stain and other stains used for identification of organisms.

❖ **M.Sc. Medical Pharmacology**

1. Take up challenges in medical education, pharmaceutical industry, new drug development and basic research.
2. Conduct teaching for undergraduates, both lectures and practicals.
3. Demonstrate and conduct animal experiments permitted by animal ethical committee.
4. Prepare a format for clinical trial of the drug.

### ➤ **PhD Faculty of Medicine**

At the end of PhD programme student should have:

1. The knowledge and needs within his own field of research nationally and internationally.
2. The diversity of research approaches and research methods relevant to medical and health research.
3. Standards for quality research within his own field and within medical and health research in general.
4. Strengths and weaknesses of his own research methods and methodological challenges within his own field.
5. Ethical dilemmas and principles within medical research including the Health Research Act and other relevant legislation.
6. Principles of interdisciplinary research.

### **B) Dental Faculty:**

<b>Programme Outcome of Bacheloar of Dental Surgery (BDS)</b>	
<b>Programme Outcome</b>	<b>After successful completion of degree program in BDS, the graduate should able to</b>
<b>PO-1</b>	Describe normal and abnormal human structure, development, function and behaviour that is relevant to the practice of Dentistry.
<b>PO-2</b>	Apply basic knowledge of biomedical, technical and clinical sciences for the effective practice of Dentistry.
<b>PO-3</b>	Elicit detailed Dental and relevant Medical history, perform an oral and general physical examination and choose relevant laboratory diagnostic tests for identification of oral disorders, prevention of oral disease and promotion of oral health.
<b>PO-4</b>	Demonstrate the ability to interpret available clinical and laboratory data and effective clinical problem solving, in order to generate differential diagnoses and to manage oral health disorders.
<b>PO-5</b>	Perform and interpret a basic oral radiological examination safely.
<b>PO-6</b>	Plan and administer, safely, appropriate treatments, including surgical procedures, for common oral disorders in adults as well as children.
<b>PO-7</b>	Identify and manage common medical emergencies encountered in general dental practice.
<b>PO-8</b>	Identify and refer patients who may require specialist care.
<b>PO-9</b>	Demonstrate knowledge of global and national needs, policies and regulatory frameworks relevant to oral health.
<b>PO-10</b>	Function effectively as an oral health care team member in health care settings.

<b>PO-11</b>	Communicate effectively and sensitively with patients, care-givers, colleagues and the public in a manner that will improve health care outcomes and patient / client satisfaction.
<b>PO-12</b>	Demonstrate the ability to continue refining existing knowledge / skills and acquire new knowledge/skills.
<b>PO-13</b>	Select and pursue an appropriate career pathway that is professionally rewarding and personally fulfilling.
<b>PO-14</b>	Recognize and manage medico-legal, ethical and professional issues in dental practice.
<b>PO-15</b>	Demonstrate and practice integrity, responsibility, respect and Selflessness.



**Programme Specific Outcome Bachelor of Dental Surgery (BDS)**

<b>Programme Specific Outcome</b>	<b>After successful completion of degree program in BDS, the graduate should able</b>
<b>PSO-1</b>	To recognize and apply cross infection control guidelines in dental practice.
<b>PSO-2</b>	To Know the basic principles of cone beam CT scan.
<b>PSO-3</b>	To prepare and restore teeth using amalgam and tooth colored restorations.
<b>PSO-4</b>	To successfully extirpate the pulp and perform root canal treatment of single rooted teeth.
<b>PSO-5</b>	To treat patients indicated for simple removable partial dentures and complete dentures.
<b>PSO-6</b>	To prepare teeth for single metal ceramic crowns and 3 unit metal-ceramic bridge.
<b>PSO-7</b>	To describe clinical indications for veneers, metal free ceramics.
<b>PSO-8</b>	To successfully diagnose patients with periodontal diseases and successfully apply phase I therapy.
<b>PSO-9</b>	To identify the need for orthodontic treatment in dental patients and develop a limited skill in orthodontic appliance treatment.
<b>PSO-10</b>	To provide routine dental care for cooperative healthy children.
<b>PSO-11</b>	To successfully give local anesthesia in the oral cavity.
<b>PSO-12</b>	To successfully perform non-surgical extractions and intra-oral incisional biopsies.
<b>PSO-13</b>	To successfully deal with medical emergencies in the dental office.
<b>PSO-14</b>	To select the best treatment option based on medical, dental, social consideration of the patient as well as the available resources.
<b>PSO-15</b>	To recognize advanced cases that need specialist care and refer to the appropriate specialist.
<b>PSO-16</b>	The undergraduate student acquires adequate knowledge, understanding and skill to perform exodontias (extraction of teeth), alveoloplasty and suturing.
<b>PSO-17</b>	The undergraduate should understand the general surgical principles like pre and post surgical management, particularly evaluation, post surgical care, and post surgical pain management.
<b>PSO-18</b>	To show increased participation in voluntary community dental activities.
<b>PSO-19</b>	To recognize the basic steps of the research process.
<b>PSO-20</b>	To volunteer in current research projects pertinent to the faculty.

Course Outcome Bachelor of Dental Surgery

**IBDS**

Course	Course Code	At the end of the course, students will be able to
<b>Gen. Human Anatomy including Embryology &amp; Histology</b>	CO-1	Describe the normal disposition, functional and cross-sectional anatomy of various structures in the head and neck.
	CO-2	Explain the microscopic structure of various tissues and organs related to head and neck.
	CO-3	Describe the principles and sequential development of the organs and systems related to head and neck.
	CO-4	Describe the appearance of normal ski grams of head and neck region.
	CO-5	Identify the various structures of the head and neck region.
	CO-6	Identify the basic tissues of the body and organs related to head and neck under the microscope.
	CO-7	Identify the features of normal ski grams of head and neck region.
	CO-8	Demonstrate the topography of various structures of head and neck on the surface of the body.
	CO-9	Identify the embryology models
<b>Human Physiology</b>		At the end of the course, students should be able to
	CO-1	Explain the normal functioning of organ systems.
	CO-2	Describe the inter-relationships and interactions among various organs and systems for maintaining Homeostasis.
	CO-3	Assess the relative contribution of each organ systems towards the maintenance of constant internal environment
	CO-4	Differentiate between normal and abnormal functioning of organs and systems.
	CO-5	Explain the physiological basis of pathogenesis and treatment of diseases and disorders.
	CO-6	Apply the physiological basis in the practice of dentistry.
	CO-7	Perform experiments designed for the better understanding of Physiological phenomenon.
	CO-8	Interpret experimental and investigative data.
	CO-9	Distinguish between normal and abnormal data derived during the practicals or observed at the laboratory
	CO-10	Apply ethical behavior to professional practice.
	CO-11	Apply effective communication skills while interacting with patients.
<b>Biochemistry</b>		At the end of the course, students should be able to
	CO-1	Enlist and describe the cell organelles with their molecular and functional organization
	CO-2	Delineate structure, function and interrelationships of various biomolecules and consequences of deviation from the normal
	CO-3	Understand basic enzymology and emphasize on its clinical applications where in regulation of enzymatic activity is disturbed

Course Outcome Bachelor of Dental Surgery		
	CO-4	Describe digestion and assimilation of nutrients and consequence of malnutrition
	CO-5	Describe and integrate metabolic pathways of various biomolecules with their regulatory mechanisms
	CO-6	Explain the biochemical basis of inherited disorders with their associated sequelae
	CO-7	Describe mechanisms involved in maintenance of water, electrolyte and acid base balance and consequences of their imbalances
	CO-8	Outline the molecular mechanisms of gene expression and regulation, basic principles of biotechnology and their applications in medicine
	CO-9	Understand the basic immunology involving molecular concepts of body defence mechanisms and their applications in medicine
	CO-10	Continue to learn advancements in biochemistry and apply the same in medical practice
	CO-11	Understand different types of Bio –medical waste, their potential risks and their management
<b>Dental Anatomy, Embryology and Oral Histology</b>		At the end of the course, students should be able to
	CO-1	Recognize normal development, morphology, structure and functions of oral tissues and variations in different pathological/ non-pathological states and understand the histological basis of various dental treatment procedures and physiologic ageing process in the dental tissues.
	CO-2	Define, describe and classify morphologic features of oro-facial structures.
	CO-3	Describe the histogenesis of oro-facial structures.
	CO-4	Categorize the orofacial structures.
	CO-5	Diagnose the slides based on the microscopic structures
	CO-6	Identify and distinguish normal from abnormal structures
	CO-7	Categorize ground section, HE stained slides and slides stained with special stains.
	CO-8	Student is able to handle the tissue specimen properly
<b>II BDS</b>		
<b>Pre- Clinical Prosthodontics, Crown &amp; Bridge</b>		At the end of the course, students should be able to
	CO-1	Understand the properties and use of various materials used in fabricating complete and removable partial dentures.
	CO-2	To carry out various clinical and laboratory procedures to fabricate complete dentures and removable partial dentures.
	CO-3	Prepare special trays - Self cured acrylic (Maxillary / mandibular)
	CO-4	Prepare Shellac Special trays (Maxillary/Mandibular)
	CO-5	Prepare temporary, Shellac and permanent denture bases
	CO-6	Prepare occlusion rims

Course Outcome Bachelor of Dental Surgery		
	CO-7	Orient occlusion rims on articulator
	CO-8	Arrange teeth for - Class I, Class II & Class III occlusion
	CO-9	Pack and Dewax the dentures
	CO-10	Deflask the dentures
	CO-11	Polishing of dentures
	CO-12	Do surveying of partially edentulous models and preparing modified master cast, designing with color pencils
<b>Pre Clinical Conservative Dentistry</b>		At the end of the course, students should be able to
	CO-1	Identify and study of hand cutting instruments chisels, gingival margin trimmers, excavators and hatchet..
	CO-2	Identify and use of rotary cutting instruments in contra angle hand pieces burs (Micromotor)
	CO-3	Understand the importance of Pulp- Dentin Complex in Restorative Dentistry.
	CO-4	Make Cavity outlines on Plaster Models.
	CO-5	Prepare class I and extended class I and class II and MOD's and class V in plaster models.
	CO-6	Prepare and restore all categories of teeth on the Plaster Models.
	CO-7	Prepare and restore all categories of cavity on extracted Teeth.
	CO-8	Prepare and restore all categories of cavity on Ivorine Teeth.
	CO-9	Dispense and manipulate materials for restorative work.
	CO-10	Plan and execute various indirect restorations.
<b>General Pathology</b>		At the end of the course, students should be able to
	CO-1	Describe the normal homeostatic mechanisms and the pathological process in their derangement and the effects on human systems.
	CO-2	Discuss the concepts of cell injury and pathological and immunological responses produced thereby in different tissues and organs and the body's capacity for healing.
	CO-3	Demonstrate basic Knowledge and understanding of the immune system in health and disease.
	CO-4	Explain the etiology, pathogenesis, pathological effects and clinic pathological correlation of common infectious and non-infectious diseases.
	CO-5	Describe the concept of hemodynamic disorders, thromboembolic disease and shock and their clinical application.
	CO-6	Describe the concept of neoplasia with reference to the etiology, morphological features, diagnosis and prognosis in different tissues and organs of the body.
	CO-7	Discuss the epidemiology, gross and microscopic features, clinical presentation and diagnostic techniques associated with different diseases in different organ systems to the extent needed for the understanding of disease processes and their clinical significance.
	CO-8	Recognise and interpret the common hematological disorders and the

Course Outcome Bachelor of Dental Surgery		
		investigations, blood banking as well as cytological procedures.
	CO-9	Perform and interpret the basic bed-side clinical pathology procedures on blood and urine samples.
<b>General Microbiology</b>		At the end of course, students should be able to
	CO-1	Understand the basics of various branches of microbiology and able to apply the knowledge relevantly.
	CO-2	Understand and practice various methods of Sterilisation and disinfection in dental clinics.
	CO-3	Have a sound understanding of various infectious diseases and lesions in the oral cavity.
	CO-4	Select, collect and transport clinical specimens to the laboratory.
	CO-5	Carry out proper aseptic procedures in the dental clinic.
<b>General &amp; Dental Pharmacology</b>		At the end of the course, students should be able to understand
	CO-1	The pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular.
	CO-2	The indications, contraindications; interactions, and adverse reactions of commonly used drugs with reason
	CO-3	The use of appropriate drugs in disease with consideration to its cost, efficacy, safety for individual and mass therapy needs.
	CO-4	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.
	CO-5	The rational drug therapy in clinical pharmacology.
	CO-6	Indications the principles underlying the concepts of "Essential drugs.
	CO-7	How to prescribe drugs for common dental and medical ailments.
	CO-8	Adverse reactions and drug interactions of commonly used drugs.
	CO-9	The experiments designed for study of effects of drugs.
	CO-10	The application of his knowledge to contemporary practices in Pharmacology as applied to the practice of dentistry.
	CO-11	Critically evaluate drug formulations and be able to interpret the clinical pharmacology of marketed preparations commonly used in dentistry.
	CO-12	Follow prescribing rationale as advised by regulatory bodies from time to time
<b>Dental Materials</b>		At the end of the course,
	CO-1	The student has knowledge about the use and properties of all dental materials.
	CO-2	The student has knowledge about the biocompatibility of dental materials and their clinical applications.
	CO-3	The student shall choose, manipulate and use appropriate dental materials in a given clinical scenario and laboratory procedures.
	CO-4	The student is now able to use dental material without causing injury to

Course Outcome Bachelor of Dental Surgery		
		the patient and use the material without wastage.
	CO-5	The student is now able to adopt ethical principles in all dental practice.
	CO-6	The student is now willing to adopt new methods and techniques in prosthodontics from time to time based on scientific research which is in the patient's best interest.
<b>III BDS</b>		
<b>General Medicine</b>		
		At the end of the course, students should
	CO-1	Has basic knowledge about signs and symptoms of various diseases.
	CO-2	Has basic Knowledge about recording a general case history of medical cases.
	CO-3	Has basic Knowledge about general investigations like blood pressure recording, inspection, palpation of medical cases.
	CO-4	Has basic knowledge about the dental management of medically compromised cases.
	CO-5	Be able to record a detail case history of medical cases.
	CO-6	Be able to identify oral manifestation of medically compromised cases.
	CO-7	Be able to record blood pressure and other basic investigation required.
	CO-8	Be able to Identify sign and symptoms of various diseases.
	CO-9	Be willing to apply current knowledge of General medicine in the best interest of patients and community.
	CO-10	Maintain a high standard of professional ethics and conduct and apply these in all aspects of professional life.
<b>General Surgery</b>		
		At the end of the course,
	CO-1	Student now has knowledge of general surgical principles pertaining to acute & chronic infections.
	CO-2	Student now has knowledge of general surgical principles pertaining to inflammation.
	CO-3	Student now has knowledge of general surgical principles pertaining to wound healing.
	CO-4	Student now has knowledge of general surgical principles pertaining to blood, blood transfusion and management of blood loss.
	CO-5	Student now has knowledge of general surgical principles pertaining to cysts & benign & malignant tumors.
	CO-6	Student now has knowledge of general surgical principles pertaining to trauma.
	CO-7	Student now has knowledge of general surgical principles pertaining to developmental anomalies
	CO-8	Student now has knowledge of general surgical principles pertaining to nerve injuries and management.
	CO-9	Student is able to demonstrate and apply principles of suturing.

Course Outcome Bachelor of Dental Surgery		
	CO-10	The student is now able to diagnose & do basic management of Patient with surgical problem.
	CO-11	The student is now able to develop good rapport with patient & Relatives.
<b>Oral Pathology &amp; Microbiology</b>		At the end of the course, students should be able to
	CO-1	Describe and identify various orofacial pathologies.
	CO-2	Know about etiopathogenesis of various oral pathologies.
	CO-3	Enumerate and describe different detection and diagnostic methods and treatment options for oral pathologies.
	CO-4	Define, classify and describe various aspects of forensic odontology and its applied aspects.
	CO-5	Detect and diagnose various oral pathologies.
	CO-6	Diagnose various microscopic slides using light microscope.
	CO-7	Diagnose various oral pathologies and syndromes using casts and specimens.
	CO-8	Classify and apply various techniques of identification.
	CO-9	Handle the tissue specimens and casts properly.
	CO-10	Develop right aptitude to apply knowledge in clinical set up.
<b>IV BDS</b>		
<b>Public Health Dentistry</b>		At the end of the course,
	CO-1	The student now knows about the concept of health, various health indicators and history of Dental Public Health, its definition and the basic concept of dental public health.
	CO-2	The student now is able to understand various types of epidemiological studies and knows the epidemiology of various oral diseases.
	CO-3	The student now knows regarding the Planning of a survey and Indices for dental diseases and conditions.
	CO-4	The student now knows regarding the influence of nutrition and diet on general and oral health.
	CO-5	The student now knows the principles, methods of identification, evaluation and control of health hazards.
	CO-6	The student now knows the basic principles of law in respect to health sciences and should know the recent laws regarding patient doctor relationship and its legal implications.
	CO-7	The student now knows the definitions, types of research, designing of the written protocol, objectivity, methodology, quantification of records and analysis.
	CO-8	The student now knows regarding the payment for dental care and health insurance.
	CO-9	The student is now able to take history, conduct clinical examination to arrive at diagnosis at individual level and conduct survey at community level to arrive at community diagnosis.



