Krishna Institute of Medical Sciences

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:

- 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.
- 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
- Communicate effectively in writing on a variety of topics related to health care.
- Demonstrate an awareness and appreciation of the delivery of culturally competent health care.
- Appreciate the socio-psychological, cultural, economic and environmental factors affecting health.
- Effectively communicate and acknowledge the impact of the legal, ethical, and political environment on health care policy and delivery.
- .Describe and demonstrate management / leadership skills.
- 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 st 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, hemoglobin 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 courrse,the student shall be able to : -

Pathology

1. Achieve complete understandining 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 medicolegal/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-Otorhinolaryngiology.

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
1. Venipuncture 2. Intramuscular injection 3. Subcutaneous injection 4. IV injection	1. Blood transfusion 2. Lumbar puncture 3. Pleural and ascitic aspiration	1. Intradermal injection 2. Urinary catheterization 3. Basic life support 4. Ryle's tube insertion

5. Oxygen therapy 6. Nebulization therapy		5. Cardiac resuscitation 6. Bedside urine analysis

Paediatrics

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 Gynecology

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.

Orthopaedics:

1. Recognise 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 variousbiomolecules.
2. Handle various instrument - 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 counselling of patients.

M.D. Pathology

ies 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.v. cannula insertion ,intubation ,intercostal drainage ,central line insertions, biopsy ,etc.
6. Perform neonatal and paediatric resuscitation. In neonatalogy, 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 Gynecology

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 counseling & 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 & Gynecological problems.
5. Manage normal & Abnormal pregnancy during Antenatal, Intra-natal & Post-natal period, gynecological 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 Gynecology, 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 & Gynecology.
11. Be familiar with research methodologies & use of newer information technologies.
12. Be up to date with advances in the field of Obstetrics & Gynecology.
13. Facilitate learning of medical / nursing students, para medical 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.v. cannula insertion ,intubation ,intercostal drainage ,central line insertions, biopsy ,etc.
6. Perform neonatal and paediatric resuscitation. In neonatalogy, 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 counseling & 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 & Gynecological problems.
5. Manage normal & Abnormal pregnancy during Antenatal, Intra-natal & Post-natal period, gynecological 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 Gynecology, 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 & Gynecology.
11. Be familiar with research methodologies & use of newer information technologies.
12. Be up to date with advances in the field of Obstetrics & Gynecology.
13. Facilitate learning of medical / nursing students, para medical 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)

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

Super speciality (MCh.)

Program Outcomes

MCh. Neurosurgery

At the end of M.Ch. Neurosurgery the student should be able to:

1. Know about the current literature on relevant aspects of the basic, investigative, clinical and operativeneurosciences.
2. Acquire performance skills and ability to interpret relevant clinical investigations.
3. Diagnose, plan investigations and treat common conditions in the specialty by relevant current therapeuticmethods.
4. Learn indications and performance skills of common neurosurgical operations
5. Acquaint himself with allied and general clinical disciplines to ensure appropriate and timelyreferral.
6. Identify, frame and carry out research proposals in the relevant specialty.
7. Develop essential skills in conducting medical research, and to get them presented in scientific forums and published in peer-reviewedjournals.
8. Develop into an effective communicator to the patients, their family, colleagues and students

MCh. Plastic Surgery

Ch Plastic Surgery, the student should be able to:

1. Understand the physiology and biochemistry of normal wound healing and abnormal wound healing, including hypertrophic scars and keloids.
2. Understand the role of nutrition in the wound healing process and is familiar with standard methods for diagnosis and treatment of nutritional deficiency.
3. Be familiar with the pharmacologic agents and other nonsurgical methods for treatment of abnormal healing of skin and subcutaneous tissue.
4. Manage dressings, splints, and other devices and techniques utilized in wound management.
5. Know the anatomy and function of the epidermis, dermis, skin appendages/nails, subcutaneous tissues and fascial layers.
6. Perform and accurately relay a pertinent history and physical for hand injuries, craniofacial injuries
7. Understand the clinically important features in monitoring a free flap, Flap physiology and assessment
8. Be Familiar with subatmospheric sponge dressings (wound VAC), tissue-engineered skin replacements (Integra, Alloderm, Transcyte), topical antimicrobials, topical growth factors, and leeches
9. Perform basic and advanced invasive surgical procedures.
10. Use information technology to evaluate and treat patients.
11. Teach medical students and other health care professionals about the practices of plastic surgery.
12. Coordinate the pre- and post-operative care and rehabilitation of plastic surgery patients.
13. Use cost-effective and efficient diagnostic testing for patient work-ups.
14. Respect all patients, their families, all healthcare personnel, and support services.
15. Maintain patient confidentiality.

Medical M.Sc. Courses
Program Outcomes
M.Sc. Medical Anatomy
1. Develop Histology Laboratory
2. Preserve the cadavers.
3. Prepare Museum Models.
4. Take Lectures for Under Graduate students.

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

1) Understand practice of epidemiology
2) Know theory and practice in core disciplines viz. Statistics, Social Sciences, health policy and economics.
3) Know primary healthcare approach
4) Acquire skills to identify and assess public health problems

Master in Public health.
After passing Master in Public health course the student should be able to: -

1) Have knowledge and skill of community diagnosis.
2) Acquire ability to plan strategies to enhance community health.
3) Skills to enhance intervention programmes.
4) Develop leadership skills in health administration.
5) Evaluate public health policies.

Ph D 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

Skill-

1. demonstrate original, independent and critical thinking in research
2. identify and develop innovative research questions
3. participate in academic discussions nationally and internationally, for instance through participation in workshops, seminars and conferences
4. read and critically assess the breadth of medical research literature in medical and health research
5. discuss, select and apply relevant research methods to answer a research question
6. publish articles in internationally recognized journals within your field
7. disseminate research finding to the society

School of Dental Sciences
KIMSDU

Program	Course	Program Outcome
I BDS	General Human Anatomy, Including Embryology, Histology	• Know the normal disposition of the structures in the body while clinically examining a patient and while conducting clinical procedures. • Know the anatomical basis of disease and injury. • Know the microscopic structure of the various tissues, a pre-requisite for understanding of the disease processes. • Know the nervous system to locate the site of lesions according to the sensory and or motor deficits encountered. • Have an idea about the basis of abnormal development, critical stages of development, effects of teratogens, genetic mutations and environmental hazards. • Know the sectional anatomy of head neck and brain to read the features in radiographs and pictures taken by modern imaging techniques. • Know the anatomy of cardio-pulmonary resuscitation. • To locate various structures of the body and to mark the topography of the living anatomy. • To identify various tissues under microscope. • To detect various congenital abnormalities.
	General Human Physiology and Biochemistry, Nutrition and Dietics	• At the end of the course, the student will be able to: • Explain the normal functioning of all the organ systems and their interactions for well co-ordinated total body function.