Course Outcome Bachelor of Dental Surgery		
	CO-10	The student is now able to plan and perform all necessary treatment, prevention and promotion of oral health at individual and community level.
	CO-11	The student is now able to plan appropriate community oral health program.
	CO-12	The student makes use of knowledge of epidemiology to identify causes and plan appropriate preventive and control measures.
	CO-13	The student is able to develop ways of helping community towards easy payment plan, and followed by evaluation for their oral health care needs.
	CO-14	The student adopts ethical principles in all aspects of community oral health activities.
	CO-15	The student is able to apply ethical and moral standards while carrying out epidemiological research.
	CO-16	The student is able to develop communication skills, in particular to explain the causes and prevention of oral diseases to the patient.
	CO-17	The student respects patient's rights and privilege including patients right to information and right to seek a second opinion.
<b>Periodontology</b>		At the end of the course,
	CO-1	The student now knows the normal anatomy of Oral mucosa, Gingiva and supporting structures of the teeth & differentiation between the normal and diseased structures of periodontium.
	CO-2	The student is now able to classify Gingival and Periodontal diseases according to Etiology.
	CO-3	The student can analyze and understand the epidemiology and statistics related to Periodontal disease.
	CO-4	The student knows the pathogenesis of periodontal disease and role of microorganisms and their interaction with the host in Etiology of Periodontal Disease.
	CO-5	The student knows potential predisposing factors of periodontal disease and methods to manage them.
	CO-6	The student knows the effects of smoking and parafunctional habits in pathogenesis of periodontal disease.
	CO-7	The student knows the dynamics related to interdisciplinary periodontics and management of cases involving periodontal tissues.
	CO-8	The student knows the periodontal conditions that could be manifestations of systemic conditions in the body and knowledge to refer patients to Specialists and Physicians whenever needed.
	CO-9	The student can now take Case history records of patients with periodontal disease, formulate provisional diagnosis, advise appropriate investigations to come to a final diagnosis.
	CO-10	The student can now formulate statistical analysis of the common and rare conditions occurring in the given populations.
	CO-11	The student can now undertake preventive programs in the community.
	CO-12	The student now diagnoses periodontal conditions based on risk



Course Outcome Bachelor of Dental Surgery		
		factors and formulate treatment plan to eliminate those risk factors.
	CO-13	The student can perform treatment procedures like Scaling, Root Planing, Prescribe patients antimicrobial and host modulation therapy and Motivate patient for plaque control.
	CO-14	The student understands the interdisciplinary association with other specialties of dentistry and correlate diagnosis and treatment parameters in proper management of dental conditions.
	CO-15	The student can diagnose periodontal disease in the society and maintain the privacy regarding patient diagnosis and investigations.
	CO-16	The student is able to understand the need to reach the common public regarding the prevention and control of periodontal disease.
	CO-17	The student is able to understand the importance of motivation and education in society to improve the overall periodontal status in general populations.
	CO-18	The student can identify social, economic, environmental and emotional determinants in periodontal health and disease conditions and take them into account for planned treatment.
	CO-19	The student is able to understand ill effects of various deleterious habits on periodontium and take adequate methods to prevent them.
	CO-20	The student is able to understand ethical and moral values in managing any periodontal conditions and treating the individual as a whole, rather than the specific condition.
<b>Orthodontics &amp; Dentofacial Orthopaedics</b>		At the end of the course,
	CO-1	The student now knows about normal growth and development of facial skeleton and dentition.
	CO-2	The student now knows about the various diseases or conditions affecting normal growth process.
	CO-3	The student can now diagnose the various malocclusion categories.
	CO-4	The undergraduate Student will be able to pinpoint aberrations in the growth process of both dental and skeletal structures and plan necessary treatment.
	CO-5	The student is able to motivate and explain to the patient (and parent) about the necessity of treatment.
	CO-6	The student can plan and execute preventive orthodontics (space maintainers or space retainers).
	CO-7	The student can plan and execute interceptive orthodontics (habit breaking appliances).
	CO-8	The student is able to manage treatment of simple malocclusion such as anterior spacing using removable appliances.
	CO-9	The student is able to handle delivery and activation of removable orthodontic appliances
	CO-10	The student can diagnose and appropriately refer patients with complex malocclusion to the specialist.

Course Outcome Bachelor of Dental Surgery		
	CO-11	The student will have highest regard for professional ethics and strive to deliver best possible treatment to patients.
	CO-12	The student will continuously seek to update his knowledge with new advances in diagnosis and treatment procedures.
<b>Oral Medicine, Diagnosis &amp; Radiology</b>		At the end of the course,
	CO-1	The student has the knowledge about differentiating normal oral mucosa with diseased mucosa in oral lesions.
	CO-2	The student educates patients with common dental problem like dental caries and periodontal diseases and their sequelae.
	CO-3	The student can advise common and advanced laboratory investigations and interpret their results.
	CO-4	The student knows about medical complications that can arise while treating systemically compromised patients and takes prior precaution/consent from concerned medical specialist.
	CO-5	The student knows about basic radiation physics and knows about radiation health hazards, radiation safety and protection.
	CO-6	The student knows about intraoral and extraoral radiography techniques and knows about their application in oral lesions and trauma management.
	CO-7	The student knows about the importance of oral radiographs in forensic identification and age estimation.
	CO-8	The student knows infection control protocols in hospital dentistry and knows its ill effects if not followed.
	CO-9	The student is able to identify normal oral mucosa and can differentiate it from diseased mucosa in oral lesions.
	CO-10	The student can record a detailed case history and perform clinical examination of patients to arrive at a provisional diagnosis.
	CO-11	The student can identify a pre malignant and malignant lesions and conditions and observe a chair side investigation done by a postgraduate student.
	CO-12	The student can perform intraoral radiography and observe and assess a post graduate in extraoral and advance radiographic techniques like CBCT, Sialography to formulate a final diagnosis and differential diagnosis.
	CO-13	The student can write a radiographic interpretation report for intraoral radiographs.
	CO-14	The student can refer the cases to concerned specialties.
	CO-15	The student is willing to apply current knowledge of Oral medicine and Radiology in the best interest of patients and community.
	CO-16	The student is able to handle patients with great compassion, explain them the required treatment options and also to educate about the preventive aspects of oral diseases.
	CO-17	The student maintains a high standard of professional ethics and conduct and apply these in all aspects of professional life.
	CO-18	The student can maintain meticulous dental records.

Course Outcome Bachelor of Dental Surgery		
<b>Oral &amp; Maxillo- facial Surgery</b>		At the end of the course, students should be able to
	CO-1	The student is able to understand the indications, contraindications, advantages, disadvantages, composition, techniques and complications of local anaesthesia & general anaesthesia.
	CO-2	The student is able to understand the indications, contraindications, principles, techniques and complications of dental extractions.
	CO-3	The student is able to do minor oral surgical procedures such as alveoloplasty, surgical extraction of impacted teeth, dentoalveolar infections and Apicectomy.
	CO-4	The student is able to complex Oral & Maxillofacial surgical procedures.
	CO-5	The student is able to demonstrate and apply principles of administration of various local anaesthesia techniques, extraction of teeth and simple minor surgical procedures in dentistry.
	CO-6	The student can diagnose and manage various medical emergencies and dental management of medically compromised patients.
	CO-7	The student is able to develop good rapport with patients.
	CO-8	Student is able to follow High Professional ethics.
	CO-9	The student can serve the community.
	CO-10	The student can serve in best interest of the patients.
	CO-11	The student can refer complex surgical cases to specialist.
	CO-12	The student continuously upgrades knowledge.
<b>Conservative Dentistry &amp; Endodontics</b>		At the end of the course,
	CO-1	Students are now capable of identifying the Carious process.
	CO-2	Students are now capable of diagnosing various pulpal diseases.
	CO-3	Students are now able to prepare Class -1 cavities in human teeth and restore them.
	CO-4	Students are able to differentiate between various disease processes.
	CO-5	Students are now able to interpret radiographs.
	CO-6	Students are able to make treatment plans.
	CO-7	Students are now able to prepare Class -2 cavities in human teeth and restore them.
	CO-8	Students are now able to prepare Class -3 and Class 5, cavities in human teeth and restore them.
	CO-9	Students are now able to use Glass Ionomer Cements and Composite Resins to restore teeth.
	CO-10	Students are able to test teeth for vitality.
	CO-11	Students are now able to perform pulp protection procedures, in order to preserve the vitality of the teeth.

Course Outcome Bachelor of Dental Surgery		
	CO-12	Students are able to discuss disease prevention with the patients.
	CO-13	Students are able to advise appropriate anti-caries measure for the patients.
	CO-14	Students are now able to perform Root Canal Therapy in the Anterior Teeth.
	CO-15	Students are now able to perform Root Canal Therapy in Posterior Teeth.
	CO-16	Students are able to allay the concerns of the patients.
	CO-17	Students are able to effectively understand the symptoms of the patients.
	CO-18	Students are able to communicate the treatment plans to the patients effectively
	CO-19	Students are now able to refer patients as per the need of the particular case.
	CO-20	Students are able to obtain consent from the patient or an accompanying care-taker for all the procedures to be carried out
	CO-21	Students are able to develop a rapport with the patient, teaching and non-teaching staff and the auxiliary staff.
	CO-22	Students are able to create Social Awareness about the Disease Process in the Society.
	CO-23	Students are able to reach out to the under privileged section of the society and render treatment to patients who do not have access to oral health care.

Course Outcome Bachelor of Dental Surgery		
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<b>Prosthodontics ,Crown &amp; Bridge</b>		<b>At the end of the course,</b>
	<b>CO-1</b>	The student has knowledge about the use, properties of all dental materials.
	<b>CO-2</b>	The student can now choose, manipulate and use appropriate dental materials in a given clinical scenario and laboratory procedures.
	<b>CO-3</b>	The student is now able to use dental materials without causing injury to the patient and use the material without wastage.
	<b>CO-4</b>	The student adopts ethical principles in all dental practice.
	<b>CO-5</b>	The student fosters professional honesty and integrity and delivers treatment irrespective of social status, caste, creed or religion of patient.
	<b>CO-6</b>	The student is willing to share the knowledge and clinical experience with professional colleagues.
	<b>CO-7</b>	The student is willing to adopt new methods and techniques in prosthodontics from time to time bases on scientific research which is in patient's best interest.
	<b>CO-8</b>	The student respects patient's rights and privileges including patient's right to information and right to seek second opinion.
	<b>CO-9</b>	The student has knowledge about physical and mechanical properties of dental materials.

**Course Outcome Bachelor of Dental Surgery**

	<b>CO-10</b>	The student knows about Ethics, laws and Jurisprudence and forensic odontology in Prosthodontics.
	<b>CO-11</b>	The student knows about Personal hygiene, infection control, prevention of cross infection and safe disposal of waste keeping in view the risks of transmission of Hepatitis and HIV.
	<b>CO-12</b>	The student knows about the applications of pharmacology and effects of drugs on oral tissue and system of a body and for medically compromised patients.
	<b>CO-13</b>	The student can diagnose and plan treatment for patients requiring simple Prosthodontic therapy.
	<b>CO-14</b>	The student can read and interpret a radiograph and other investigations for the purpose of diagnosis and treatment plan.
	<b>CO-15</b>	The student can diagnose failed restorations and provide Prosthodontic therapy and after care.
	<b>CO-16</b>	The student can refer complex cases to specialist.
<b>Pedodontics &amp; Preventive Dentistry</b>		<b>At the end of the course,</b>
	<b>CO-1</b>	Students now know the development, structure and function of the teeth, mouth and jaws and associated tissues both in health and disease and their relationship and effect on general-state of health and also the bearing on physical and social well-being of the patient.
	<b>CO-2</b>	Students now know the principles of prevention and preventive dentistry right from birth to adolescence.
	<b>CO-3</b>	Students now have adequate experience required for pedodontic dental practice.
	<b>CO-4</b>	The students now have the skills necessary for practice of pediatric dentistry. Students are now able to obtain clinical history, methodological examination of the child patient, perform essential diagnostic procedures and interpret them and arrive at a reasonable diagnosis and treat appropriately.
	<b>CO-5</b>	Students are now able to treat dental diseases which are occurring in child patient.
	<b>CO-6</b>	Students are now able to repair and restore the lost or fractured tooth structures so as to maintain harmony between both hard and soft tissues of the oral cavity.
	<b>CO-7</b>	Students are now able to acquire skills in managing efficiently life-threatening condition with emphasis on basic life support measures.
	<b>CO-8</b>	Students are now able to adopt ethical principles in all aspects of pedodontic practice.
	<b>CO-9</b>	Students are now able to foster honesty and integrity in clinical practice.
	<b>CO-10</b>	Students are now able to deliver quality care service irrespective of a person's religion, caste, creed and ethnicity.
	<b>CO-11</b>	Students are now able to share the knowledge and clinical experience with professional colleagues.

Course Outcome Bachelor of Dental Surgery

	<b>CO-12</b>	Students are now able to adopt, after a critical assessment, new methods and techniques of pedodontic management time to time.
	<b>CO-13</b>	Students are now able to develop alliances with other areas of health profession.

## PROGRAMME OUTCOME MDS

Programme Outcome MDS : After completion of postgraduate degree,		
<b>Prosthodontics, Crown and Bridge</b>	<b>PO-1</b>	The candidate should be able to examine the patients requiring Prosthodontic therapy, investigate the patient systemically, analyze the investigation results, radiographs, diagnose the ailment, plan the treatment, communicate it with the patient and execute it.
	<b>PO-2</b>	To understand the prevalence and prevention of diseases of craniomandibular system related to prosthetic dentistry.
	<b>PO-3</b>	The candidate should be able to restore lost functions of stomatognathic system like mastication, speech, appearance and psychological comforts by understanding biological, biomedical, bioengineering principles and systemic conditions of the patients to provide quality health care in the craniofacial regions.
	<b>PO-4</b>	The candidate should be able to demonstrate good interpersonal, communication skills and team approach in interdisciplinary care by interacting with other specialties including medical specialty for planned team management of patients for craniofacial & oral acquired and congenital defects, temporomandibular joint syndromes, esthetics, Implant supported Prosthetics and problems of Psychogenic origins.
	<b>PO-5</b>	Should be able to demonstrate the clinical competence necessary to carry out appropriate treatment at higher level of knowledge, training and practice skills currently available in their specialty area with a patient centered approach.
	<b>PO-6</b>	Should be able to interpret various radiographs like IOPA, OPG, CBCT and CT. Should and be able to plan and modify treatment plan based on radiographic findings
	<b>PO-7</b>	Should be able to critically appraise articles published and understand various components of different types of articles and be able to gather the weight of evidence from the same
	<b>PO-8</b>	To identify target diseases and create awareness amongst the population regarding Prosthodontic therapy.
	<b>PO-9</b>	To perform Clinical and Laboratory procedures with a clear understanding of biomaterials, tissue conditions related to prosthesis and have required dexterity & skill for performing clinical and laboratory all procedures in fixed, removable, implant, maxillofacial, TMJ and esthetics Prosthodontics.
	<b>PO-10</b>	To carry out necessary adjunctive procedures to prepare the patient before prosthesis like tissue preparation and preprosthetic surgery and to prepare the patient before prosthesis / prosthetic procedures
<b>Periodontology</b>	<b>PO-1</b>	The postgraduate should take a proper clinical history, thorough examination of intra oral, extra oral, medical history evaluation, advice essential diagnostic procedures and interpret them to come to a reasonable periodontal diagnosis.
	<b>PO-2</b>	The postgraduate should do effective motivation and education regarding periodontal disease maintenance after the treatment
	<b>PO-3</b>	The postgraduate should be able to perform both non-surgical and surgical procedures independently
	<b>PO-4</b>	The postgraduate should be able to provide Basic Life Support Service (BLS) recognizes the need for advance life support and does the