		• Assess the relative contribution of each organ system towards the maintenance of the milieu interior. • List the physiological principles underlying the pathogenesis and treatment of disease • Conduct experiments designed for the study of physiological phenomena. • Interpret experimental and investigative data • Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory • A sound but crisp knowledge on the biochemical basis of the life processes relevant to the human system and to dental/medical practice. • Dental student with knowledge on biochemical agents related to dentistry, various micro and macro nutrients.
	Dental Anatomy, Embryology and Oral Histology	• The student is expected to appreciate the normal development, morphology, structure & functions of oral tissues & variations in different pathological/non-pathological states. • The student should understand the histological basis of various dental treatment procedures and physiologic ageing process in the dental tissues. • The students must know the basic knowledge of various research methodologies.
II BDS	General Pathology and Microbiology	Pathology • To demonstrate and apply basic facts, concepts and theories in the field of Pathology. • To recognize and analyze pathological changes at macroscopical and microscopical levels and explain their observations in terms of disease processes. • To integrate knowledge from the basic sciences, clinical medicine and dentistry in the study of Pathology. • To demonstrate understanding of the capabilities and limitations of morphological Pathology in its contribution to medicine, dentistry and biological research. • To demonstrate ability to consult resource materials outside lectures, laboratory and tutorial classes. • Microbiology • Understand the basics of various branches of microbiology and able to apply the knowledge relevantly. • Apply the knowledge gained in related medical subjects like General Medicine and General Surgery and Dental subjects like Oral Pathology, Community Dentistry, Periodontics, Oral Surgery, Pedodontics, Conservative Dentistry and Oral medicine in higher classes. • Understand and practice various methods of Sterilisation and disinfection in dental clinics. • Have a sound understanding of various infectious diseases and lesions in the oral cavity.

	General and Dental Pharmacology and Therapeutics	• Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular. • List the indications, contraindications; interactions, and adverse reactions of commonly used drugs with reason. • Tailor the use of appropriate drugs in disease with consideration to its cost, efficacy, safety for individual and mass therapy needs. • Indicate special care in prescribing common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal, hepatic damage and immuno compromised patients. • Integrate the rational drug therapy in clinical pharmacology. • Indicate the principles underlying the concepts of "Essential drugs".
	Dental Materials	• To understand the evolution and development of science of dental material. • Dental student with knowledge of physical, chemical, mechanical and biological properties of all materials used in dentistry. • Knowledge of biomechanical requirements of particular restorative procedure. • To understand and evaluate the claims made by manufactures of dental materials • Dental student with an ability to manipulate various dental materials
	Pre clinical Conservative Dentistry	• Dental student will sound knowledge on hand and rotary cutting instruments. • Dental student with basic skill to prepare cavity designs to receive various restorative materials on typhodont teeth in skill laboratory.
	Pre clinical Prosthodontics and Crown & Bridge	• Dental student with sound knowledge on landmarks in edentulous patients would be able to do all lab procedures to make a conventional complete denture.
III BDS	General Medicine	• Dental student with sound knowledge on oral manifestations of systemic diseases, medical emergencies in dental practice. • Special precautions/ contraindication of anesthesia. • Dental students with ability to diagnose and manage various common medical problems encountered in general, dental practice and dental emergencies. • Dental student with basic skill to prevent and manage complications encountered while carrying out various dental surgical and other procedures
	General Surgery	• Dental student with sound surgical knowledge on anomalies, lesions and diseases of the teeth, mouth and jaws.

		• Dental student with an ability to diagnose and manage various common surgical problems encountered in general, dental practice and dental emergencies.
	Oral Pathology and Oral Microbiology	• The manifestations of common oral and systemic diseases, their diagnosis & correlation with clinical pathological processes. • Study of teeth anomalies through tooth specimens & plaster models. • Microscopic study of common lesions affecting oral tissues through microscopic slides • Basic principles of Forensic Odontology.

IV BDS	ORAL MEDICINE & RADIOLOGY	• Able to identify precancerous and cancerous lesions of the oral cavity and refer to the concerned¬ speciality for their management • Should have an adequate knowledge about common laboratory investigations and interpretation of their results. • Should have adequate knowledge about medical complications that can arise while treating systemically compromised patients and take prior precautions/ consent from the concerned medical specialist. • Have adequate knowledge about radiation health hazards, radiations safety and protection. • Competent to take intra-oral radiographs and interpret the radiographic findings • Gain adequate knowledge of various extra-oral radiographic procedures, TMJ radiography and¬ sialography. • Be aware of the importance of intra- and extra-oral radiographs in forensic identification and age¬ estimation • Should be familiar with jurisprudence, ethics and understand the significance of dental records¬ with respect to law
	PAEDIATRIC & PREVENTIVE DENTISTRY	• Able to instill a positive attitude and behaviour in children towards oral health and understand¬ the principles of prevention and preventive dentistry right from birth to adolescence. • Able to guide and counsel the parents in regards to various treatment modalities including¬ different facets of preventive dentistry. • Able to treat dental diseases occurring in child patient.¬ Able to manage the physically and mentally challenged disabled children effectively and¬ efficiently, tailored to the needs of individual requirement and conditions.

	ORTHODONTICS & DENTOFACIAL ORTHOPAEDICS	• Understand about normal growth and development of facial skeleton and dentition. • Pinpoint oberrations in growth process both dental and skeletal and plan necessary treatment • Diagnose the various malocclusion categories • Able to motivate and explain to the patient (and parent) about the necessity of treatment • Plan and execute preventive orthodontics (space maintainces or space regaines) • Plan and execute interceptive orthodontics (habit breaking appliances) • Manage treatment of simple malocclusion such as anterior spacing using removable appliances • Handle delivery and activation of removable orthodontic appliances • Diagnose and appropriately refer patients with complex malocclusion to the specialist
	PROSTHODONTICS AND CROWN & BRIDGE	• Able to understand and use various dental materials • Competent to carry out treatment of conventional complete and partial removable dentures and¬ fabricate fixed partial dentures • Able to carry out treatment of routine prosthodontic procedures • Familiar with the concept of osseointegration and the value of implant-supported Prosthodontic¬ procedures
	CONSERVATIVE DENTISTRY AND ENDODONTICS	• Competent to diagnose all carious lesions • Competent to perform Class I and Class II cavities and their restoration with amalgam • Restore class V and Class III cavities with glass ionomer cement • Able to diagnose and appropriately treat pulpally involved teeth (pulp capping procedures) • Able to perform RCT for anterior teeth • Competent to carry out small composite restorations • Understand the principles of aesthetic dental procedures
	ORAL & MAXILLOFACIAL SURGERY	• Able to apply the knowledge gained in the basic medical and clinical subjects in the management¬ of patients with surgical problems • Able to diagnose, manage and treat patients with basic oral surgical problems • Have a broad knowledge of maxillofacial surgery and oral implantology • Should be familiar with legal, ethical and moral issues pertaining to the patient care and communication skills

		• Should have acquired the skill to examine any patient with an oral surgical problem in an¬ orderly manner • Understand and practice the basic principles of asepsis and sterilization. • Should be competent in the extraction of the teeth under both local and general anaesthesia. • Competent to carry out certain minor oral surgical procedure under LA liketrans-alveolarextraction, frenectomy, dento alveolar procedures, simple impaction, biopsy, etc. • Competent to assess, prevent and manage common complications that arise during and after minor oral surgery • Able to provide primary care and manage medical emergencies in the dental office • Familiar with the management of major oral surgical problems and principles involved in the inpatient management
	PUBLIC HEALTH DENTISTRY	• Apply the principles of health promotion and disease prevention • Have knowledge of the organization and provision of health care in community and in the hospital service • Have knowledge of the prevalence of common dental conditions in India. • Have knowledge of community based preventive measures • Have knowledge of the social, cultural and env. factors which contribute to health or illness. • Administer and hygiene instructions, topical fluoride therapy and fissure sealing • Educate patients concerning the aetiology and prevention of oral disease and encourage them to assure responsibility for their oral health.