<b>Programme Outcome MDS : After completion of postgraduate degree,</b>		
		immediate need for that.
	<b>PO-5</b>	The postgraduate should be able to apply high moral and ethical standards while carrying out human or animal research.
	<b>PO-6</b>	The postgraduate should be able to learn the principles of lip repositioning and perio esthetics surgeries.
	<b>PO-7</b>	The postgraduate should be able to identify the clinical indications for using different dental implant systems.
<b>Conservative Dentistry &amp; Endodontics</b>	<b>PO-1</b>	The postgraduate should be able to take proper chair side history, examine the patient and perform medical and dental diagnostic procedures as well as perform relevant tests and interpret to them to come to a reasonable diagnosis about the dental condition in general and Conservative Dentistry Endodontics in particular. And undertake complete patient monitoring including preoperative as well as post operative care of the patient.
	<b>PO-2</b>	The postgraduate should be able to perform all levels of restorative work, surgical and non-surgical Endodontics as well as endodontic-periodontal surgical procedures as part of multidisciplinary approach to clinical condition.
	<b>PO-3</b>	The postgraduate should be able to manage acute pulpal and pulpo periodontal situations.
<b>Orthodontics &amp; Dentofacial Orthopaedics</b>	<b>PO-1</b>	The postgraduate should be able to obtain proper clinical history, methodical examination of the patient, perform essential diagnostic procedures, and interpret them and arrive at a reasonable diagnosis about the Dento-facial deformities.
	<b>PO-2</b>	The postgraduate should be able to be competent to fabricate and manage the most appropriate appliance intra or extra oral, removable or fixed, mechanical or functional, and active or passive for the treatment of any orthodontic problem to be treated singly or as a part of multidisciplinary treatment of oro-facial deformities.
<b>Oral &amp; Maxillo Facial Surgery</b>	<b>PO-1</b>	The postgraduate should acquire adequate knowledge and understanding of the etiology, pathophysiology and diagnosis, treatment planning of various common Oral and Maxillofacial surgical problems both minor and major in nature.
	<b>PO-2</b>	The postgraduate should understand the general surgical principles like pre and post surgical management, particularly evaluation, post surgical care, fluid and electrolyte management, blood transfusion and post surgical pain management.
	<b>PO-3</b>	The postgraduate should be able to perform with competence minor oral surgical procedures and common maxillofacial surgery and treat both surgically and medically the problems of the oral and Maxillofacial and the related area.
	<b>PO-4</b>	The specialist in Oral & Maxillofacial Surgery can deal with the diagnosis and management of the diseases of stomatognathic system, jaw bones, cranio-maxillofacial region, salivary glands and temporomandibular joints etc.
	<b>PO-5</b>	The Oral & maxillofacial Surgeon should be competent in the management of cleft lip & cleft palate, orthognathic surgery, micro vascular surgery, reconstructive and oncological surgical procedures of maxillofacial region.



<b>Programme Outcome MDS : After completion of postgraduate degree,</b>		
<b>Pediatric and Preventive Dentistry</b>	<b>PO-1</b>	The postgraduate should be able to create not only a good oral health in the child but also a good citizen tomorrow, instill a positive attitude and behavior in children.
	<b>PO-2</b>	The postgraduate should be able to understand the principles of prevention and preventive dentistry right from birth to adolescence
	<b>PO-3</b>	The postgraduate should be able to guide and counsel the parents in regards to various treatment modalities including different facets of preventive dentistry Prevent and intercept developing malocclusion.
	<b>PO-4</b>	The postgraduate should be able to obtain proper clinical history, methodological examination of the child patient, perform essential diagnostic procedures and interpret them. and arrive at a reasonable diagnosis and treat appropriately.
	<b>PO-5</b>	The postgraduate should be able to manage the disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.
	<b>PO-6</b>	The postgraduate should be able to acquire skills in managing efficiently life threatening conditions with emphasis on basic life support measures.
<b>Oral Medicine And Radiology</b>	<b>PO-1</b>	The postgraduate should be able to acquire adequate theoretical, clinical and practical knowledge of all oral mucosal lesions, skeletal involvement of maxillofacial region, diagnostic procedures pertaining to them and latest information of imaging modules.
	<b>PO-2</b>	The postgraduate should be able to develop skill in recognition of oral diseases with radiographic diagnosis and their management
	<b>PO-3</b>	The postgraduate should acquire research skills in handling scientific problems pertaining to oral treatment
<b>Oral Pathology</b>	<b>PO-1</b>	The postgraduate should be able to ensure higher competence in both general and special pathology dealing with the nature of oral diseases, their causes, processes and effects.
	<b>PO-2</b>	An oral pathologist is expected to perform routine histopathological evaluation of specimens relating to oral and perioral tissues, to carry out routine diagnostic procedures including hematological, cytological, microbiological, Immunological and ultra structural investigations.
	<b>PO-3</b>	An oral pathologist is expected to have an understanding of current research methodology, collection and interpretation of data, ability to carry out research projects on clinical and or epidemiological aspects, a working knowledge on current databases, automated data retrieval systems, referencing and skill in writing scientific papers.
<b>Public Health Dentistry</b>	<b>PO-1</b>	The candidate should be able to take history, conduct clinical examination including all diagnostic procedures to arrive at diagnosis at the individual level and conduct survey of the community at state and national level of all conditions related to oral health to arrive at community diagnosis.
	<b>PO-2</b>	The candidate should be able to plan appropriate Community Oral Health Program, conduct the program and evaluate, at the community level.
	<b>PO-3</b>	The candidate should be able to make use of knowledge of epidemiology to identify causes and plan appropriate preventive and control measures.

<b>Programme Outcome MDS : After completion of postgraduate degree,</b>		
	<b>PO-4</b>	The candidate should be able to develop ways of helping the community towards easy payment plan, and followed by evaluation for their oral health care needs.
	<b>PO-5</b>	The candidate should be able to develop the planning, implementation, evaluation and administrative skills to carry out successful community Oral Health Programs.
<b>Course Outcome Master of Dental Surgery (MDS)</b>		
<b>Prosthodontics, Crown &amp; Bridge</b>		<b>At the end of the course,</b>
<b>Applied Anatomy, Physiology, Pathology and Dental Materials</b>	<b>CO-1</b>	The candidate would possess knowledge about applied basic and systematic medical sciences.
	CO-2	The candidate would be able to examine the patients requiring Prosthodontics therapy, investigate the patient systemically, analyze the investigation results.
	CO-3	The candidate would diagnose the ailment, plan a treatment, communicate it with the patient and execute it.
<b>Removable Prosthodontics and Oral Implantology</b>	CO-1	The candidate would possess knowledge about age changes and Prosthodontic Therapy for the aged related to removable Prosthodontics and oral Implantology
	CO-2	The candidate would be able to demonstrate the clinical competence to restore lost functions of stomatognathic system namely mastication, speech, appearance and psychological comforts by removable prosthesis.
	CO-3	The candidate would be able to adopt ethical principles in Prosthodontic practice. Professional honesty and integrity are to be fostered. Treatment to be delivered irrespective of social status, caste, creed or religion of patient.
<b>Fixed Prosthodontics</b>	CO-1	The candidate would be understand the prevalence and prevention of diseases of craniomandibular system related to fixed prosthetic dentistry.
	CO-2	The candidate would be willing to adopt new methods and techniques in fixed prosthodontics from time to time based on scientific research, which is in patient's best interest.
	CO-3	The candidate would be able to communicate in simple understandable language with the patient and explain the principles of fixed prosthodontics to the patient
<b>Essay</b>	CO-1	The candidate would be able to outline the knowledge, procedural and operative skills needed in Masters Degree in Prosthodontics.
	CO-2	The candidate would possess comprehensive knowledge and the ability to apply the same in all the sub branches of Prosthodontics in toto.

**Course Outcome Master of Dental Surgery (MDS)**

<b>Periodontology</b>		<b>At the end of the course, postgraduate</b>
<b>Applied basic sciences</b>	CO-1	Should have abroad overview of the current research and methods used in studying problems in periodontal disease.
	CO-2	Should have an understanding of the broad range of infection diseases affecting the oral cavity .
	CO-3	Should have an understanding the clinical and biological factors to be considered in the appropriate use of antimicrobial drugs
	CO-4	Be aware of the contemporary principles and practices of laboratory diagnostic techniques and interpretation of laboratory reports.
	CO-5	Should have an understanding of hospital acquired infections and infections in the compromised host
	CO-6	Should have a basic knowledge on research methodology, biostatistics and be able to apply it in various research projects as well as dissertations.
<b>Normal periodontal structure and etiopathogenesis and epidemiology</b>	CO-1	Should have a understanding on the normal structure of periodontium and the contributing etiological factors resulting in the pathogenesis of periodontal diseases and be able to apply this knowledge in the diagnosis.
	CO-2	Should be able to record indices and plan out epidemiological survey to assess the prevalence and incidence of early onset periodontitis and adult periodontitis in Indian Population
<b>Periodontal Diagnosis, Therapy and Oral Implantology</b>	CO-3	Should have a sound knowledge of the etiopathogenesis and apply it in diagnosing various periodontal diseases and should be familiar with various periodontal therapies available to treat those cases.
	CO-4	Should have an updated knowledge on the recent advancements and be able to modify their treatment accordingly.
	CO-5	Develop knowledge skill and the science of oral implantology. Should be aware of the various designs and placement of oral implants and follow up of implant restorations.
<b>Essay</b>	CO-1	Should be knowledgeable to provide clinical care for patients with complex problems that are beyond the treatment skills of general dentist and demonstrate evaluative and judgment skills in making appropriate decision regarding prevention, correction and referral to deliver comprehensive care to patients.
	CO-2	Should be able to analyze various clinical scenarios and apply their knowledge accordingly.

**Course Outcome Master of Dental Surgery (MDS)**

<b>Conservative Dentistry &amp; Endodontics</b>		<b>At the end of the course, postgraduate</b>
<b>Applied Basic Science</b>	CO-1	Students should demonstrate understanding of basic sciences as relevant to conservative / restorative dentistry and Endodontics
	CO-2	Students would demonstrate infection control measures in the dental clinical environment and laboratories
	CO-3	Student would adopt ethical principles in all aspects of restorative and contemporary Endodontics including non-surgical and surgical Endodontics
	CO-4	Students would be able to demonstrate communication skills in particular to explain various options available management and to obtain a true informed consent from the patient
	CO-5	Students would be able to apply high moral and ethical standards while carrying on human or animal research
<b>Conservative Dentistry</b>	CO-1	Students would be able to describe aetiology, pathophysiology, diagnosis and management of common restorative situations, that will include contemporary management of dental caries, non-caries lesions and hypersensitivity.
	CO-2	Students would be able to take proper chair side history, examine the patient and perform medical and dental diagnostic procedures; as well as perform relevant tests and interpret them to come to a reasonable diagnosis about the dental condition
	CO-3	Perform all levels of restorative work including Aesthetic procedures and treatment of complicated restorative procedures
<b>Endodontics</b>	CO-1	Students would be able to describe aetiology, pathophysiology, periapical diagnosis and management of common endodontic situations that will include contemporary management of trauma and pulpal pathoses including endo-periodontal situations.
	CO-2	Students would be able to master differential diagnosis and recognize conditions that may require multidisciplinary approach or a clinical situation outside the realm of the specialty, which he or she should be able to recognize and refer to appropriate specialist
	CO-3	Students would undertake complete patient monitoring including preoperative as well as post operative care of the patient.
	CO-4	Students would perform all levels of surgical and non-surgical Endodontics including endodontic endosseous implants, retreatment as well as endodontic-periodontal surgical procedures as part of multidisciplinary approach to clinical condition
	CO-5	Students would be able to manage acute pulpal and pulpo

		periodontal situations
Essay	CO-1	Students would diagnose , plan and execute challenging clinical cases requiring comprehensive management strategies using contemporary materials and techniques in the specialty of conservative dentistry and endodontics

<b>Course Outcome Master of Dental Surgery (MDS)</b>		
<b>Orthodontics &amp; Dentofacial Orthopaedics</b>		<b>At the end of the course, postgraduate should be able to understand</b>
<b>Applied Basic Sciences</b>	CO-1	Anatomy they would have learnt about Prenatal and post natal growth of head, bone growth, assessment of growth and development, muscles of mastication, Development of dentition and occlusion.
	CO-2	Physiology they would have learnt about Endocrinology and its disorders, Calcium and its metabolism, Nutrition-metabolism and their disorders, Muscle physiology, craniofacial biology, bleeding disorders.
	CO-3	Dental Materials they would have learnt about Gypsum products, impression materials, acrylics, composites, banding and bonding cements, wrought metal alloys, orthodontic arch wires, elastics, applied physics, specification and tests methods, survey of all contemporary and recent advances of above.
	CO-4	Physical Anthropology they would have learnt about Evolutionary development of dentition, Evolutionary development of jaws
	CO-5	Pathology they would have learnt about inflammation, and necrosis
	CO-6	Biostatistics they would have learnt about Statistical principles, Sampling and Sampling technique, Experimental models, design and interpretation, Development of skills for preparing clear concise and cogent scientific abstracts and Publication.
	CO-7	Applied research methodology in Orthodontics they would have learnt about Experimental design, Animal experimental protocol, Principles in the development, execution and interpretation of methodologies in Orthodontics, Critical Scientific appraisal of literature.
<b>Diagnosis &amp; Treatment planning</b>	CO-1	Orthodontic History they would have learnt about Historical perspective, Evolution of orthodontic appliances, Pencil sketch history of Orthodontic peers, History of Orthodontics in India.
	CO-2	Structure and function of all anatomic components of occlusion, Mechanics of articulation, Recording of masticatory function, Diagnosis of Occlusal dysfunction, Relationship of TMJ anatomy and pathology and related neuromuscular physiology.
	CO-3	A comprehensive review of the local and systemic factors in the causation of Malocclusion and Various classifications of malocclusion.
	CO-4	Anatomical, physiological and pathological characteristics of major

		groups of developmental defects of the orofacial structures.
	CO-5	Stages of child development, Theories of psychological development, Management of child in orthodontic treatment, Management of handicapped child, Motivation and Psychological problems related to malocclusion / orthodontics, Adolescent psychology, Behavioral psychology and communication.
	CO-6	Stages of child development, Theories of psychological development, Management of child in orthodontic treatment, Management of handicapped child, Motivation and Psychological problems related to malocclusion/ orthodontics, Adolescent psychology, Behavioral psychology and communication.
	CO-7	Instrumentation, Image processing, Tracing and analysis of errors and applications, Radiation hygiene, Advanced Cephalometrics techniques, Comprehensive review of literature, Video imaging principles and application.
	CO-8	Economics and dynamics of solo and group practices, Personal management, Materials management, Public relations, Professional relationship, Dental ethics and jurisprudence, Office sterilization procedures, Community based Orthodontics
<b>Clinical Orthodontics</b>	CO-1	The strategies to treat developing malocclusion at a younger age.
	CO-2	Treatment regimes using orthopaedic appliances to the appropriate cases.
	CO-3	The strategies to treat the CL/ CP cases with empathy starting with Naso alveolar moulding at the infant stage and then systematically treat the malocclusion using removable / fixed orthodontics during the mixed & permanent dentition by harmonizing the treatment plan with the other members of the multidisciplinary cleft team.
	CO-4	Applied anatomy & physiology regarding to tooth & its surrounding structures will be inculcated into the student, so that the results of application of orthodontic forces can be understood and clinically used.
	CO-5	Diagnosis & treatment planning of cases requiring surgical intervention.
	CO-6	Management of complicated cases requiring a multi- disciplinary approach in patient management.
	CO-7	The designing , construction , fabrication & management of cases using both removable & fixed orthodontics .
	CO-8	A comprehensive view of diagnosing & preventing caries, periodontal diseases to maintain proper inter arch relationship.
	CO-8	Growth guidance, diagnosing & treatment planning of early malocclusion both at mixed/ permanent dentition.
	CO-9	Inculcating the acumen to analyze post treatment stability to prevent any relapse.

Essay	CO-1	The Students would be trained in above mentioned topics in detail, so that the student would know the recent updates along with the previous literature available.
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<b>Course Outcome Master of Dental Surgery (MDS)</b>		
<b>Oral Maxillo Facial Surgery</b>		<b>At the end of the course, postgraduate should be able to</b>
<b>Applied Basic Sciences</b>	CO-1	Understand development and growth of face, teeth and jaws, age changes and evaluation of mandible in detail
	CO-2	Understand the surgical anatomy of head and neck region.
	CO-3	Understand Nervous system –physiology of nerve conduction, pain pathway, sympathetic and parasympathetic nervous system, hypothalamus and mechanism of controlling body temperature.
	CO-4	Study blood - its composition hemostasis, blood dyscrasias and its management,hemorrhage and its control, blood grouping, cross matching, blood componenttherapy, complications of blood transfusion, blood substitutes, auto transfusion, cell savers. Digestive system - composition and functions of saliva, mastication, deglutition, digestion, assimilation, urine formation, normal and abnormal constituents.
	CO-5	Respiratory system – respiration control of ventilation, anoxia, asphyxia, artificial respiration, hypoxia – type and management
	CO-6	CVS - cardiac cycle, shock, heart sounds, blood pressure, hypertension
	CO-7	Endocrinology - metabolism of calcium , endocrinal activity and disorder relating thyroid gland, parathyroid gland, adrenal gland, pituitary gland, pancreas and gonads.
	CO-8	Nutrition – general principles balanced diet, effect of dietary deficiency, protein energy malnutrition, nutritional assessment, metabolic responses to stress, need for nutritional support ,entails nutrition, roots of access to GIT, parenteralnutrition, access to central veins, nutritional support
	CO-9	Fluid and electrolytic balance / acid base metabolism – the body fluid compartment, metabolism of water and electrolytes, factors maintaining homeostasis causes for treatment of acidosis and alkalosis.
	CO-10	Inflammation – acute and chronic inflammation, repair and regeneration, necrosis and gangrene and role of component system in acute inflammation, role of arachidonic acid and its metabolites in acute inflammation, growth factors in acute inflammation role of NSAIDS in inflammation, cellular changes in radiation injury and its manifestations.
	CO-11	Wound management - wound healing factors influencing healing,

		properties of suture materials, and appropriate uses of sutures.
	CO-12	Hemostasis - role of endothelium in thrombogenesis, arterial and venous thrombi, disseminated intravascular coagulation.
	CO-13	Hypersensitivity - shock and pulmonary failure, types of shock, diagnosis, resuscitation, pharmacological support, ARDS and its causes and prevention, ventilation and support
	CO-14	Neoplasia - classification of tumours, carcinogens and carcinogenesis, spread of tumors, characteristics of benign and malignant tumors, grading and staging of tumours various laboratory investigation.
	CO-15	Chromosomal abnormalities with oro- facial manifestations.
	CO-16	Basics of immunology – primary and acquired immuno deficiencies.
<b>Minor Oral Surgery and Trauma</b>	CO-1	The students would be well trained in the assessment and management of: <ol style="list-style-type: none"> <li>1. Basic Exodontia</li> <li>2. Complicated Exodontia</li> <li>3. Surgical management of Impacted teeth</li> <li>4. Ectopically positioned and unerupted teeth</li> <li>5. Tooth Reimplantation and Transplantation</li> <li>6. Surgical uprighting and Repositioning</li> <li>7. Periodontal Considerations for Oral Surgery</li> <li>8. Procedures Involving the Dentogingival Junction</li> <li>9. Pediatric Dentoalveolar Surgery</li> <li>10. Lasers in Oral and Maxillofacial Surgery</li> <li>11. Complications of Dentoalveolar Surgery</li> </ol>
	CO-2	<b>The students would be able to diagnose and manage Medical emergencies like,</b> prevention and management of altered consciousness (syncope, orthostatic hypotension, seizures, diabetes mellitus, adrenal insufficiency), hypersensitivity reactions, chest discomfort, and respiratory difficulty
	CO-3	The students would be knowledgeable about <ol style="list-style-type: none"> <li>1. Diagnosis and Perioperative Management of Head and Neck Injuries</li> <li>2. Basic Principles of Treatment: Hard and Soft Tissue injuries</li> </ol>
	CO-4	The students would be acquainted with the knowledge and clinical skills in the management of . <ol style="list-style-type: none"> <li>1. Dentoalveolar Injuries</li> <li>2. Mandibular Fractures</li> <li>3. Temporomandibular Joint Region Injuries</li> <li>4. Zygomatic Complex Fractures</li> <li>5. Orbital Trauma</li> <li>6. Midface Injuries</li> <li>7. Frontal Sinus Fractures and associated Injuries</li> <li>8. Nasal Injuries</li> <li>9. Soft Tissue Injuries</li> <li>10. Special Soft Tissue Injuries</li> </ol>



11. Avulsive Hard Tissue Injuries
12. Maxillofacial Injuries in Children
13. Maxillofacial Injuries in the Elderly
14. Complex Facial Trauma Patient

**Maxillofacial Surgery**

CO-1

**The students would be acquainted with the knowledge and clinical skills in the management of**

**Salivary gland:** Sialography, Salivary fistula and management diseases of salivary gland - developmental disturbances, cysts, inflammation and sialolithiasis, Mucocele and Ranula, Tumors of salivary gland and their management, Staging of salivary gland tumors, Parotidectomy

**Temporomandibular Joint:** Etiology, history signs, symptoms, examination and diagnosis of temporomandibular joint disorders, Ankylosis and management of the same with different treatment modalities, MPDS and management, Condylectomy - different procedures, Various approaches to TMJ, Recurrent dislocations - Etiology and Management

**Oncology:** Biopsy, Management of pre-malignant tumors of head and neck region, Benign and Malignant tumors of Head and Neck region, Staging of oral cancer and tumor markers

**Laser surgery:** The application of laser technology in surgical treatment of lesions

**Cryosurgery:** Principles, applications of cryosurgery in surgical management

**Cleft lip and palate surgery:** Detailed knowledge of the development of the face, head and neck, Diagnosis and treatment planning Current concepts in the management of cleft lip and palate deformity Knowledge of Naso endoscopy and other diagnostic techniques in the evaluation of speech and hearing Concept of multidisciplinary team management

**Aesthetic facial surgery:** Detailed knowledge of the structures of the face and neck including skin and underlying soft tissue, Diagnosis and treatment planning of deformities and conditions affecting facial skin, Underlying facial muscles, bone. Eyelids external ear Surgical management of post acne scarring, facelift, blepharoplasty, otoplasty, facial bone recontouring, etc

**Craniofacial surgery:** Basic knowledge of developmental anomalies of the face, head and neck, Basic concepts in the diagnosis and planning of various head and neck anomalies including facial clefts, craniosynostosis syndromes, etc. Current concept in the management of Craniofacial anomalies

**Implantology:** Principles for the Surgical Placement Of Endosseous Implants, Subperiosteal Implants, The Transmandibular Implant Reconstruction System, Single-tooth Replacement in Oral Implantology, Posterior Implant Restorations For Partially Edentulous Patients, Maxillary Sinus Grafts and Implants, Surgical Implant Failures, Soft Tissue Considerations

	CO-2	<p><b>The students would be acquainted with the knowledge and clinical skills in the management of</b> oral cancer, Radial Neck dissection, Modes of spread of tumors, Diagnosis and management of tumors of nasal, paranasal, neck, tongue, cheek, maxilla and mandible</p> <p>Radiation therapy in maxillofacial regions, Lateral neck swellings</p> <p><b>Orthognathic surgery:</b> Diagnosis and treatment planning, Cephalometric analysis, Model surgery, Maxillary and mandibular repositioning procedures, Segmental osteotomies, Management of apertognathia, Genioplasty, Distraction osteogenesis</p> <p><b>Cysts and tumor of oro facial region:</b> Odontogenic and non-Odonfogenic tumors and their management ,Giant lesions of jawbone, Fibro osseous lesions of jawbone, Cysts of jaw</p>
Essay	CO-1	The students would be able to diagnose, meticulously plan and manage competently various conditions in maxillofacial surgery including challenging cases.
	CO-2	They would be knowledgeable about conventional and recent advances in the diagnosis and management of oral and maxillofacial conditions.
	CO-3	The students would be well versed in basic surgical techniques and knowledgeable about the advanced skills required in maxillofacial surgery.

<b>Course Outcome Master of Dental Surgery (MDS)</b>		
<b>Pedodontics and preventive</b>		<b>At the end of the course, postgraduate</b>
<b>Applied Basic Sciences</b>	CO-1	Student should be able to understand applied Anatomy, genetics, Applied Physiology, Applied Pathology, Nutrition, Dietics, Growth & Development, Cariology and Fluoride.
	CO-2	Student will be get acquainted with Dental health concepts, Effects of civilization and environment, Dental Health delivery system, Public Health measures related to children along with principles of Pediatric Preventive Dentistry
	CO-3	Student should be able develop an attitude of Counselling in Paediatric Dentistry
	CO-4	Student should be able to do Case History Recording, Outline of principles of examination, diagnosis & treatment planning.
<b>Clinical Paedodontics</b>	CO-1	Student should be competent to treat dental diseases which are occurring in child patient. Student should be able to manage to repair and restore the lost / tooth structure to maintain harmony between both hard and soft tissues of the oral cavity.
	CO-2	Student should be able to manage the disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.

	CO-3	Student should be able to acquire skills in managing efficiency life threatening condition with emphasis on basic life support measure.
	CO-4	Student should able to develop an attitude to adopt ethical principles in all aspects of Paediatric dental practice along with professional honesty and integrity.
<b>Preventive and Community Dentistry as applied to Paediatric Dentistry</b>	CO-1	Student should be able to create a good oral health in the child with Installing a positive attitude and behaviour in children
	CO-2	Student should able to understand the principles of prevention and preventive dentistry right from birth to adolescence
	CO-3	Student should able to guide and counsel the parents in regards to various treatment modalities including different facets of preventive dentistry
	CO-4	Student should able to deliver care irrespective of the social status, cast, creed, and religion of the patients.
	CO-5	Student should able to share the knowledge and clinical experience with professional colleagues with own willingness.
<b>Essay</b>	CO-1	For a given case,the student after a critical assessment should able to adopt new methods and techniques of Paediatric dentistry that is developed time to time, based on scientific researches, which are in the best interest of the child and patient.
	CO-2	Student should able to respect child patient's rights and privileges, including child patient's right to information and right to seek a second opinion.

### **Course Outcome Master of Dental Surgery (MDS)**

<b>Oral Pathology &amp; Microbiology</b>		<b>At the end of the course, postgraduate</b>
<b>Applied Basic Science</b>		The students should have basic knowledge of biostatistics and research methodology.
		They would have learnt the anatomy, histology, biochemical and physiology of oral and paraoral structure.
		They would have learnt the basic pathology, microbiology and basic molecular aspects of pathology.
<b>Oral Pathology, Microbiology, Immunology And Forensic Odontology</b>		The student should have to understand the pathological processes of oral diseases.
		The student would have to understand the pathological processes of oral diseases, compare and diagnose based on clinical, radiographical and histopathological findings which involves the oral and paraoral

		structures.
		They would have learnt and perform the preparation of ground sections oral smears and histology slides.
		Student would have studied and be able to identify and diagnose the disease based on microscopy.
<b>Labrotary Techniques , Diagnosis And Oncology</b>		The students should have basic knowledge of biopsy procedure and slide preparation.  Student should have knowledge on Basic hematological tests, urine analysis and its clinical significance.
		They would have the basic knowledge on laboratory chemicals and equipments.
		Student should have learnt to identify and appreciate the microscopic slide and writing a report on oral diseases /lesion.
<b>Essay</b>		Student should have comprehensive knowledge on oral and paraoral structures and related pathologies and also on recent advanced methodology / techniques and molecular aspect.

<b>Course Outcome Master of Dental Surgery (MDS)</b>		
<b>Oral Medicine and Radiology</b>		<b>At the end of the course, postgraduate</b>
<b>Applied Anatomy, Physiology, Pathology and Pharmacology</b>	CO-1	The student would demonstrate sound theoretical knowledge and understanding of basic relevant sciences namely, the applied anatomy of the face and oral cavity, the basic physiologic processes, pathologic processes and the basics of pharmacologic applications
	CO-2	The student would be proficient in physical examination of the patient, identification of normal and abnormal functioning of the various systems of the body.
<b>Diagnosis, diagnostic methods and imageology and Applied Oral Pathology</b>	CO-1	The student would possess ample understanding and knowledge of diagnosis and diagnostic methods, ionizing radiation, its applications in dentistry and its limitations.
	CO-2	The student would be proficient in detailed physical examination of the oral and paraoral structures, identification of pathologies and techniques involved in conventional and advanced diagnostic radiographic examination.
	CO-3	Apply high moral and ethical standards while carrying out clinical and radiographic examinations.
<b>Oral Medicine, therapeutics and laboratory</b>	CO-1	The student would be proficient in describing the etiology, pathophysiology, principles of diagnosis and management of common oro facial disorders.

<b>investigations.</b>		
	CO-2	The student would be proficient in formulating a differential diagnosis and investigations plan and frame the treatment strategy.
	CO-3	The student would develop communication skills and ability to explain the disease process to the patient and to obtain a informed consent from the patient.
<b>Essay</b>	CO-1	The student would be proficient ineffectively and freely analyzing the problem presented by recalling factually.
	CO-2	The student would be an expert at synthesizing ideas and rendering a suitable opinion of the problem presented.

## **Dr. APJ Abdul Kalam College of Physiotherapy:**

### **I B.P.T.**

- a. Deals with the basic foundation in medical as well as physiotherapy subjects. The foundation of human body structure and function and energy utilization is achieved by studying the subjects Human Anatomy, Physiology, and Biochemistry.
- b. Students knowledge of Physics i.e. – Mechanics, Electricity, Water , Sound and Light is recalled to apply it on human body in understanding movements and the various physiotherapeutic modalities under the subject of Fundamentals of Electrotherapy and Fundamentals of Kinesiology and Kinesiotherapy

### **II B.P.T.**

- a. Deals with understanding of altered physiology by studying pathology and Microbiology.
- b. The students get oriented to various Pharmacotherapeutic agents used along with their effects by studying Pharmacology.
- c. The students will study about normal and altered human mind and behavior by studying Psychology and Psychiatry. They will also learn skills required for effective communication with the patients and care givers.
- d. Students will acquire the knowledge of Biomechanics as applicable to human body in the context of Kinetics and kinematics of Joints, Movements and Daily activities under subject of Kinesiology and shall acquire knowledge and learn various physiotherapeutic skills on models in subject of Kinesiotherapy.
- e. In the subject of Electrotherapeutics, students will acquire knowledge and learn application and uses of various electrotherapeutic modalities on models.

### **III B.P.T.**

- a. Students acquire knowledge of all the clinical subjects like Orthopaedics, General Surgery, Medicine, Neurology, Paediatrics, Dermatology and Gynecology and Obstetrics, Community Medicine and Sociology, *Radio-Diagnosis and Oncology*
- b. Students will acquire knowledge about the principles of International Classification of Functioning (I.C.F.) and its applicability in context to movement dysfunctions.
- c. Students will learn the physiotherapeutic evaluation skills including electrodiagnosis on patients to arrive at a Functional/ Physical Diagnosis in Neuromuscular, Cardiovascular and Respiratory dysfunction. They will also acquire knowledge of various specialized manual therapy and neurodevelopmental techniques and practice these skills on models under the subject of functional diagnosis and physiotherapeutic skills.

### **IV B.P.T.**

- a. Students will revise, recall and integrate the knowledge of previous years to evaluate, functionally diagnose, plan and execute short and long term management of various musculoskeletal, neurological and cardiovascular- respiratory dysfunctions in hospital and community settings.
- b. Students also acquire knowledge pertaining to health promotion and disease prevention throughout lifespan in the community. They will also be able to analyse, prevent and treat problems associated with various industries in community physiotherapy.
- c. Students will also acquire knowledge about biomechanical principles and application of variety of aids and appliances used for ambulation, protection and prevention by studying Bioengineering.
- d. Professional Practice and ethics as a subject will be studied in continuum from first year, so students will acquire the knowledge of ethical code of professional practice and **Bioethics**, as well as its moral and legal aspects. The principles of Hospital Administration, Management and Marketing, **Environmental Sciences** will be studied separately.
- e. Students will also acquire knowledge of Research Methodology and Biostatistics and apply the knowledge in project work in community physiotherapy.