Course outcomes - BDS

SR. No.	Nameof the program	Name of the course	Course outcome
1.1	BDS – 1st year	General Human Anatomy, Including Embryology, Osteology, Histology &MedicalGenetics	1. Dental student with knowledge on normal disposition of the structures in the body, microscopic structure of the various tissues, nervous system to locate the site of lesions, sectional anatomy of head, neck andbrain. 2. Dental student possessing skills to locate various structures of head and neck of the body, identify various tissues under microscope, 3. Dental student with an integrated knowledgeonbasicsciencesandclinical subjects.
1.2	BDS – 1st year	General Human Physiology	1. Dental student with knowledge on normal functioning of all the organ systems and their interactions, relative contribution of each organ system towards the maintenance of total body function, physiological principles underlying the pathogenesis of various diseases and oral and para - oralstructures. 2. Dental student with basic skill to conduct and interpret experimentaland investigative data,
1.3	BDS – 1st year	Biochemistry	1. Dental student with knowledge on biochemical agents related to dentistry, various micro and macro nutrients.
1.4	BDS – 1st Year	Dental Anatomy, Embryology And Oral Histology	1. Dental graduate with basic knowledge on Morphology of both deciduous and permanent teeth, Methods of identifying the teeth and age of the plastercast 2. Dental graduate with basic skills in Wax carving of teeth, Identifying the basic histology slides bymicroscopy 3. Dental graduate with potential to efficiently communicate physiological development, morphology, structure & functions of teeth and oral &paraoral tissues& its variations.

2.1	BDS – 2nd Year	General Pathology	1. Dental student with knowledge on pathological changes at macroscopic and microscopic levels, capabilities and limitations of morphological Pathology in

			its contribution to dentistry. 2. Dental student with an ability to integrate knowledge from the basic sciences to clinical application in dentistry
2.2	BDS – 2nd Year	Microbiology	1. Dental student with sound understanding of various infectious diseases and lesions in the oral cavity, various methods of Sterilisation anddisinfection. 2. Dental student with basic skills to select, collect and transport clinical specimens to the laboratory and be able to carry out proper aseptic procedures in thedental clinic.
2.3	BDS – 2nd Year	General and Dental Pharmacology and Therapeutics	1. Dental student with knowledge on indications, contraindications; interactions, allergies and adverse reactions of commonly used drugs, use of appropriate drugs in disease with consideration to its efficacy, safety for individual and mass therapyneeds. 2. Dental student with an ability to advice special care in prescribing common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal, hepatic damage and immune compromisedpatients. 3. Dental student with skills to prescribe drugs for common dental and medical ailments, appreciate adverse reactions and drug interactions ofcommonly used drugs.
2.4	BDS – 2nd Year	Dental Materials	1. Dental student with knowledge of physical, chemical, mechanical and biological properties of all materials used indentistry. 2. Dental student with an abilityto manipulate various dental materials
2.5	BDS – 2nd Year	Pre-Clinical Prosthodontics	1. Dental student with sound knowledge on landmarks in edentulous patients would be able to do all lab procedures to make a conventional complete denture.

2.6	BDS – 2nd Year	Pre-Clinical Conservative Dentistry	1. Dental student will sound knowledge on hand and rotary cuttinginstruments. 2. Dental student with basic skill to prepare cavity designs to receive various restorative materials on typhodontteeth in skill laboratory.
3.1	BDS – 3rd Year	General Medicine	1. Dental student with sound knowledgeon oral manifestations of systemicdiseases,

			medical emergencies in dental practice. special precautions/ contraindication of anesthesia. 2. Dental students with ability to diagnose and manage various common medical problems encountered in general, dental practice and dentalemergencies. 3. Dental student with basic skill to prevent and manage complications encountered while carrying out various dentalsurgical and other procedures.
3.2	BDS – 3rd Year	General Surgery	1. Dental student with sound surgical knowledge on anomalies, lesions and diseases of the teeth, mouth andjaws. 2. Dental student with an ability to diagnose and manage various common surgical problems encountered in general,dental practice and dental emergencies.
3.3	BDS – 3rd Year	Oral Pathology	1. Dental graduate with basic knowledge on pathogenesis of Oral disease, diagnosis and comparison based on clinical, radiograph and histopathologic features of oraldisease 2. Dental graduate with basic skills in preparation of ground sections and oral smears, age estimation based on teeth, identifying and diagnosing the pathology based on lightmicroscopy 3. Dental graduate with potential to efficiently communicate diagnosis & correlate with other oral diseasewith their pathological processes.
4.1	BDS – 4th Year	Oral Medicine andRadiology	1. Generate graduates that demonstrate the necessary knowledge, skills and attitude in Oral & Maxillofacial Diagnosis, Diagnostic procedures and medical management of suchdisorders. 2. Create confident and competent Dental professionals who can accomplish and execute clinical deftness in thediagnosis and management of Orofacial disorders

4.2	BDS – 4th Year	Oral and Maxillofacial Surgery	1. Application of knowledge of related medical subjects in management of patients with oral surgicalproblem. 2. Sufficient knowledge to diagnose, manage and treat minor oral surgical procedures. 3. Understanding and exposure to the management of major oral surgical problems and principles involved in inpatientmanagement.
4.3	BDS – 4th Year	Periodontology	1. Oral health professionals who are efficient and trained to handle oral healthissues 2. Dental graduates on par with latest technologies which would develop them as professionals as well as help them in their employmentopportunities 3. Dental graduate with practical skills which would improve doctor patient relationship having positive impact on society 4. Dental graduate who is skilled to apply multidisciplinary approach for successful treatmentoutcome 5. Dental graduate with a research mindset trained on par withinternational standards
4.4	BDS – 4th Year	Paedodontics and Preventive Dentistry	1. KNOWLEDGE: Dental practitioners with ability to diagnose common dental problems and/or capability to assess growth and development variations and suggest necessary referrals or actions as neededtimely. 2. SKILL: Clinicians who can effectively and efficiently perform basic dental treatments in children from birth to adolescence with proper behavior management of child and the parent, as well as instill positive dental attitudewith preventive modalities

4.5	BDS – 4th Year	Conservative Dentistry and Endodontics	1. To educate and impart clinical skill to students which will help them in providing quality restorative treatment and basic endodonticprocedures. 2. To provide restorative care in dentistry in a competent and ethical manner which will contribute to the oral health and generalwellbeingoftheindividualand community.

			3. As a graduate, the dentist would exhibit professional behaviour, basic skills to carry out range of dental procedures in general dental practice independently with consistency andaccuracy. 4. To instill the importance of life-long learning and updating the knowledge in the field of restorative dentistryand endodontics.
4.6	BDS – 4th Year	Prosthodontics and Crown and Bridge	1. Dental graduate with knowledge on prosthetics needs of patients, fabrication of all prosthodontic modes oftreatment 2. Dental graduate who is able to diagnose, motivate and treat patients who are partially and completely edentulous (including geriatric patients) with complete and partialdentures 3. Dental graduate skilled enough to identify cases requiring specialist prosthodontic treatment needs and refer themfor further followup
4.7	BDS – 4th Year	Orthodontics and Dentofacial Orthopedics	1. Graduates emerging from this institute are excelling in academics &Practice. 2. Many undergraduates from ourinstitutes are pursuing post graduation in our specialty.

Course Outcomes – MDS

Sl. No.	Name of the Program	Name of the course	Course outcome
1.1	**MDS in Prosthodontics and Crown & Bridge**	Applied Anatomy, Physiology, Pathology and Dental Materials	1.The candidate would possess knowledge about applied basic and systematic medical sciences. 2. The candidate would be able to examine the patients requiring Prosthodontics therapy, investigate the patient systemically,analyze the investigation results. 3.The candidate wouldd diagnose the ailment, plan a treatment, communicate it with the patient and execute it.
1.2		Removable Prosthodontics and Oral Implantology	1.The candidate would possess knowledge about age changes and Prosthodontic Therapy for the aged related to removable Prosthodontics and oral Implantology 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. 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.
1.3		Fixed Prosthodontics	1.The candidate would be understand the prevalence and prevention of diseases of craniomandibular system related to fixed prosthetic dentistry. 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.

			3.The candidate would be able to communicate in simple understandable language with the patient and explain the principles of fixed prosthodontics tothe patient
1.4		Essay	1. The candidate would be able tooutline the knowledge, procedural and operative skills needed in Masters Degree in Prosthodontics. 2. The candidate would possess comprehensive knowledge and the ability to apply the same in all the sub branches of prosthodonticsin toto.
			effectively and freely analyzing the problem presented by recalling factually. 2. The student would be an expert at synthesizing ideas and rendering a suitable opinion of the problem presented.

Sl. No.	Nameof Program	Name of the Course	Course out come
3.1	**MDS-Paedodontics & Preventive Dentistry**	Applied Basic Sciences	1. Student should be able to understand applied Anatomy, genetics, Applied Physiology, Applied Pathology, Nutrition, Dietics, Growth & Development, Cariology andFluoride. 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 PreventiveDentistry 3. Student should be able develop an attitude of Counselling in PaediatricDentistry 4. Student should be able to do CaseHistory Recording, Outline of principles of examination, diagnosis & treatment planning.
3.2		Clinical Paedodontics	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. 2. Student should be able to manage the disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions. 3. Student should be able to acquire skills in managing efficiency life threatening condition with emphasis on basic life supportmeasure. 4. Student should able to develop an attitude to adopt ethical principles in all aspects of Paediatric dental practice along withprofessional honesty and integrity.

3.3		Preventive and Community Dentistry as applied to Paediatric Dentistry	1. Student should be able to create a good oral health in the child with Installing a positive attitude and behaviour inchildren 2. Student should able to understand the principles of prevention and preventive dentistry right from birth toadolescence 3. Student should able to guide and counsel the parents in regards to various treatment modalities including different facets of preventivedentistry 4. Student should able to deliver care irrespective of the social status, cast, creed, and religion of thepatients. 5. Student should able to share the knowledgeand clinical experience with professional colleagues with own willingness.

3.4		Essay	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 andpatient. 2. Student should able to respect child patient's rights and privileges, including child patient's righttoinformationandrighttoseekasecond opinion.

Sl. No.	Name of the programme	Name of the Course	Course outcome

4.1	**MDS-Oral &Maxillofacial Surgery**	Applied basic sciences	The student would be knowledgeable about: Development and growth of face, teeth and jaws, Age changes and evaluation of mandible in detail 1. Congenital abnormality of orofacial regions 2.Surgical anatomy of scalp , temple and face 3. Anatomy and its applied aspects of triangles of neck and deep structures ofneck 4.Cranial facial bones and surrounding softtissues 5.Cranialnerves 6. Tongue 7. Temporal and infratemporal region and Temperomandibular joint indetail 9. Orbits and itscontents 10. Muscles of face andneck 11. General consideration of the structureand function of brain and applied anatomy of intracranial venous sinuses 12. Cavernous sinus and superior sagitalsinus 13. Brief consideration of autonomousnervous system of head andneck 14. Functional anatomy of mastication,Deglutition andSpeech 15. Respiration andcirculation 16. Histology of skin, oral mucosa, connectivetissue, bone, cartilage, cellularelements of blood vessels, Lymphatic , Nerves,Muscles 17. Tooth and its surroundingstructures 18. Cross – sectional Anatomy of the head and neck, as applied in CT, MRIInterpretation 19. Salivary glands – Anatomy, Embryology and Histology **APPLIED PHYSIOLOGY** 1. Nervous system – physiology of nerve conduction,pain pathway, sympathetic andparasympathetic nervous system,

			hypothalamus and mechanism ofcontrolling bodytemperature. 2. 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, cellsavers. 3. Digestive system - composition and functions of saliva, mastication, deglutition, digestion,assimilation, urine formation, normal and abnormalconstituents. 4. Respiratory system – respiration control of ventilation, anoxia, asphyxia, artificialrespiration, hypoxia – type andmanagement 5. CVS - cardiac cycle, shock, heart sounds, blood pressure, hypertension 6. Endocrinology - metabolism of calcium , endocranial activity and disorder relating tohyroid gland, parathyroid gland, adrenal gland, pituitary gland, pancreasandgonads. 7. Nutrition – general principles balanced diet, effect of dietary deficiency, protein energy malnutrition, nutritional assessment, metabolic responses tostress, need for nutritionalsupport ,entrails nutrition, roots of access to GIT, parenteralnutrition, access to central veins, nutritional support 8. Fluid and electrolytic balance / acid base metabolism – the body fluid compartment,metabolism of water and electrolytes, factors maintaining hemostasis causes for treatmentof acidosis andalkalosis. **APPLIED PATHOLOGY** 1. Inflammation – acute and chronic inflammation, repair and regeneration, necrosis andgangrene and role of component system in acute inflammation, role of arachidonic acid and its metabolites in acute nflammation, growth factors in acute inflammation role ofNSAIDS in inflammation, cellular changes in radiation injury and its manifestations. 2. Wound management - wound healing factors

			influencing healing, properties of suturematerials, and appropriate uses of sutures. 3. Hemostasis - role of endotheliumin

			thrombogenesis, arterial and venous thrombi,disseminated intravascular coagulation. 4. Hypersensitivity - shock and pulmonary failure, types of shock, diagnosis, resuscitation, pharmacological support, ARDS and its causes and prevention, ventilation andsupport 5. Neoplasia - classification of tumours, carcinogens and carcinogenesis, spread of tumors,characteristics of benign and malignant tumors, grading and staging of tumoursvarious laboratoryinvestigation. 6. Chromosomal abnormalities with oro-facialmanifestations. 7. Basics of immunology – primaryand acquiredimmunodeficiencies.