## **HUMAN ANATOMY**

### **PROGRAM OUTCOME:**

The focus of this course is an in-depth study and analysis of the regional and systemic organization of the body. Emphasis is placed upon structure and function of human movement. A comprehensive study of human anatomy with emphasis on the nervous, musculoskeletal and circulatory systems is incorporated. Introduction to general anatomy lays the foundation of the course. Dissection and identification of structures in the cadaver supplemented with the study of charts, models, prosected material and radiographs are utilized to identify anatomical landmarks and configurations of the:

### **COURSE OUTCOME:**

#### **1] MUSCULOSKELETAL ANATOMY**

- i. The student should be able to identify and describe Anatomical aspects of muscles, bones, joints, their attachments and to understand and analyze movements.
- ii. Application of knowledge of anatomy on the living (living anatomy).
- iii. To understand the Anatomical basis of various clinical conditions.

#### **2] NEURO ANATOMY**

- i. To identify and describe various parts of nervous system.
- ii. To describe blood circulation of C.N.S. and spinal cord.
- iii. Be able to identify the Structures of various C.N.S Trans-sections.
- iv. To identify and describe the course of peripheral nerves.
- v. To understand anatomical basis of clinical conditions of nervous system.

#### **3] CARDIOVASCULAR and RESPIRATORY ANATOMY**

- i. To identify and describe various structures of the Cardio Vascular and Respiratory system and the course of blood vessels
- ii. Identify and describe various structures of Thoracic cage and mechanisms of Respiration
- iii. Be able to apply knowledge of Living anatomy with respect to Cardio Vascular and Respiratory system.
- iv. To understand anatomical basis of clinical conditions of cardiovascular and Respiratory system

#### 4] To Obtain Knowledge of OTHER SYSTEMS and SENSORY ORGANS

### **HUMAN PHYSIOLOGY**

#### **PROGRAM OUTCOME:**

The course is designed to study the function of the human body at the molecular, cellular, tissue and systems levels. The major underlying themes are; the mechanisms for promoting homeostasis, cellular processes of the metabolism, membrane function and cellular signaling; the mechanisms that match supply of nutrients to tissue demands at different activity levels; the mechanisms that match the rate of excretion of waste products to their rate of production; the mechanisms that defend the body against injury and promote healing.

These topics address the consideration of nervous and endocrine regulation of the cardiovascular, hematopoietic, pulmonary, renal, gastro-intestinal and musculoskeletal systems including the control of cellular metabolism. The course stresses on the integrative nature of physiological responses in normal function and disease.

This course will serve as a pre-requisite/foundation for the further courses i.e. Exercise physiology or Pathology.

#### **COURSE OUTCOME:**

At the end of the course, the candidate will

1. Acquire the knowledge of the relative contribution of each organ system in maintenance of the Milieu Interior (Homeostasis)
2. Be able to describe physiological functions of various systems, with special reference to Musculo-skeletal, Neuro-motor, Cardio-respiratory, Endocrine, Uro-genital function, and alterations in function with aging
3. Analyze physiological response and adaptation to environmental stresses-with special emphasis on physical activity, altitude, temperature
4. acquire the skill of basic clinical examination, with special emphasis to Peripheral and Central Nervous system, Cardiovascular and Respiratory system, and Exercise tolerance / Ergography

### **BIOCHEMISTRY**

#### **PROGRAM OUTCOME:**

This course provides the knowledge and skills in fundamental organic chemistry and introductory biochemistry that are essential for further studies It covers basic biochemical, cellular, biological and



microbiological processes, basic chemical reactions in the prokaryotic and eukaryotic cells, the structure of biological molecules, introduction to the nutrients i.e. carbohydrates, fats, enzymes, nucleic acids and amino acids.

**COURSE OUTCOME:**

The student would know:

1. Various biomolecules which are present in the body and functions
2. The formation and fate of these biomolecules

Their normal levels in body fluids required for functioning and their abnormal levels to understand the disease process.

**FUNDAMENTALS OF KINESIOLOGY and KINESIOTHERAPY**

**PROGRAM OUTCOME:**

This course covers the definition of various terms used in mechanics, biomechanics kinesiology as well as its importance in physical therapy. It applies the mechanical principles to simple equipments of therapeutic gymnasium and familiarizes the candidate to its use. It covers the types of human motions as well as planes and relative axes of motion. It also explains the inter-relationship among kinematic variables and utilizes this knowledge to describe and analyze motion. It covers the classification of the joints and muscles along their distinguishing characteristics and skill of measurement of its ranges in various planes and axes. This course additionally covers therapeutic principles and skills of application of massage, yoga, aerobic exercise and use of suspension therapy. It also enhances the skill of evaluation of vital parameters and sensory system.

**COURSE OUTCOME:**

**Cognitive:**

At the end of the course, the candidate will be able to:

- a) Define the various terms used in relation to Mechanics, Biomechanics and Kinesiology
- b) Recall the basic principles of Biophysics related to mechanics of movement / motion and understand the application of these principles to the simple equipment designs along with their efficacy in Therapeutic Gymnasium and various starting positions used in therapeutics.

**Psychomotor:**

At the end of the course, the candidate will be able to:

- a) Describe and also acquire the skills of use of various tools of the Therapeutic Gymnasium
- b) Demonstrate the movements in terms of various anatomical planes and axes.
- c) Demonstrate various starting and derived positions used in therapeutics.
- d) Describe physiological principles and acquire the skills of application of therapeutic massage
- e) Acquire the skills of assessment of basic evaluation like sensations, reflexes and vital parameters

- f) Acquire the skill of objective assessment of Range of Motion of the joints by Goniometry
- g) Describe physiological basis and principle of relaxation and acquire the skills of relaxation methods
- h) Describe physiological responses and principles of aerobic exercises for general fitness and demonstrate fitness skills on self and group.
- i) Describe physiological principles and acquire the skill of performing Pranayama and Yogasanas

## **FUNDAMENTALS OF ELECTROTHERAPY**

### **PROGRAM OUTCOME:**

This course will cover the basic principles of Physics that are applicable in medical equipments used in Physiotherapy. It will also help to understand the fundamentals of currents, sound waves, Heat and its effects, electromedical radiations and their effects as well as their application in physical therapy. It covers the skill of application of superficial thermal agents and Cryotherapy.

### **COURSE OUTCOME:**

#### **Cognitive:**

At the end of the course, the candidate will be able to:

- a) Recall the physics principles and Laws of Electricity, Electro magnetic spectrum, and ultra sound
- b) Describe effects of environmental and man made electromagnetic field at the cellular level and risk factors on prolonged exposure.
- c) Describe the Main electrical supply, Electric shock, precautions
- d) Enumerate Types and Production of various Therapeutic electrical currents and describe the panel diagrams of the machines

#### **Psychomotor:**

At the end of the course the candidate will be able to –

- a) Test the working of the various electrotherapeutic equipments
- b) Describe in brief, certain common electrical components such as transistors, valves, capacitors, transformers etc and the simple instruments used to test / calibrate these components [ such as potentiometer, oscilloscope , multimeter ] of the circuit ; and will be able to identify such components.
- d) Describe and identify various types of electrodes used in therapeutics, describe electrical skin resistance and significance of various media used to reduce skin resistance. Acquire knowledge of various superficial thermal agents such as Paraffin wax bath, Cryotherapy, Hydrocollator packs, Home remedies, their physiological and therapeutic effects, Merits / demerits and acquire the skill of application.

## **PATHOLOGY**

### **PROGRAM OUTCOME:**

Students will develop an understanding of pathology underlying clinical disease states involving the major organ systems and epidemiological issues. Students will learn to recognize pathology signs and symptoms considered red flags for serious disease. Students will use problem-solving skills and information about pathology to decide when referrals to another health care provider or alternative interventions are indicated. Students will develop the ability to disseminate pertinent information and findings, and ascertain the appropriate steps to follow.

The course more deals with structural impairments as an important part in ICF Classification.

### **COURSE OUTCOME:**

#### a. Knowledge

At the end of one year, the student shall be able to

1. Describe the structure and ultra structure of a sick cell, the mechanisms of cell degradation, cell death and repair.
2. Correlate structural and functional alterations in the sick cell.
3. Explain the pathophysiological processes which govern the maintenance of homeostasis, mechanism of their disturbances and the morphological and clinical manifestations associated with it.
4. Describe the mechanisms and patterns of tissue response to injury to appreciate the Pathophysiology of disease processes and their clinical manifestations.
5. Correlate the gross and microscopic alterations of different organ systems in common diseases to the extent needed to understand disease processes and their clinical significance.
6. Develop an understanding of neoplastic change in the body in order to appreciate need for early diagnosis and further management of neoplasia.
7.
  - a. Understand mechanisms of common hematological disorders and a logical approach in their diagnosis.
  - b. Normal values and interpretation of common hemoatological tests like Hb, TLC, DLC, ESR
8. Correlate normal and altered morphology of different organ systems in different diseases needed for understanding disease process and their clinical significance (with special emphasis to neuromusculoskeletal and cardio respiratory systems).
9. Understand Etiopathogenesis and laboratory diagnosis of Diabetes Mellitus.

## **MICROBIOLOGY**

### **PROGRAM OUTCOME:**

Students will develop an understanding of pathology underlying clinical disease states and involving the major organ systems and epidemiological issues. Epidemiological issues will be presented and discussed. Students will learn to recognize pathology signs and symptoms considered red flags for serious disease. Students will use problem-solving skills and information about pathology to decide when referral to another health care provider or alternative intervention is indicated. Students will develop the ability to disseminate pertinent information and findings, and ascertain the appropriate steps to follow.

#### **COURSE OUTCOME:**

At the end of the course, the candidate will

1. Have sound knowledge of prevalent communicable diseases and the agents responsible for causing clinical infections, pertaining to C.N.S, C.V.S, Musculoskeletal system, Respiratory system, Genitourinary system, wound infections and of newer emerging pathogens
2. Know the importance and practices of best methods to prevent the development of infections in self and patients (universal safety precautions)

#### **PHARMACOLOGY**

##### **PROGRAM OUTCOME:**

This course covers the basic knowledge of Pharmacology including administration, physiologic response and adverse effects of drugs under normal and pathologic conditions. Topics focus on the influence of drugs in rehabilitation patient/client management. Drugs used in iontophoresis and phonophoresis will be discussed in detail.

##### **COURSE OUTCOME:**

At the end of the course, the candidate will be able to:

##### **Cognitive:**

- a. Describe Pharmacological effects of commonly used drugs by patients referred for Physiotherapy; list their adverse reactions, precautions, contraindications, formulation and route of administration.
- b. Identify whether the pharmacological effect of the drug interferes with the Therapeutic response of Physiotherapy and vice versa
- c. Indicate the use of analgesics and anti-inflammatory agents with movement disorders with consideration of cost, efficiency, and safety for individual needs.

##### **Psychomotor:**

Get the awareness of other essential and commonly used drugs by patients- The bases for their use and common as well as serious adverse reactions.

#### **PSYCHIATRY (INCLUDING PSYCHOLOGY)**

##### **PROGRAM OUTCOME:**

The course design increases awareness of psychosocial issues faced by individuals. Their significance at various points on the continuum of health and disability should be emphasised. The course discusses personal and professional attitudes and values as they relate to developing therapeutic relationships. It

emphasizes on communication skills for effective interaction with patients, health-care professionals and others. It expects students to identify common psychiatric conditions.

### **COURSE OUTCOME:**

At the end of the course, the candidate will be able to:

#### **Cognitive:**

- a. Define the term Psychology and its importance in the Health delivery system, and will gain knowledge of Psychological maturation during human development and growth and alterations during aging process.
- b. Understand the importance of psychological status of the person in health and disease; environmental and emotional influence on the mind and personality.
- c. Have the knowledge and skills required for good interpersonal communication.

#### **Psychomotor:**

- a. Enumerate various Psychiatric disorders with special emphasis to movement / Pain and ADLs
- b. Acquire the knowledge in brief, about the pathological and etiological factors, signs / symptoms and management of various Psychiatric conditions.
- c. Understand the patient more empathetically.

## **KINESIOLOGY**

### **PROGRAM OUTCOME:**

This course is based on anatomical, physiological and related kinesiological principles for normal human movement. Students have the opportunity to develop and acquire understanding of kinesiological responses for the efficacy in various kinesiotherapeutic applications.

### **COURSE OUTCOME**

– At the end of the course, the candidate will be able to –

1. Understand the principles of Biomechanics.
2. Acquire the knowledge of kinetics and kinematics of Spine, Extremities, Temporomandibular joint, Thoracic cage
3. Acquire the knowledge of Musculo skeletal movements during normal Gait and Activities of Daily Living

## **KINESIOTHERAPY**

### **PROGRAM OUTCOME:**

This course is based on anatomical and physiological and related kinesiological principles for normal human movement and for the efficacy in the assessment methods for mobility, muscle strength. Students have the opportunity to develop and acquire understanding of physiological responses to various types of training and develop skills of exercise programs (on models). Exercise components of muscle strength, flexibility, balance, breathing and gait are examined. Evidence of appropriate, safe and effective exercise

design and proper exercise biomechanics and prescription parameters are addressed with all interventions.

### **COURSE OUTCOME:**

At the end of the course, the candidate will be able to

#### **Cognitive:**

Describe the Biophysical properties of connective tissue, and effect of mechanical loading, & factors which influence the muscle strength, and mobility of articular and periarticular soft tissues.

#### **Psychomotor:**

1. Apply the biomechanical principles for the efficacy in the assessment methods for mobility, muscle strength
2. Acquire the skill of subjective and objective assessment of individual and group muscle strength
3. Acquire the skills of subjective and objective methods of muscle strengthening
4. Describe the physiological effects, therapeutic uses, merits / demerits of various exercise modes including Hydrotherapy
5. Demonstrate various therapeutic exercises on self;and acquire the skill of application on models with Home Programs
6. Analyze normal Human Posture [static and dynamic].
7. Acquire the skill of functional re-education techniques on models
8. Acquire the skill of Balance and Coordination Exercises
9. Acquire the skill of using various walking aids for Gait Training
10. Acquire the skill of demonstrating breathing exercises and retraining on self and others
11. Acquire the skill of demonstrating Postural Drainage on models

## **ELECTROTHERAPY**

### **PROGRAM OUTCOME:**

This course tends to explore fundamental skills in application of electrotherapeutic modalities and knowledge of indications, contraindications and physiological principles needed for appropriate patient care. It includes topics such as Electrical stimulation, T.E.N.S., Iontophoresis, Ultrasound / Phonophoresis, Diathermy and Electro diagnostic testing etc.

### **COURSE OUTCOME:**

At the end of the course, the candidate will be able to:

#### **Cognitive:**

1. Acquire the knowledge about the physiology of pain, Pain pathways and Methods of pain modulation, selection of appropriate modality for Pain modulations.
2. Describe the Physiological effects, Therapeutic uses, indication and contraindications of various Low/ Medium and High Frequency modes / Actinotherapy

3. Describe the Physiological Effects and therapeutic uses of various therapeutic ions and topical pharmaco -therapeutic agents to be used for the application of iontophoresis and sono/phonophoresis

**Psychomotor:**

1. Acquire the skills of application of the Electro therapy modes on models, for the purpose of Assessment and Treatment.
2. Acquire an ability to select the appropriate mode as per the tissue specific and area specific application.

**III B. P.T.**

**SURGERY (General Surgery, Cardiovascular and Thoracic Surgery and Plastic/ Reconstructive Surgery)**

**PROGRAM OUTCOME:**

This course intends to familiarize students with principles of General surgery including various specialties like cardiovascular, thoracic, neurology and plastic surgery. It also familiarizes the students with terminology and abbreviations for efficient and effective chart reviewing and documentation. It explores various conditions needing attention, focusing on epidemiology, pathology, as well as primary and secondary clinical characteristics and their surgical and medical management. The purpose of this course is to make physiotherapy students aware of various surgical conditions general surgery and specialty surgeries so these can be physically managed effectively both pre as well as postoperatively.

**COURSE OUTCOME:**

At the end of the course, the candidate will be able to:

1. Describe the effects of surgical trauma and Anaesthesia in general
2. Clinically evaluate and describe the surgical management in brief of
  - a) General Surgery
  - b) Neuro Surgery
  - c) Cardiovascular and Thoracic Surgery
  - d) ENT and Ophthalmic Surgery
  - e) Plastic and Reconstructive Surgery
3. Describe pre-operative evaluation, surgical indications in various surgical approaches, management and post operative care in above mentioned areas with possible complications.
4. Be able to read and interpret findings of the relevant investigations

**ORTHOPAEDICS**

**PROGRAM OUTCOME:**

This course intends to familiarize students with principles of orthopaedic surgery along with familiarization with terminology and abbreviations for efficient and effective chart reviewing and documentation. It also explores various orthopaedic conditions needing attention, focusing on

epidemiology, pathology, as well as primary and secondary clinical characteristics and their surgical and medical management. The purpose of this course is to make physiotherapy students aware of various orthopaedic surgical conditions so these can be physically managed effectively both pre as well as postoperatively.

#### **COURSE OUTCOME:**

At the end of the course, the candidate will –

- a) Be able to discuss the, aetiology, Pathophysiology, clinical manifestations and conservative / surgical management of various traumatic and cold cases of the Musculoskeletal Conditions.
- b) Gain the skill of clinical examination; apply special tests and interpretation of the preoperative old cases and all the post-operative cases.
- c) Be able to read and interpret salient features of the X-ray of the Spine and Extremities and correlate the radiological findings with the clinical findings.
- d) Be able to interpret Pathological / Biochemical studies pertaining to Orthopaedic conditions.

#### **MEDICINE-I**

#### **PROGRAM OUTCOME:**

This course intends to familiarize students with medical terminology and abbreviations for efficient and effective chart reviewing and documentation. It also explores selected systemic diseases, focusing on epidemiology, pathology, histology, etiology as well as primary and secondary clinical characteristics and their management. Discusses and integrates subsequent medical management of General, Rheumatology, Gerontology, Cardio-vascular and Respiratory systems, to formulate appropriate intervention, indications, precautions and contraindications.

#### **COURSE OUTCOME:**

At the end of the course, the candidate will:

1. Be able to describe Etiology, Pathophysiology, Signs and Symptoms and Management of the various Endocrinal, Metabolic, Geriatric and Nutrition Deficiency conditions.
2. Be able to describe Etiology, Pathophysiology, Signs and Symptoms, Clinical Evaluation and Management of the various Rheumatologic Cardiovascular and Respiratory Conditions.
3. Acquire skill of history taking and clinical examination of Musculoskeletal, Respiratory, Cardio-vascular and Neurological System as a part of clinical teaching.
4. Be able to interpret auscultation findings with special emphasis to pulmonary system.
5. Study Chest X-ray, Blood gas analysis, P.F.T. findings and Haematological studies, for Cardiovascular, Respiratory, Neurological and Rheumatological conditions.
6. Be able to describe the principles of Management at the Intensive Care Unit.
7. Be able to acquire the skills of Basic Life Support.
8. Acquire knowledge of various drugs used for each medical condition to understand its effects and its use during therapy.



## **MEDICINE-II (Neurology and Paediatrics)**

### **PROGRAM OUTCOME:**

This course intends to familiarize students with medical terminology and abbreviations for efficient and effective chart reviewing and documentation, It also explores select systemic diseases, focusing on epidemiology, etiology, pathology, histology as well as primary and secondary clinical characteristics and their management. It discusses and integrates subsequent medical management of Neurological and Paediatric conditions to formulate appropriate intervention, indications, precautions and contraindications.

### **COURSE OUTCOME:**

At the end of the course, the candidate will:

1. Be able to describe Aetiology, Pathophysiology, signs and Symptoms and Management of the various Neurological and Paediatric conditions.
2. Acquire skill of history taking and clinical examination of Neurological and Paediatric conditions as a part of clinical teaching.
3. Acquire knowledge of various drugs used for each medical condition to understand its effects and its use during therapy.
4. Acquire knowledge in brief about intra-uterine development of the foetus.
5. Be able to describe normal development and growth of a child, importance of Immunization, breast-feeding and psychological aspect of development.
6. Be able to describe neuromuscular, musculoskeletal, cardio-vascular and respiratory conditions related to immunological conditions, nutritional deficiencies, infectious diseases, and genetically transmitted conditions.
7. Acquire skill of clinical examination of a neonate / child with respect to neurological, musculoskeletal and respiratory function.

## **COMMUNITY HEALTH and SOCIOLOGY**

### **A-COMMUNITY HEALTH**

#### **PROGRAM OUTCOME:**

The course is organized to introduce the concept of health care and management issues in Health Services. It will help them in assuming a leadership role in their profession and assume the responsibility of guidance. It will help them assume wider responsibilities at all levels of health services. It will help them in improving their performance through better understanding of the health services at all the levels of community.

### **B- SOCIOLOGY**

#### **PROGRAM OUTCOME:**

This course covers the basic knowledge and concepts of sociology to with the aim to help them understand the impact of group, culture and environment on the behavior and health of the patients. Make

them realize the importance of the relationship of the physical therapist and the patient and the environment around them.

### **GYNAECOLOGY and OBSTETRICS (COLLEGE EXAMINATION)**

#### **PROGRAM OUTCOME:**

This course intends to provide introduction to women's health which includes problems related to pregnancy, osteoporosis, and other disorders specific to women. Topics will focus on medical terminology, clinical examination, evaluation, comparing contemporary, traditional interventions and the impact of evolving technology in this area. It also emphasises on evaluation and medical treatment of pelvic floor dysfunctions.

### **DERMATOLOGY (COLLEGE EXAMINATION)**

#### **PROGRAM OUTCOME:**

At the end of the course, the student will be able to describe the Pathophysiology, Signs and Symptoms, Clinical Features, Examination and Management of Common Skin Conditions like Leprosy, Psoriasis, Bacterial and Fungal Infections of the skin, connective tissue disorder, hand eczema, drug reaction, cutaneous manifestation of HIV, and Sexually Transmitted Diseases

### **RADIO-DIAGNOSIS (COLLEGE EXAMINATION) TOTAL - 10 HRS**

#### **PROGRAM OUTCOME:**

Radio-diagnosis is a useful resource for musculoskeletal conditions and is an invaluable tool for physiotherapists when used appropriately. Imaging such as MRI, X-ray, CT scans, and bone scans are prime examples of practical diagnostic imaging that facilitates accurate diagnosis, prognosis, intervention, and assessment of injuries and dysfunctions that physiotherapist address on a daily basis.

### **ONCOLOGY (COLLEGE EXAMINATION) TOTAL - 10 HRS**

#### **PROGRAM OUTCOME:**

This course will teach application of principles of management of patients with cancer through all care and rehabilitation programmes from diagnosis to the end of life. The objective of this course is to teach Physiotherapy students to conduct ongoing assessment of the needs of this patient group and their carers, in order to apply skilled interventions, which are vital for patients' independence, functional capacity and quality of life.

### **FUNCTIONAL DIAGNOSIS and PHYSIOTHERAPEUTIC SKILLS**

(Didactic - 135 hrs + Clinical – 325 hrs) **TOTAL 460 HRS**

#### **PROGRAM OUTCOME:**

1. Functional Diagnosis and Physiotherapeutic Skills is a stepping stone to introduce students to actual concepts of PT assessment and later to the treatment concepts
2. Functional Diagnosis focuses on the assessment of all the body systems i.e. Musculoskeletal, Neurological and Cardiovascular-Respiratory in order to study the various impairments and their

impact on activity and participation of the individual taking into consideration the contextual factors as well. It also emphasizes on the clinical reasoning of the underlying components of a universal evaluation tool (ICF) for a better understanding of the patient in a holistic manner. The student is also subjected to learn basics of manipulative, cardiovascular-respiratory and neurotherapeutic skills on models so that he/she will be able to apply these principles eventually on patients.

3. The student will also gain a sound knowledge of electro-diagnosis, which is an integral part of Functional Diagnosis.

## **COURSE OUTCOME:**

### **Cognitive:**

At the end of the course, student will be able to:

1. Understand the use of ICF.
2. Acquire the knowledge of human growth and development from new life to birth and adulthood
3. Understand structure and function of nerve and muscle as a base for understanding the electro-diagnostic assessment.
4. Understand the use of appropriate tools or instruments of assessment in Musculoskeletal, Neurological and Cardio-vascular conditions.
5. Understand the theoretical basis and principles of manipulative skills, neurotherapeutic skills and skills of cardiopulmonary care and resuscitation
6. Document results of assessment to evaluate the patient from time to time.

### **Psychomotor:**

Student will be able to:

1. Perform assessment of measures of body structures and functions related to tissue mechanics.
2. Perform assessment of measures of body structures and functions related to motor control affecting activity and participation, quality of life and independence.
3. Perform the skill of electro-diagnosis (SD Curve) and observe skills of EMG and NCV studies, to understand the documentation of finding of these studies.
4. Interpretation and analysis of assessment and findings.
5. Demonstrate skills of manual therapy musculoskeletal, neurotherapeutics and cardiovascular and respiratory skills on models (Laboratory work).

### **Affective:**

Student will be able to:

1. Select appropriate assessment techniques to facilitate safety, sensitive practices in patient comfort and effectiveness.

2. Demonstrate safe, respectful and effective performance of physical therapy handling techniques taking into account patient's clinical condition, need for privacy, resources available and the environment.
3. Follow the principles of appropriate handling technique that is draping, hand placement, body part positioning, manual techniques, lifting and transfer techniques.
4. Communicate with patients and their families/caregivers regarding the need and uses of various assessment techniques.

## **IV B.P.T.**

### **PROFESSIONAL PRACTICE AND ETHICS (COLLEGE EXAMINATION)**

**Total -60Hrs (I to IV year)**

#### **PROGRAM OUTCOME:**

This subject will be taught in continuum from first year to final year. An examination will be conducted only in final year. Professional and ethical practice curriculum content addresses the Knowledge, Skills and Behaviors required by the physiotherapist in a range of practice relationships and roles. The course will discuss the role, responsibility, ethics administration issues and accountability of the physical therapists. The course will also cover the history and change in the profession, responsibilities of the professional to the profession, the public and to the health care team. This includes the application of professional and ethical reasoning and decision-making strategies and professional communication.

<b>Sr. No.</b>	<b>Topics</b>	<b>I B.P.Th.</b>	<b>II B.P.Th.</b>	<b>III B.P.Th.</b>	<b>IV B.P.Th.</b>	<b>Total Hours</b>
<b>1</b>	<b>PROFESSIONAL ISSUES and ETHICS</b>	<b>15 hrs</b>	<b>15 hrs</b>	<b>15 hrs</b>	<b>15 hrs</b>	<b>60</b>

#### **COURSE OUTCOME:**

At the end of the course, the student will be compliant in following domains:

**Cognitive:** The student will

1. Be able to understand the moral values and meaning of ethics

2. Be able to learn and apply ethical code of conduct in fields of clinical practice, learning, teaching, research and physiotherapist-patient relationship
3. Acquire bedside manners and communication skills in relation with patients, peers, seniors and other professionals
4. Will acquire the knowledge of the basics in Managerial and Management skills, and use of information technology in professional Practice
  1. Develop psychomotor skills for physiotherapist-patient relationship
  2. Develop the skill to evaluate and make decisions for plan of management based on sociocultural values and referral practice
    1. Develop behavioral skills and humanitarian approach while communicating with patients, relatives, society and co-professionals
    2. Develop bedside behavior, respect and maintain patients' confidentiality

## **ADMINISTRATION, MANAGEMENT and MARKETING Total – 20 HRS**

### **PROGRAM OUTCOME:**

This curriculum content addresses the Knowledge, Skills and Behaviors required of the physiotherapist in a range of practice relationships and roles. The course will discuss the role, responsibility, administration issues of the physiotherapists. The course will also cover responsibilities of the professional to the profession, the public and to the health care team. This includes the application of professional and ethical reasoning and decision-making strategies, professional communication, reflective practice strategies and personal management issues (stress, work-life balance). Factors that influence individual practice are addressed, including the availability and accessibility of local health care resources as well as the ethical, legal and regulatory requirements of practicing the physiotherapy profession in a given jurisdiction.

### **COURSE OUTCOME:**

At the end of the course the student will be compliant in following domains:

#### **Cognitive:**

The student will:

- a. Learn the management basics in fields of clinical practice, teaching, research and physiotherapy practice in the community.
- b. Acquire communication skills in relation with patients, peers, seniors and other professionals and the community.
- c. Acquire the knowledge of the basics in Managerial and Management skills, and use of Information technology in professional Practice

#### **Psychomotor:**

The student will be able to:

- a. Develop psychomotor skills for physiotherapy practice.
- b. Develop skill to evaluate and make decision for plan of management based on sociocultural values and referral practice.

**Affective:**

The student will be able to:

Develop behavioral skills and humanitarian approach while communicating with patients, relatives, society at large and co-professionals.

## **MUSCULOSKELETAL PHYSIOTHERAPY**

### **PROGRAM OUTCOME:**

This course includes a study of applied anatomy and physiology of the musculo-skeletal system along with pathological changes and patho-mechanics of the system. It discusses relevant tests and measures for determining impairment and differentiating the diagnosis based on the specificity and sensitivity of the assessment instruments as related to patients with disorders of the musculo-skeletal system.

Musculo-skeletal Physiotherapy focuses on maximizing functional independence and well-being. The course uses a patient-centered model of care with multi-system assessment, evidence based interventions and a significant patient education component to promote a healthy, active lifestyle and community-based living.

The candidate will have a sound understanding of theory, scientific evidence and best practices in the areas of the Musculo-skeletal System including Movement Sciences, Psychosocial Sciences and Physiotherapy.

### **COURSE OUTCOME:**

At the end of the course, student will be able to:

**Cognitive:**

- a) Identify, evaluate, analyze and discuss primary and secondary musculo-skeletal dysfunction, based on biomechanical, kinesiological and patho-physiological principles.
- b) Correlate the same with radiological, electrophysiological, biochemical/ haematological investigations as applicable and arrive at the appropriate Physiotherapy diagnosis with skillful evaluation of structure and function with clinical reasoning.
- c) Understand the pharmaco-therapeutics, its interaction with physiotherapeutic measures and modify physiotherapeutic intervention appropriately.

- d) Apply knowledge of psychosocial factors (personal and environmental factors in the context of disability associated with the musculo-skeletal system or multiple body systems) for behavioral and lifestyle modification and use appropriate training and coping strategies.

**Psychomotor:**

- a) Apply theoretical basis of physiological effects, indications, contraindications; and best available evidence on the effectiveness, efficacy and safe application guidelines for a full range of physiotherapeutic strategies and interventions, including appropriate modes of soft tissue and joint mobilization, electrotherapy, therapeutic exercise, and appropriate ergonomic advice that can be employed to manage problems of the individual's structures, functions, activities and participation, capacity and performance levels associated with the musculo-skeletal system, for relief of pain and prevention, restoration and rehabilitation measures for maximum possible functional independence at home, workplace and in community.
- b) Prescribe and train for appropriate orthoses, prostheses and walking aids based on musculoskeletal dysfunction.

**Affective:**

Acquire ethical skills by demonstrating safe, respectful and effective performance of physical handling techniques taking into account the patient's clinical condition, the need for privacy, the physiotherapist, the resources available and the environment.

**NEUROPHYSIOTHERAPY**

**PROGRAM OUTCOME:**

This course includes a study of applied anatomy and physiology of the neuromuscular system along with the pathological changes and patho-mechanics of the system. It discusses relevant tests and measures for determining impairment and differentiating the diagnosis based on the specificity and sensitivity of the assessment instruments as related to patients with disorders of the neuromuscular system.

Neurophysiotherapy curriculum emphasizes the selection and use of measurement tools and management techniques based on the best available evidence. Physiotherapy strategies for assessment and treatment address structural and functional impairments and activity limitations of individuals and population (both adults and paediatric) in the context of their personal needs/goals including participation restrictions and the environment they live in. The permanence of many neurological impairments mandates that, where possible, emphasis is placed on prognosis and criterion – referenced outcomes to establish realistic goals. The therapeutic approach is patient and family focused with a biopsychosocial emphasis that embraces inter professional collaboration and requires ongoing communication, education and negotiation with the client, family, care giver and healthcare team.

**COURSE OUTCOME:**

At the end of the course, student will

**Cognitive:**

- a) Be able to identify and analyze movement dysfunction due to neuromuscular skeletal disorders in terms of biomechanical and biophysical basis, correlate the same with the health condition, routine electrophysiological, radiological and biochemical investigations, and arrive at appropriate physical therapy diagnosis using WHO-ICF with clinical reasoning.
- b) Be able to plan realistic goals based on the knowledge of prognosis of the disease of the nervous system and prescribe appropriate, safe evidence based physiotherapy interventions with clinical reasoning.
- c) Understand infection control principles, best practices and techniques applicable to a range of setting where clients with neurological conditions would receive physiotherapy services.
- d) Know determinacy of health (environmental, nutritional, self-management/ behavioral factors) and chronic disease management principles related to neurological health.