4.2		Minor Oral Surgery and Trauma	The students would be well trained in the assessment and management of: 1. BasicExodontia 2. ComplicatedExodontia 3. Surgical management of Impactedteeth 4. Ectopically positioned and uneruptedteeth 5. Tooth Reimplantation andTransplantation 6. Surgical uprighting andRepositioning 7. Principles of EndodonticMicrosurgery 8. Periodontal Considerations for OralSurgery 9. Procedures Involving the DentogingivalJunction 10. Pediatric DentoalveolarSurgery 11. Lasers in Oral and MaxillofacialSurgery 12. Complications of DentoalveolarSurgery The students would be able to diagnose and manage Medical emergencies like, prevention and management of altered consciousness (syncope, orthostatic hypotension, seizures, diabetes mellitus, adrenal insufficiency), hypersensitivity reactions, chest discomfort, and respiratorydifficulty The students would be knowledgeable about 1. Diagnosis and Perioperative Management ofHead and Neck Injuries 2. Basic Principles of Treatment: Hard andSoft Tissueinjuries The students would be acquainted with the knowledge and clinical skills in the management of. 1. Dentoalveolar Injuries

			2. MandibularFractures 3. Temporomandibular Joint RegionInjuries 4. Zygomatic ComplexFractures 5. OrbitalTrauma 6. MidfaceInjuries 7. Frontal Sinus Fracturesand associated Injuries 8. NasalInjuries 9. Soft TissueInjuries 10. Special Soft TissueInjuries 11. Avulsive Hard TissueInjuries 12. Maxillofacial Injuries inChildren 13. Maxillofacial Injuries in theElderly 14. Complex Facial Trauma Patient

4.3		Maxillofacial Surgery	The students would be acquainted with the knowledge and clinical skills in the management of 1. **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 2. **Temporomandibular Joint**: Etiology,history signs, symptoms, examination anddiagnosis of temporomandibular jointdisorders, 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 Management of oral cancer, Radial Neck dissection, Modes of spread of tumors, Diagnosis and management of tumors of nasal, paranasal, neck, tongue, cheek, maxilla and mandible Radiation therapy in maxillofacial regions,Lateral neck swellings **Orthognathic surgery:** Diagnosis and treatment planning, Cephalometric analysis, Model surgery, Maxillary and mandibular repositioning procedures, Segmental osteotomies, Management of apertognathia, Genioplasty, Distraction osteogenesis **Cysts and tumor of oro facial region:** Odontogenic and non-Odonfogenic tumors and their management ,Giant lesions of jawbone, Fibro osseous lesions of jawbone, Cysts of jaw

			Laser surgery: The application of laser technology in surgical tr eatment of lesions **Cryosurgery:** Principles, applications of cryosurgery in surgica l 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, craniosynostosissyndromes, 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
4.4		Essay	The students would be able to diagnose, meticulously plan and manage competently various conditions in maxillofacial surgery including challenging cases. They would be knowledgeable about conventional and recent advances in the diagnosis and management of oral and maxillofacial conditions. The students would be well versed in basic surgical techniques and knowledgeable about the advanced skills required in maxillofacial surgery.

Sl. No.	Name of the Program	Name of the Course	Course Outcome
5.1	**MDS-Orthodontics &Dentofacial Orthopaedics**	Applied Basic Sciences	**1. AppliedAnatomy** Under 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. **2. AppliedPhysiology** Under 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. **3. DentalMaterials** Under 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. **4. Genetics** Under Genetics they would have learnt about Cell structure, DNA, RNA, protein synthesis, cell division, Chromosomal abnormalities, Principles of orofacial genetics, Genetics in malocclusion, Molecular basis of genetics, Studies related to malocclusion, Recent advances in genetics related to malocclusion, Genetic counselling, Bioethics and relationship to Orthodontic management of patients **5. PhysicalAnthropology** Under Physical Anthropology they would have learnt about Evolutionary development of dentition, Evolutionary development of jaws **6. Pathology**

			Under Pathology they would have learnt about inflammation, and necrosis 7. **Biostatistics** Under 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 cognent scientific abstracts and Publication. **8. Applied research methodology in Orthodontics** Under 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.

5.2		Diagnosis & Treatment planning	1. **Orthodontic history** Under Orthodontic History they would have learnt about Historical perspective, Evolution of orthodontic appliances, Pencil sketch history of Orthodontic peers, History of Orthodontics in India. 2. **Concepts of occlusion and esthetics** Under this, the students would learn about 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 neuromuscularphysiology. 3. **Etiology and Classification of malocclusion** Under this, the students would learn about, a comprehensive review of the local and systemic factors in the causation of Malocclusion and Various classifications of malocclusion. 4. **DentofacialAnomalies** Under this, the students would learn about, anatomical, physiological and pathological characteristics of major groups of developmental defects of the orofacial structures. 5. **Child and AdultPsychology** Under this, the students would learn about Stages of childdevelopment, 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. **6. Diagnostic procedures and treatment planning in orthodontics** Under this, the students would learn about 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. **7. Cephalometrics** Under this the student would learn about, Instrumentation, Image processing, Tracing and analysis of errors and applications, Radiation hygiene, Advanced Cephalometrics techniques, Comprehensive review of literature, Video imaging principles and application. **8. Practice management in Orthodontics** Under this the student would learn about, 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

5.3		Clinical Orthodontics	**1. MyofunctionalAppliances** The students will be capable of diagnosing and interpreting the knowledge obtained to treat developing malocclusion at a younger age. **2. DentofacialOrthopaedics** The students will develop acumen to identify and deliver treatment regimes using orthopaedic appliances tothe

			appropriate cases. 3. **Cleft Lip & PalateRehabilitation** The students will be trained to treat the CLCP 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 og the multidisciplinary cleft team. 4. **Biology of toothmovement** Basic understanding of the 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. 5. **Orthodontics/ OrthognathicSurgery** Students will be thoroughly trained in conjoint diagnosis & treatment planning of cases requiring surgical intervention. 6. **Ortho/ Perio/ Prostho inter relationship** Students will be trained in treating complicated cases requiring a multi- disciplinary approach in patient management. 7. **Basic Principles of mechanotherapy**Students will be trained in designing , construction , fabrication &management of cases using both removable & fixed orthodontics. 8. **Applied preventive aspects in Orthodontics** A comprehensive view of diagnosing & preventing caries, periodontal diseases to maintain proper inter arch relationship. 9. **Interceptiveorthodontics** Students will be trained in growth guidance, diagnosing & treatment planning of early malocclusion both at mixed/ permanent dentition. 10. **Retention &relapse** Inculcating the acumen to analyze post

			treatment stability to prevent any replase.
5.4		Essay	**1. Recent Advances** The Students would be trained in above mentioned topics in detail, so that the student would know the recent updates along with the previousliterature available.