**Psychomotor:**

- a) Be able to develop psychomotor skills to implement timely and appropriate physiotherapy assessment tools/techniques to ensure a holistic approach to patient evaluation in order to prioritize patient's problems.
- b) Be able to select timely physiotherapeutic interventions to reduce morbidity and physiotherapy management strategies, suitable for the patients' problems and indicator conditions based on the best available evidence.
- c) Implement appropriate neuro-physiotherapeutic approaches, electrotherapeutic modalities, joint and soft tissue mobilizations and ergonomic advice for neuromuscular skeletal systems, contextual factors to enhance performance of activities and participation in society.

**Affective:**

- a) Be able to develop behavioral skills and humanitarian approach while communicating with patients, relatives, society and co-professionals, to promote individual and community health.

**CARDIO-VASCULAR and RESPIRATORY PHYSIOTHERAPY (INCLUDING CRITICAL CARE)**

**PROGRAM OUTCOME:**

This course includes a study of applied anatomy and physiology of the Cardiovascular and Respiratory system along with pathological changes and patho-mechanics of the system. It discusses relevant tests and measures for determining impairment and differentiating the diagnosis based on the specificity and sensitivity of the assessment instruments as related to patients with disorders of the Cardiovascular and Respiratory system.



Cardiovascular and Respiratory Physiotherapy focuses on maximizing functional independence and well-being. This course uses a patient-centered model of care with multi-system assessment, evidence based interventions and a significant patient education component to promote healthy active lifestyle and community-based living. The candidate will have a sound understanding of theory, scientific evidence and best practices in the areas of the Cardio vascular and Respiratory System including critical care, Psychosocial Sciences, Movement Sciences and Physiotherapy.

### **COURSE OUTCOME:**

At the end of the course, the student will be able to:

#### **Cognitive:**

- a. Identify and analyze cardio-vascular and pulmonary dysfunction in terms of bio-mechanical, and Bio-physical basis and correlate the same with the Health condition, routine electrophysiological, radiological, and biochemical investigations and arrive at appropriate Physical therapy diagnosis using WHO-ICF tool (Disability, Functioning and contextual factors) with clinical reasoning.
- b. Plan, prescribe appropriate, safe physiotherapy interventions with clinical reasoning for and prevention of impairments, activity limitations, participation restrictions and environmental barriers related to cardio-vascular and pulmonary dysfunction in acute care settings, at home , work place, in society and in leisure activities.

#### **Psychomotor:**

- a. Utilise skills such as executing exercise tests, PFT, Ankle brachial index, arterial and venous insufficiency tests
- b. Utilise psychomotor skills to implement appropriate bronchial hygiene therapy, therapeutic exercise, electrotherapeutic modalities, CPCR, Intensive (critical) care, joint and soft tissue mobilisations, offering ergonomic and energy conservation advice for patients with cardio-vascular and pulmonary dysfunction.
- c. Utilise the knowledge about contextual factors to enhance capacity and performance of activities and participation in society
- d. Utilise the skill to deliver cardiac, pulmonary and vascular rehabilitation

#### **Affective:**

- a. Develop behavioral skills and humanitarian approach while communicating with patients, relatives, society at large and co-professionals
- b. Develop bed side behavior, respect and maintain patients' confidentiality

### **COMMUNITY PHYSIOTHERAPY**

#### **PROGRAM OUTCOME:**

Community Physiotherapy describes the roles and responsibilities of the Physiotherapist as an efficient member of the society. This component introduces the Physiotherapist to a proactive preventive oriented philosophy for optimization and betterment of health.

Community Physiotherapy is not apart from the other sections of Physiotherapy described in this syllabus. In fact, it is the in-depth application of these same aspects viz. Musculoskeletal, Neurological and Cardio Vascular and Respiratory to the entire society. This is done by understanding the sections and sub sections of the societies, the national and international health policies, role of Government and Non Government Organizations.

The applications of Community Physiotherapy are not limited to conditions and dysfunctions but as attributed to promotion of Health and rehabilitation in Communities like Elderly, Women, and Occupational Health etc.

### **COURSE OUTCOME:**

At the end of the course the student shall:

#### **Cognitive:**

Be able to describe:

- a) The general concepts about health, disease and physical fitness.
- b) Physiology of aging process and its influence on physical fitness.
- c) National policies for the rehabilitation of disabled – role of PT.
- d) The strategies to access prevalence and incidence of various conditions responsible for increasing morbidity in the specific community – role of PT in reducing morbidity, expected clinical and functional recovery, reasons for non-compliance in specific community environment and solution for the same.
- e) The evaluation of disability and planning for prevention and rehabilitation.
- f) Rehabilitation in urban and rural set up.
- g) Able to be a part of decision making team regarding the policies for the welfare of special communities and on issues of disability

#### **Psychomotor:**

- a) Be able to identify with clinical reasoning the prevailing contextual {e.g. environmental and psycho-social cultural} factors, causing high risk responsible for various dysfunctions and morbidity related to sedentary life style and specific community like women, children, aged as well as industrial workers and describe planning strategies of interventional policies to combat such problems at community level.
- b) Be able to gain the ability to collaborate with other health professionals for effective service delivery and community satisfaction
- c) Utilize the research methodology knowledge for formulation of a research question (synopsis)

#### **Affective:**

Be an empathetic health professional, especially for those in the community, who is away from the health institutions and having difficulty in healthcare access

## **PRINCIPLES OF BIOENGINEERING (COLLEGE EXAMINATION)**

### **PROGRAM OUTCOME:**

The course is designed to give knowledge and application of biomechanical principles related to Orthotics and Prosthetics. Students will also learn the principles of the prescription and the checkout procedures of aids and appliances as per the physical dysfunction of the person. They will learn to fabricate simple splints.

### **COURSE OUTCOME:**

At the end of the course, the candidate shall

#### **Cognitive:**

- a) Acquire knowledge about biomechanical principles of application of variety of aids and appliances used for ambulation, protection and prevention.
- b) Acquire in brief knowledge about various material used for splints/ Orthoses and prostheses and their selection criteria

#### **Psychomotor:**

Acquire the skill of fabrication of simple splints made out of Low cost material

## **RESEARCH METHODOLOGY AND BIOSTATISTICS (COLLEGE EXAMINATION)**

### **PROGRAM OUTCOME:**

To provide the students with the necessary concepts of statistics to enable them to realize a research project in the field of Physiotherapy. It involves selection of appropriate statistical techniques to address questions of medical and physiotherapeutic relevance; selects and applies appropriate statistical techniques for managing common types of medical / physiotherapeutic data. It uses various software packages for statistical analysis and data management. It interprets the results of statistical analyses and critically evaluates the use of statistics in the medical literature. It communicates effectively with statisticians and the wider medical community, in writing and orally through presentation of results of statistical analyses. It explores current and anticipated developments in medical statistics as applied to physiotherapists. It is designed to teach entry-level physical therapy students the fundamentals of reading and understanding research methods, design, and statistics.

### **COURSE OUTCOME:**

At the end of the study of this subject the student should be able to:

1. Enumerate the steps in Physiotherapy research process.
2. Describe the importance and use of biostatistics for research work.
3. Acquire skills of reviewing literature, formulating a hypothesis, collecting data, writing research proposal etc.

## **College of Nursing Loni CON)**

### **Program: BSc Nursing**

#### **A. Program Outcome**

- This program prepare a professional graduate nurses to meet the great challenges of services in the field of nursing and prepares its students to become exemplary citizen by adhering to the code of ethics and professional conduct at all times in fulfilling personal, social and professional obligations so as to respond to national aspirations.

#### **B. Program Specific Outcome**

1. Prepare graduates to assume responsibilities as professional, competent nurses and midwives in providing promotive, preventive, curative and rehabilitative services.
2. Prepare nurses who can make independent decisions in nursing situations, protect the rights of and facilitate individuals and groups in pursuit of health, function in the hospital, community nursing services and conduct research studies in the areas of nursing practice.
3. They are also expected to assume the role of teacher, supervisor and manager in clinical/public health settings.

#### **C. Course outcome**

#### **On completion of the four year BSc Nursing program the graduate will able to:**

1. Apply knowledge from physical, biological and behavioral sciences, medicine including alternative systems and nursing in providing nursing care to individuals, families and communities.
2. Demonstrate understanding of life style and other factors which affect health of individuals and groups.
3. Provide nursing care based on steps of nursing process in collaboration with the individuals and groups.
4. Demonstrate critical thinking skill in making decisions in all situations in order to provide quality care.
5. Utilize the latest trends and technology in providing the health care.
6. Provide promotive, preventive and restorative health services in line with the National Health Policies and programs.
7. Practice within the framework of code of ethics and professional conduct and acceptable standards of practice within the legal boundaries.
8. Communicate effectively with individuals and groups and members of the health team in order to promote effective interpersonal relationship and team work.
9. Demonstrates skills in teaching to individuals and groups in clinical/community health settings
10. Participate effectively as members of the health team in health care delivery system.
11. Demonstrate leadership and managerial skills in clinical/community health settings.
12. Conduct need based research studies in various settings and utilize the research findings to improve the quality of care.

13. Demonstrate awareness, interest and contribute towards advancement of self and of the profession.

### **Program: PBBSc Nursing**

#### **A. Program Outcome**

- This program prepare a professional graduate nurses to meet the great challenges of services in the field of nursing and prepares its students to become exemplary citizen by adhering to the code of ethics and professional conduct at all times in fulfilling personal, social and professional obligations so as to respond to national aspirations.

#### **B. Program Specific Outcome**

1. Prepare graduates to assume responsibilities as professional, competent nurses and midwives in providing promotive, preventive, curative and rehabilitative services.
2. Prepare nurses who can make independent decisions in nursing situations, protect the rights of and facilitate individuals and groups in pursuit of health, function in the hospital, community nursing services and conduct research studies in the areas of nursing practice. They are also expected to assume the role of teacher, supervisor and manager in clinical /public health settings.

#### **C. Course outcome**

On completion of Post Basic B.Sc. Nursing degree program the graduates will be able to:

1. Assess health status, identify nursing needs, plan implement and evaluate nursing care for patients / clients that contribute to health of individual families and communities.
2. Demonstrate competency in technique of nursing based on concepts and principles from selected areas of nursing physical, biological and behavioral sciences.
3. Participate as members of health team in the promotive, preventive, curative and restorative health care delivery system of country.
4. Demonstrate skills in communication and interpersonal relationship.
5. Demonstrate leadership qualities and decision – making abilities in various situations.
6. Demonstrate skills in teaching to individual and groups in community health settings.
7. Demonstrate managerial skills in community health setting.
8. Practice ethical values in their personal and professional life.
9. Participate in research activities and utilize research findings in improving nursing practice.
10. Recognize the need for continued learning for their personal and professional development.

### **Program: MSc Nursing**

#### **A. Program Outcome**

- The program prepares nurses for leadership position in nursing and health fields who can function as nurse specialists, consultants, educators, administrators and researchers in a wide variety of professional settings in meeting the National priorities and the changing needs of the society.

#### **B. Program Specific Outcome**

1. Prepare graduates to assume responsibilities as nurse specialists, consultants, educators, administrators in a wide variety of professional settings

### **C. Course outcome**

On Completion of the two year MSc nursing program, the graduate will be able to:

1. Utilize/apply the concepts, theories and principles of nursing science
2. Demonstrate advance competence in practice of nursing
3. Practice as a nurse specialist.
4. Demonstrate leadership qualities and function effectively as nurse educator and manager.
5. Demonstrate skill in conducting nursing research, interpreting and utilizing the findings from health related research.
6. Demonstrate the ability to plan and effect change in nursing practice and in the health care delivery system.
7. Establish collaborative relationship with members of other disciplines
8. Demonstrate interest in continued learning for personal and professional advancement.

## Centre for Biotechnology (CBT):

### Graduate Attributes:

A graduate of a higher education institute, while studying should broaden their horizon & attitudes, develop their current skills and abilities to learn new ones not only in their studies & future careers but also support their role for the society. For each programme, graduate attributes are defined and the programme aims to inculcate these attributes in the students during their course of study. The graduate attributes are as follows:

- Knowledge & Expertise of a Discipline
- Research and Enquiry
- Information & Digital Literacy
- Problem Solving
- Communication
- Behavioural Skills, Teamwork and Leadership
- Ethical, Social and professional understanding
- Employability & Entrepreneurship
- Lifelong Learning

Program Name	Program Outcome	Program specific outcome
B. Sc + M. Sc (Int.) Medical Biotechnology	<ul style="list-style-type: none"> <li>• To impart basic knowledge and skills of various aspects of biotechnology.</li> <li>• To train the students for industrial need and to pursue further education.</li> <li>• To inculcate entrepreneurship among the students so as to start their own ventures in the field of biotechnology.</li> <li>• The programme leads the students to higher learning in biological, chemical and applied sciences and contribute to the welfare of the society.</li> </ul>	<ul style="list-style-type: none"> <li>• The students would be equipped with a thorough basic understanding of Cell Biology, Immunology, Biochemistry, Molecular Biology, Microbiology etc. which would put them in a better position to take up higher studies in any of those fields and have the benefit of interdisciplinary approach.</li> <li>• The programme would make the students to identify, analyze &amp; understand the problem related to life sciences &amp; find valid conclusions with basic knowledge acquired in Biotechnology.</li> <li>• The student will be able to demonstrate their practical learning skills to work effectively in team.</li> </ul>
M. Sc (Ind.) Medical Biotechnology	<ul style="list-style-type: none"> <li>• Our course is designed to enhance student career in the medical biotechnology sector in a variety of research, product and technology development and leadership roles.</li> <li>• Medical Biotechnology will equip students with broad theoretical knowledge in area of Cellular &amp; Molecular Biology, Biochemistry &amp; Immunology and critical understanding of advanced principles in biotechnology.</li> <li>• Student will understand use and applications of relevant analytical technique in the field of Medical</li> </ul>	<ul style="list-style-type: none"> <li>• Students of the programme would be benefitted from the core biology domains like Cytology, Microbiology, Genetics, Biochemistry etc along with Molecular Biology, Genetic Engineering, Cell Culture, and Immunology etc.</li> <li>• The students will possess the modern Biological &amp; Technical knowledge needed to support Biotechnology research activities.</li> <li>• The students will be competent for jobs in industries in the domains of pharmaceuticals, dairy, clinical</li> </ul>

	Biotechnology. <ul style="list-style-type: none"> <li>• Student will gain the practical skills required to underpin a career within a business or research environment.</li> </ul>	research etc. <ul style="list-style-type: none"> <li>• The students will be capable for competitive exams like CSIR NET, SET etc and also to write research proposals for grants.</li> </ul>
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Course Name	Objectives	Course Outcome
<b>Sem I</b>		
<b>Basic Chemistry</b>	<ul style="list-style-type: none"> <li>• To familiarize the students with basic concepts of organic &amp; inorganic chemistry.</li> <li>• To familiarize the students with structures of organic molecules as: alkanes, alkenes, alkynes, aliphatic and aromatic molecules</li> <li>• To introduce them to interactions amongst compounds</li> </ul>	At the end of this course student should be able to understand basic principles of organic & Inorganic chemistry and develop skills in handling organic molecules. This is essential for undertaking practical training in Biochemistry and genetic engineering at the later stage.
<b>Mathematics for Life Sciences</b>	The objective of the course is to familiarize the students with advancement in mathematics for life sciences.	At the end of the course, the students will have advance knowledge and understanding of principles of mathematics tools used in biotechnology.
<b>Evolutionary Biology</b>	To familiarize the student with basics of Evolutionary process and its relatedness with current bioprocesses and living organism.	Students shall be able to understand evolution among non living and living things. <ul style="list-style-type: none"> <li>- Compressive and stepwise evolution among non living things.</li> <li>- Emergence of life with simple geochemistry to complex biochemistry of current time.</li> <li>- Relatedness among life forms through studying fossils &amp; molecular evidence of evolution.</li> </ul>
<b>Introduction to Biotechnology</b>	The objective of the course is to enlighten the student with knowledge of biotechnology with techniques involved in Biotechnology and its use in the field of Medical and health care.	The anticipated knowledge, skills and/or attitude to be developed by the student are: <ol style="list-style-type: none"> <li>1. Be able to define the term “biotechnology” and appreciate its scope</li> <li>2. Have an awareness of the global significance of biotechnology and its resultant industries, and a broad knowledge of which are represented nationally and locally</li> <li>3. Be familiar with the key events in the development of biotechnology</li> <li>4. Be able to state the broad categories of biotechnological processes based on the products formed and/or the process or substrates used, and have detailed knowledge of examples of each of these</li> <li>5. Have an understanding of the multidisciplinary nature of biotechnology and the associated role that has been played by enabling technologies in the</li> </ol>



		development of biotechnology 6. Have an awareness of some of the current and future issues surrounding the relationship between biotechnology and government, investors, the environment and consumers and the impact of these on the development of future biotechnology enterprises.
<b>Sem II</b>		
<b>Biophysics</b>	To provide student with foundation in basic concept of Biophysics. Topics will include basic ideas of diffusion, thermodynamics & kinetics will be discussed in context of biological process.	At the end of the course student will be able to demonstrate knowledge of fundamental concept in physics & chemistry that underlie biological process. Define characteristic nucleic acid protein and examine parameter that determine their stability & function.
<b>Cell Biology</b>	The objective of the course is to familiarize the students with the fundamentals of cell biology.	At the end of the course, the students will be familiar with cell science and cell-cell interaction. This would help him to take further courses in biotechnology in the subsequent semesters.
<b>Basic Laboratory Methods</b>	This course has been designed to introduce the student to laboratory, Preparations of reagents, measurements and various classical and modern techniques used in biochemical research. The course encompasses the principles, significance, applications, and limitations of these techniques. The basic instrumentation is also included.	At the end of this course student will be able to understand advanced level concepts of analytical tools, their principle and applications in the area of Biotechnological.
<b>Computational Methods in Biotechnology</b>	To familiarize the students with computers and programming concepts. To introduce basic concepts in: hardware, software and its implementation. To introduce concepts of Networking, World Wide Web (Internet), Telnet, FTP, Etc. Programming module is intended to familiarize them with computer logic and solution of real world problems using computers.	At the end of this course student would be able to understand basic principles of Computing, Networking and Programming.
<b>Sem III</b>		
<b>Genetics – A</b>	<ul style="list-style-type: none"> <li>• The objective of the course is to familiarize the students with the importance &amp; universality of Genetics.</li> <li>• To provide knowledge of basic law of inheritance.</li> <li>• To understand the concept of linkage map, sex linked genes &amp; crossing over.</li> </ul>	At the end of the course, the student will understand the mechanism of Mendelian Genetics, structure of nucleic acids gene expression, linkage & crossing over & sex inexistence. They will gain better knowledge in gene mutation, repair mechanism, process of gene transfer. They will be able to analyse the role of transposable elements.