Sl. No.	Name of the programme	Name of the Course	Course outcome
6.1	**MDS-Oral Pathology &Microbiology**	Applied Basic Science	1. The students should havebasic knowledge of biostatistics and researchmethodology. 2. They would have learnt the anatomy, histology, biochemical and physiology of oral and paraoralstructure. 3. They would have learnt the basic pathology, microbiology and basic molecular aspects ofpathology.
6.2		Oral Pathology, Microbiology, Immunology And Forensic Odontology	1. The student should have to understand the pathologicalprocesses of oraldiseases. 2. The student would have to understand the pathologicalprocesses of oral diseases, compare and diagnose based on clinical, radiographical and histopathological findings which involves the oral and paraoralstructures. 3. They would have learnt andperform the preparation of ground sections oral smears and histologyslides. 4. Student would have studied and be able to identify and diagnose the disease based onmicroscopy.

6.3		Labrotary Techniques , Diagnosis And Oncology	1. The students should have basic knowledge of biopsy procedureand slidepreparation. 2. They would have the basicknowledge on laboratory chemicals and equipments. 3. Student should have learnt toidentify and appreciate the microscopic slide and writing a report on oraldiseases /lesion. 4. Student should have knowledge on Basic hematological tests, urine analysis and its clinicalsignificance.
6.4		Essay	1. Student should have comprehensive knowledge on oral and paraoral structures and related pathologies
			and also on recent advanced methodology / techniques and molecular aspect.

Sl. No.	Name of the program	Name of course	Course outcome
7.1	**MDS - Periodontoly**	Applied basic sciences	1. Should have abroad overview of thecurrent research and methods used in studying problems in periodontaldisease. 2. Should have an understanding of thebroad range of infection diseases affecting the oral cavity. 3. Should have an understanding the clinical and biological factors to be considered in the appropriate use of antimicrobialdrugs 4. Be aware of the contemporary principles and practices of laboratory diagnostic techniques and interpretation oflaboratory reports. 5. Should have an understanding ofhospital acquired infections and infections in the compromisedhost 6. Should have a basic knowledge onresearch methodology,biostatistics and be able to apply it in various research projects aswell as dissertations.

7.2		Normal periodontal structure and etiopathogenesisa nd epidemiology	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. 2. Should be able to record indices andplan out epidemiological survey to assess the prevalence and incidence of early onset periodontitis and adult periodontitisin Indian Population
7.3		Periodontal Diagnosis, Therapy And Oral Implantology	1. Should have a sound knowledge of the etiopathogenesis and apply it in diagnosing various periodontaldiseases and should be familiar with various periodontal therapies available to treat thosecases. 2. Should have an updated knowledge on the recent advancements and be able tomodify their treatmentaccordingly. 3. Develop knowledge skill and the scienceof oral implantology. Should be aware of the various designs and placement of oral implants and follow up ofimplant restorations.
7.4		Descriptive Analysing Type	1. Should be knowledgeable to provide clinical care for patients with complex

		Question	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. 2. Should be able to analyze various clinical scenarios and apply their knowledge accordingly.

Sl. No.	Name of program	Name of course	Course outcome
8.1	**MDS-Conservative Dentistry & Endodontics**	Applied Basic Science	1. Students would be able to demonstrate understanding of basic sciences as relevant to conservative/ restorative dentistry andEndodontics 2. Students would demonstrateinfection control measures in the dental clinical environment andlaboratories 3. Student would adopt ethical principles in all aspects of restorative and contemporary Endodontics including non-surgical and surgicalEndodontics 4. Students would be able to demonstrate communication skills in particular to explain various options available management and toobtain a true informed consent from the patient 5. Students would be able to applyhigh moral and ethical standards while carrying on human oranimal research

8.2		Conservative Dentistry	1. Students would be able to describe aeitology, pathophysiology, diagnosis and management of common restorative situations, that will include contemporary managementof dental caries, non-carious lesions and hypersensitivity. 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 3. Perform all levels of restorativework including Aesthetic procedures and treatment of complicatedrestorative procedures
8.3		Endodontics	1. Students would be able to describe aeitology, pathophysiology, periapical diagnosis and management of common endodontic situations that will include contemporary management of trauma and pulpal pathoses including endo-periodontal

			situations. 2. Students would be able to master differential diagnosis and recognize conditions that may require multidisciplinary approach or aclinical situation outside the realm of the specialty, which he or she should be able to recognize and refer to appropriatespecialist 3. Students would undertake complete patient monitoring including preoperative as well as postoperative care of thepatient. 4. Students would perform all levels of surgical and non-surgical Endodontics including endodontic endoosseousimplants,retreatement as well as endodontic-periodontal surgical procedures as part of multidisciplinary approach to clinical condition 5. Students would be able tomanage acute pulpal and pulpoperiodontal situations
8.4		Long Essay	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

	2015-16	2016-17	2017-18	2018-19	2019-20
MDS	9	17	19	19	20
HIGHER EDUCATION Abroad Any other courses	0	2	5	5	3
SELF EMPLOYED	0	1	3	0	3
	0	1	3	0	3
	38	99	92	66	55
TOTAL EMPLOYED	28	67	66	56	49

4.8	BDS – 4th Year	Public Health Dentistry	1. Dental graduate with basic knowledge on oral health problems in India, methods for collecting data on these problems, methods for prevention and control of these problems at individual and communitylevels. 2. Dental graduate with basic skills in identifying oral health problems, collecting data on oral health problems prevailing in the country through surveys, developing strategies for their control at individual and communitylevels. 3. Dental graduate with potential to efficiently communicate needs of the community, simple self care strategiesto promote oral health of population.

ANALYSIS OF PO AND CO OUT COMES THROUGH THE PLACEMENTS OF STUDENTS

POST COMPLETION YEARWISE

KRISHNA INSTITUTE OF MEDICAL SCIENCES

DEEMED TO BE UNIVERSITY, KARAD.

FACULTY OF PHYSIOTHERAPY

PROGRAMME OUTCOME AND COURSE OUTCOMES

UNDERGRADUATE PHYSIOTHERAPY PROGRAMME OUTCOMES:

B.P.Th (BACHELOR OF PHYSIOTHERAPY)

The course is of four & half years duration and it proceeds in this format as follows:

First year: It deals with basic foundation in Medical as well as Physiotherapy subjects. The application of Physics to human body in understanding movements and Physiotherapeutic modalities are included.

Second year: It deals with understanding of - altered physiology by studying Pathology & Microbiology; normal & altered human mind by studying Psychology; knowledge of Biomechanics & various Physiotherapeutic / Electrotherapeutic application skills.

Third year: It deals with clinical subjects, Physiotherapeutic evaluation skills including electro

diagnosis on patients & knowledge about Principles of International classification of functioning and its applicability.

Fourth year: It deals with integrating knowledge of previous years to evaluate, diagnose, plan and manage Musculoskeletal, Neurological & Cardio-respiratory dysfunctions in Hospital and Community settings. In addition students study Bioengineering, Professional practice & Ethics inclusive of knowledge of Hospital administration, Management, Marketing, Research methodology & Biostatistics. A prevalence research work as a community level field project has to be submitted as part of examination in community health physiotherapy.

At the end of the program, students should be able to understand the biological, physical, behavioral sciences underpinning physiotherapy & effective / appropriate applicability on patients. The program equips the students with six months of compulsory internship under supervision.

END OF THE PROGRAMME:

After the completion of UG (B.P.Th) programme, the above mentioned programme features in Krishna college of Physiotherapy enables the student to become a autonomous physiotherapist on successful completion of his/her programme to practice collaboratively in variety of health care set ups from Neonatal to Geriatric inclusive of specific personal training, sports fitness, critical care to community fitness and on the whole responsive to the current and future needs of the health care system.

POSTGRADUATE PROGRAMME OUTCOMES:

M.P.Th (Master of Physiotherapy)

The course is of two years duration advanced learning program in physiotherapy with 5 specialties namely:

1. Musculoskeletal sciences
2. Neuro sciences
3. Pediatric neurological sciences
4. Cardiopulmonary sciences
5. Community health sciences

First year: It is common for all the specialties which include the subjects as Physiotherapy practice - I & II, Advanced physiotherapy I & II and Biostatistics & Research methodology. These subjects are replaced with Basic sciences, Basic Therapeutics & Advanced Therapeutics in the revised curriculum.

Second Year: It is as per the specialty with two subjects' namely General physiotherapy & Specialty physiotherapy. Specialty subject is Advances in Musculoskeletal / Neurological / Cardio Pulmonary / Community Health / Pediatric Health conditions. An individual research project preferentially interventional study is mandatory to be completed before appearing for the examination.

END OF THE PROGRAMME:

After the completion of PG (M.P.T) programme, with the above mentioned programme featuresthe postgraduates will be equipped with advanced knowledge in respective specialty related to technical, problem solving and scientific skills to practice with evidence based Physiotherapy practice through firm decision making process in assessment and treatment. Establish advanced research hypothesis and undertake research works effectively within the health-care sectors and community

safely and efficiently inculcating effective communication skills.

UNDER GRADUATE PHYSIOTHERAPY COURSE OUTCOMES:

UNDERGRADUATE PROGRAM:

B.P.Th (BACHELOR OF PHYSIOTHERAPY)

The course is of Four & Half years duration (Inclusive of 6 Months Compulsory Internship Program) and it proceeds in this format as follows:

1. The courses are structured such that learning is vertically and horizontally integrated into the curriculum.
2. The course learning outcomes are aligned to the program sequentially and well adaptive to the graduate attributes.
3. The B.P.Th program is inclusive of 4 years of study duration and 6 months of compulsory rotator internship.
4. Supervised clinical training is a compulsory one starting from first year. Evaluation of the courses varies as appropriate to the subject area, inclusive of formative and summative assessment for both Theory & Practicals.

COURSE OUTCOMES OF FIRST YEAR B.P.Th:

1. It deals with basic foundation in Medical as well as Physiotherapy subjects. The application of Physics to human body in understanding movements and Physiotherapeutic modalities are included.
2. To acquire the necessary knowledge and skills to help them practice efficiently and accurately with relevance to Human Physiology and Anatomy inclusive of knowledge in biochemistry that are required to be practiced in community and at all levels of health care system.
3. To understand and practice basics of yoga as a subject at entry level.

HUMAN ANATOMY:

The student should be able to identify and describe anatomically all the structures of the human body for e.g. muscles, bones, joints, viscera, CNS & PNS, etc.

HUMAN PHYSIOLOGY:

The student shall acquire the knowledge of physiological functions of various systems with special

reference to musculoskeletal, neuro-motor, cardio-respiratory, endocrine & urogenital system. Student should be able to analyze relative contribution of each organ system in homeostasis. Student should be able to analyze physiological response an adaptation to environmental stresses. Student shall acquire basic clinical examination of PNS & CNS, cardiovascular-respiratory system & exercise tolerance.

BIOCHEMISTRY:

The Student should be able to identify various biomolecules present in the body with their functions, formation & fate of these molecules, identify the normal - abnormal levels of these molecules in body fluids to understand the disease process by the end of the course.

FUNDAMENTALS OF EXERCISE THERAPY:

The student be able to define various exercises used in relation to mechanics biomechanics & kinesiology. Students should be able to apply basic biophysics principles to mechanics of movement. The student should be able to describe, acquire and demonstrate all the assessment and treatment skills prescribed in the syllabus.

FUNDAMENTALS OF ELECTROTHERAPY:

The student should be able to describe effects of various electromagnetic field and therapeutic currents. The Student should be able to gain knowledge of electrical supply, hazards & precautions. The student should be able to test the various electrotherapeutic equipment prescribed in their syllabus; describe and identify various electrical components in the circuits of the same. The Student should be able to acquire & apply knowledge of various superficial thermal agents.

COURSE OUTCOMES OF SECOND YEAR B.P.Th:

1. It deals with understanding of - altered physiology by studying Pathology & Microbiology; normal & altered human mind by studying Psychology; knowledge of Biomechanics & various Physiotherapeutic / Electrotherapeutic application skills.
2. To understand the process to detect & evaluate anatomical, patho-physiological and psychosomatic impairments resulting in physical dysfunction in various age groups, occupations & arrive at appropriate diagnosis.

PATHOLOGY:

The students should be able understand diseases involving major organ systems, their epidemiology, red flag signs & symptoms.This knowledge will enable the students to identify diseases that require referrals and/or alternate interventions.

MICROBIOLOGY:

The students should be develop a sound knowledge of prevalent infections which are communicable, with the agents/ pathogens (known & newly emerging) causing them.This will enable them to prevent causing an infection to the patients & themselves.

PHARMACOLOGY:

The student develop an understanding about administration, physiological effects, and adverse effects, drug interactions under normal & pathological conditions. They will thus, be able to apply the above knowledge while prescribing appropriate exercise protocols to patients with varied pathologies taking into account the influence the above drugs may have on the condition &/ or rehabilitation.

PSYCOLOGY:

The student is made aware of psychological issues faced by patients, and the influence they may have on the patient's condition, response to therapy & developing therapeutic relationships.The students can, thus, emphasis on communication skills to make interaction move effective and identify psychiatric illnesses for their referral.