<b>Medical Microbiology – A</b>	<p>To provide student with basic knowledge of microorganism in general.</p> <p>To study main characteristic of microbe of medical importance.</p> <p>To study mechanism of pathogenesis</p> <p>To teach aseptic technique.</p>	<p>After successful completion of this course students are expected to be able to: knowledge about microorganism and their medical importance.</p> <p>Also acquire the skill of aseptic technique in field of microbiology.</p> <p>To transfer culture from one medium by inoculating another medium and to isolate microorganism from a mixed culture to obtain a pure culture</p> <p>Identify organism on the basis of staining technique.</p>
<b>Human Biochemistry – A</b>	<p>To create general understanding about bio-molecules their synthesis in relation to living systems.</p> <ul style="list-style-type: none"> <li>• To familiarize the student with basic concepts in bioenergetics.</li> </ul>	<p>At the end of the course, the students will have sufficient scientific understanding of the basic concepts in biochemical processes. This would enable him to understand use of biochemical methods in understanding synthesis of various products.</p>
<b>Biostatistics</b>	<p>The objective of the course is to familiarize the students with advancement in biostatistics.</p>	<p>At the end of the course, the students will have advance knowledge and understanding of principles of biostatistics statistical tools used in biotechnology.</p>
<b>Sem IV</b>		
<b>Genetics – B</b>	<ul style="list-style-type: none"> <li>• The provide knowledge of population genetics &amp; evolutionary genetics.</li> <li>• To familiarize the students with basic concepts of nucleic acid in prokaryotic &amp; eukaryotic organism.</li> </ul>	<p>At the end of the course, the student will understand the population genetics gene expression &amp; its regulation in prokaryotes &amp; eukaryotes DNA sequencing, Gene cloning. They will be able to understand the basic of cancer.</p>
<b>Medical Microbiology – B</b>	<p>About diagnostic microbiology. In that clinical presentation of an infectious disease, the diagnosis, treatment and prevention of infectious disease.</p>	<p>After completion of this course students are expected to be able to-</p> <ul style="list-style-type: none"> <li>— Describe disease</li> <li>— Pathogenesis</li> <li>— Treatment also</li> <li>— Explain general and specific mechanism by which infectious agent cause disease.</li> </ul>
<b>Human Biochemistry – B</b>	<p>To familiarize the student with basic biochemistry involved in human metabolism.</p>	<p>At the end of the course, the students will have sufficient scientific understanding of the subject and have good knowledge of various bio-molecules their functions and metabolism.</p>
<b>Enzyme Technology</b>	<p>The objective of the course is to familiarize the students with basic properties, enzyme kinetics, enzyme inhibition and applications of enzyme in various fields.</p>	<p>At the end of the course, the students will have sufficient scientific understanding of the enzymology. This knowledge would be applicable in different industries</p>
<b>Sem V</b>		

<b>Molecular Biology</b>	<ul style="list-style-type: none"> <li>▪ The course gives an in-depth insight into the molecular aspects of life - the central dogma.</li> <li>▪ It explains molecular aspects of genes and its regulation- genome-gene expressions.</li> </ul>	At the end of the course, the student will get an idea about the principles behind molecular biology which makes student to understand the basic molecular tools & techniques & its application in basic research & applied research in various field of life sciences.
<b>Fermentation Technology</b>	Provide knowledge of basic principle of fermentation process, which help student to design, develop and operate industrial level fermentation process.	After completion of this course student will be able to recognize the fundamentals of microbial fermentation. Student will be able to optimize different bacterial fermentation process.
<b>Biomembrane</b>	The objective of the course is to enlighten the student with knowledge of membrane structure and transport of small and macromolecules across the cell membrane.	<ul style="list-style-type: none"> <li>• How the biochemical and biophysical properties of membranes constituents contribute to the structure and organization of membranes</li> <li>• Cell compartmentalization and how proteins are transported between organelles.</li> <li>• The principles and organization of signal transduction pathways</li> <li>• How ions and solutes are transported across membranes</li> </ul>
<b>Sem VI</b>		
<b>Ethical issues in biotechnology</b>	This part of the syllabus helps the students to understand the ethical, social, legal aspects in biology and bio-containment	Identifying potential ethical issues associated with biotechnology. Selecting questions and approaches that address the issues identified. Discussing the necessary interaction between science, economics, communication, and public policy
<b>Pharmaceutics</b>	To impart basic knowledge in the area of pharmaceutics, where is usage from? To impart effect of different route of administration and distribution of drug actions, different drug delivery system. To acquire basic knowledge of pharmaceutical jurisprudence.	The student will be able to understand the concepts of ADME of drug in human body, drug action various conventional dosage forms. They will able to understand the formation of different pharmaceutical product based on biotechnological applications.
<b>Basic Immunology</b>	To acquire basic and broad overview of immunology and its applications in the challenging fields of medicine and in basic and applied research in immunology.	At the end of the course, the students will have sufficient scientific understanding of immune system, molecular biology of antibody formation, various immunological assay and function of immune system in various microbial infections.
<b>Sem VII</b>		
<b>Advance Cell Biology</b>	The objective of the course is to familiarize the students with the fundamentals of cell biology.	At the end of the course, the students will be familiar with cell science and cell-cell interaction. This would help him to take further courses in biotechnology in the subsequent semesters.
<b>Advance Molecular Biology</b>	The objective of the course is to familiarize the student with the	At the end of the semester, it is expected that students understood the basic genetic

	fundamentals concepts and technique in molecular biology and its use in the medical research.	mechanisms such as DNA and chromosomes, replication, DNA repair and recombination, gene expression and regulation, and how to apply molecular knowledge to solve a critical problem. It is expected that they will be more confident to develop independent research projects either for pursuing their higher education or for industrial applications.
<b>Bioinformatics</b>	The objective of the course is to enlighten the student with basic concepts and technique in Bioinformatics and its use in the field of Medical and health care.	<p>knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics</p> <p>existing software effectively to extract information from large databases and to use this information in computer modeling</p> <p>an understanding of the intersection of life and information sciences, the core of shared concepts, language and skills the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries</p>
<b>Sem VIII</b>		
<b>Genetic Engineering</b>	To familiarize the student with emerging field of biotechnology i.e. Recombinant DNA Technology as well as to create understanding and expertise in wet lab techniques related to genetic engineering.	At the end of the course, the student will be achieve a round knowledge on methodological respective which allows them to innovatively apply these techniques in basic & applied fields of life science researches.
<b>Human Physiology</b>	The objective of the course is to develop insight of physiological aspects of the human systems with respect to various interactions occurring with all the major organs of the body. The course is well equipped to deal with branches of biophysics, biochemistry and clinical applications as well.	The course would enables the student to understand the integral mechanism operating in the human system along with the regulation of each system
<b>Drug Delivery</b>	To impart basic concepts and market perspective of drug delivery. To acquire advance drug delivery and various targeting system.	At the end of the course, the student will have sufficient scientific understanding in advance drug delivery & targeting system. They will be able to understand different technologies in drug delivery.
<b>Sem IX</b>		
<b>Advance Immunology</b>	The objective of the course is to familiarize the student with the basics of immune system and its role in disease outcome	<p>Students shall be able to understand.</p> <ul style="list-style-type: none"> <li>- Evolutionary development of immune system across all species of organism.</li> <li>- Components of immune system.</li> <li>- Mechanism of functioning of immune system</li> <li>- Applications of immune components in research and treatment.</li> </ul>

<b>Biopharmaceutical Biotechnology</b>	The objective of the course is to give strong base and advanced information on biopharmaceutical aspects in relation to drug development.	At the end of course, the student will have sufficient understanding of different biopharmaceuticals products and their manufacturing products, different aspects of pharmacokinetics, pharmacodynamics, pharmacogenomics & nanobiotechnology
<b>Animal Tissue Culture</b>	The objective of the course is to familiarize the students with the basics of Animal Tissue Culture Techniques and use of in various fields of research and human welfare.	At the end of the course, the students will have sufficient scientific understanding of the Animal Tissue Culture techniques, knowledge of aseptic handling of cell lines. Use of these techniques in various fields of research and medicine and human welfare.
<b>Sem X</b>		
<b>M.Sc. Dissertation Project</b>		

<b>Course Name</b>	<b>Objectives</b>	<b>Course Outcome</b>
<b>Sem I</b>		
<b>Cell Biology</b>	The objective of the course is to familiarize the students with the fundamentals of cell biology.	At the end of the course, the students will be familiar with cell science and cell-cell interaction. This would help him to take further courses in biotechnology in the subsequent semesters.
<b>Molecular Biology</b>	The objective of the course is to familiarize the student with the fundamentals concepts and technique in molecular biology and its use in the medical research.	At the end of the semester, it is expected that students understood the basic genetic mechanisms such as DNA and chromosomes, replication, DNA repair and recombination, gene expression and regulation, and how to apply molecular knowledge to solve a critical problem. It is expected that they will be more confident to develop independent research projects either for pursuing their higher education or for industrial applications.
<b>Human Biochemistry</b>	The Objective of the course is to familiarize the students with the fundamental and advances in Human Biochemistry	At the end of the course, the student will have sufficient scientific understanding of the subject & have good knowledge of various bimolecular, their factions & metabolism.
<b>Animal Tissue Culture</b>	The objective of the course is to familiarize the students with the basics of Animal Tissue Culture Techniques and use in various fields of research and human welfare.	<ul style="list-style-type: none"> <li>- Successfully maintain cultures of animal cells and established cell lines with good viability, minimal contamination and appropriate documentation.</li> <li>- Perform supportive or episodic tasks relevant to cell culture, including preparation and evaluation of media, cryopreservation and recovery, and assessment of cell growth/health.</li> <li>- Recognize and troubleshoot problems common to routine cell culture.</li> </ul>

<b>Sem II</b>		
<b>Human Physiology</b>	The objective of the course is to study the physiological aspects of the human systems and its role in functioning of all the major organs of the body.	At the end of the course, the students will be able to understand the integral mechanism operatly in the human system among with regulation of each system.
<b>Microbiology</b>	To familiarize student with bacteria, viruses, their structure metabolism, disease caused by bacteria, viruses & their control.	After completion of this course students are expected to be able to. <ul style="list-style-type: none"> <li>- Demonstrate theory and practical skill in microscopy and their handling technique and staining procedure.</li> <li>- Know various culture media and their application</li> <li>- Understand physical and chemical means of sterilization on</li> <li>- Know various biochemical test to analysis, understand, basic concept of chemical reaction that occur in lining system.</li> </ul>
<b>Industrial Biotechnology</b>	To make the students aware of the overall industrial bioprocesses which requires for understanding the process and industrial demands.	By the end of the course, the student will be develop as understanding of the various aspects of bioprocess technology, develop skill associated with screening of industrially important strains & understand principles of design of fermenter, fermentation process & downstream processing.
<b>Bioinformatics</b>	The objective of the course is to enlighten the student with basic concepts and technique in Bioinformatics and its use in the field of Medical and health care.	knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics  existing software effectively to extract information from large databases and to use this information in computer modeling  an understanding of the intersection of life and information sciences, the core of shared concepts, language and skills the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries.
<b>Sem III</b>		
<b>Genetic Engineering</b>	To familiarize the student with emerging field of biotechnology i.e. Recombinant DNA Technology as well as to create understanding and expertise in wet lab techniques related to genetic engineering.	At the end of the course, the students will have sufficient scientific understanding of the subject and have good knowledge of application of Recombinant DNA techniques in Life Sciences Research.
<b>Immunology</b>	The objective of this course to familiarize students with basics & broad overview of immunology & its implications in bio-medical research.	Students shall be able to understand. <ul style="list-style-type: none"> <li>- Evolutionary development of immune system across all species of organism.</li> <li>- Components of immune system.</li> <li>- Mechanism of functioning of immune system</li> <li>- Applications of immune components in research and treatment.</li> </ul>

<b>Medical Microbiology</b>	It is not only about diagnosing and treating disease if also involve study of beneficial microbe. Microbe have been shown to be helpful in combating infections disease and promoting health.	After successful completion of this course student are expected to be able to. - Identify common infectious agent and disease that they cause. - Student will be able to evaluate method used to identify infectious agent in chemical microbiology lab. - In detail knowledge abouts microorganism. - Knowledge about diagnostic microbiology-chemical presentation of an infectious disease, diagnosis, treatment and prevention of infectious disease.
<b>Elective any one</b>		
<b>Clinical Research</b>	The objective of the course is to impart the knowledge of clinical research which can be used for drug discovery and development.	At the end of the course the student will be capable to design, execute & inspects data of clinical research & trials.
<b>Developmental Biology and Stem Cells</b>	The objective of the course is to develop insight of embryonic development of various organisms, with emphasis on human embryonic development. The course is designed include development at various levels.	At the end of the course, the student will be able under the human embryonic development & different types of stem cell and new technique used in stem cell biology.
<b>Human Genetics</b>	The objective of the course is to familiarize the students with the importance & universality of Human Genetics. The students will be familiar with sub-disciplines in Genetics and their importance in applied medical sciences.	At the end of this course students should have sound knowledge of Genetics and its importance in applied sciences with respect to its use in Medical Biotechnology.
<b>Sem IV</b>		
<b>Research Methodology and Socio-Ethical aspects of Biotechnology</b>	The objective of the course is to make students aware of research methodology and biostatistics used in biotechnology research as well as to aware them the legal, safety and public policy issues raised due to the progress in Biotechnology and development of new products as well as regulatory framework governing processing of bio-products.	At the end of the course, the students will have sufficient understanding of the basic knowledge of research methodology which is basically knowledge of Biosatistic tools like chi square test, f test, t- test ,multivariate analysis, regression analysis, random block design and software packages like SPSS for statistical analysis. Students will have basic knowledge of scientific writing skills.
<b>Pharmaceutical Biotechnology</b>	The objective of the course is to give strong base and advanced information on biopharmaceutical aspects in relation to drug development.	At the end of course, the student will have sufficient understanding of different biopharmaceuticals products and their manufacturing products, different aspects of pharmacokinetics, pharmacodynamics, pharmacogenomics & nanobiotechnology
<b>Project work/ Dissertation</b>		