ELECTROTHERAPY:

The student should develop a sound understanding of the application of various electrotherapeutic modalities in the treatment of pain& would healing, taking into account their physiological effects, indications contraindications & therapeutic application. This will thus, enable them to choose an appropriate modality and parameters according to the area/tissue.

EXERCISE THERAPY:

The students develop an in depth knowledge about anatomy, physiology & biomechanical principles of normal human movements. Thus it enables them to understand the effect of common kinesio-therapeutic application (exercises/positions) on the same.

COURSE OUTCOMES OF THIRD YEAR B.P.Th:

1. It deals with clinical subjects, Physiotherapeutic evaluation skills including electro diagnosis on patients & knowledge about Principles of International classification of functioning and its applicability.
2. To understand the rationale and basic investigative approach to medical diseases, surgical interventions & accordingly plan / implement specific Physiotherapy measures effectively.
3. Evaluate and objectively assess all the three components (as per ICF) of Movement Dysfunction or any other dysfunction as per the health condition and arrive at a functional diagnosis, with biomechanical and physiological reasoning.

4. To understand the use of appropriate tools of Assessment, Evaluation and Reevaluation in Musculoskeletal, Neurological, Cardiovascular conditions and all other health conditions pertaining to different ages & occupation, etc.

SURGERY:At the end of the course,the student shall be trained to establish:

1. Effects of surgical trauma & anaesthesia.
2. Surgical management in brief with relevance to general surgery, neurosurgery, cardiovascular & thoracic surgery, ENT & ophthalmic surgery, plastic & reconstructive surgery along with clinical evaluation.
3. Preoperative evaluation, surgical indications, management & post-operative care with possible complications in above mentioned domains.
4. Be able to read & interpret findings of relevant investigations.

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

1. Be able to discuss aetiology, pathophysiology, clinical manifestations & conservative/ surgical management of various traumatic & cold cases of musculoskeletal conditions.
2. Gain the skill of clinical examination, apply special tests & interpretation of preoperative & postoperative cases.
3. Be able to read & interpret X-ray of spine & extremities & correlate radiological findings with clinical findings
4. Be able to interpret pathological/biochemical studies pertaining to orthopaedic conditions.

MEDICINE:

At the end of the course,the student enriches knowledge in various ailments and population like:

1. Be able to describe aetiology, pathophysiology, signs & symptom s & management of various neurological & paediatric conditions.
2. Acquire skill of history taking and clinical examination of neurologic & paediatric conditions
3. Acquire knowledge of various used for each condition to understand its effect & use.
4. Acquire knowledge in brief about intra-uterine development of foetus.
5. Be able to describe normal development & growth of a child, importance of Immunization, breast feeding & psychological aspects of development.
6. Acquire skill of clinical examination of neurological, musculoskeletal & respiratory function of a neonate/child.
7. Be able to describe neuromuscular, musculoskeletal, cardio-vascular & respiratory conditions related to immunological conditions, nutritional deficiencies, infectious diseases & genetically transmitted conditions.

COMMUNITY HEALTH & SOCIOLOGY

COMMUNITY HEALTH:

At the end of the course,the student is well accomplished with knowledge of Community Health like:-

1. Concepts & determinants of health & diseases.
2. National public health administration.
3. Health care delivery system.
4. Primary health care, etc.

SOCIOLOGY:

At the end of the course,the student is well accomplished with sociology like:-

1. Definition & relevance with physiotherapy
2. Socialization
3. Social groups
4. Family
5. Community role
6. Culture
7. Social change factor
8. Social control
9. Population groups, etc.

GYNAECOLOGY & OBSTETRICS:

At the end of the course,the student learns and differentiates Normal & abnormal physiological events, complications during puberty, pregnancy, menopause, urogenital dysfunction. She/he should acquire cognate skill of clinical examination of pelvic floor.

DERMATOLOGY:

At the end of the course, the student will be able to describe pathophysiology, signs & symptoms clinical features, examination & management common skin conditions like leprosy, psoriasis, bacterial & fungal infections of the skin, connective tissue disorder, hand eczema, drug reaction, cutaneous manifestations of HIV & Sexually transmitted diseases.

FUNCTIONAL DIAGNOSIS & PHYSIOTHERAPEUTIC SKILLS: At the end of the course, the students will expertise in:

1. Understand use of ICF.
2. Acquire Knowledge of human growth & development from new life to birth & adulthood.
3. Understand structure & function of nerve, muscle as a basis for electro diagnostics.
4. Understand theoretical basis & principles of manipulative skills, neuro-therapeutic skills & skills of cardiopulmonary care & resuscitation.
5. Document results of assessment to evaluate patient from time to time.

COURSE OUTCOMES OF FOURTH YEAR B.P.Th:

1. It deals with integrating knowledge of previous years to evaluate, diagnose, plan and manage Musculoskeletal, Neurological & Cardio-respiratory dysfunctions in Hospital and Community settings.
2. In addition students study Bioengineering, Professional practice & Ethics inclusive of knowledge of Hospital administration, Management, Marketing, Research methodology & Biostatistics.
3. A prevalence research work as a community level field project has to be submitted as part of examination in community health physiotherapy.

PHYSIOTHERAPY PRACTICE AND ETHICS:

At the end of the course, the Students will learn about knowledge, skills & behaviour required by physiotherapist in a range of practice relationships & roles. Student will be able to understand the role, responsibility ethics administration issues & accountability of physiotherapy and will be able to apply to professional & ethical reasoning and decision strategies and professional communication.

PHYSIOTHERAPY IN MUSCULOSKELETAL SCIENCES:

At the end of the course,the student will be able to have knowledge about applied anatomy & physiology of musculoskeletal system along with pathological changes and patho-mechanics of the system. They will also discuss relevant tests and measures for determining impairment and differentiating the diagnosis based on the specificity and sensitivity of the assessment. The Student should be able to use patient specific assessment, evidence based intervention and significant patient education to promote a healthy, active lifestyle & community based living as well as maximizing patients' functional independence.

PHYSIOTHERAPY IN NEUROLOGICAL SCIENCES:

At the end of the course, the student should be able to describe anatomy, physiology & pathophysiology of various neuromuscular system along with various tests used to determine impairments & differentiating diagnosis. The students should be able to apply It emphasis various physiotherapy strategies for assessment & treatment addressing structural & functional impairments & activity limitations of individuals and population both adults & paediatrics in context of their personal goals including participation restrictions and environment they live in.

PHYSIOTHERAPY IN MEDICAL AND SURGICAL CONDITIONS:

At the end of the course, the students will acquire knowledge about anatomy physiology & pathophysiology of various cardiovascular & respiratory diseases. They will learn various tests to diagnosis & identify the impairments, also tests for differentiating the diagnosis. Course focuses on maximizing functional independence & wellbeing. The student will have a sound understanding of theory, scientific evidence and best practices in the areas of cardiovascular & Respiratory system including critical care, psychosocial sciences, movement sciences & PT.

PHYSIOTHERAPY IN COMMUNITY HEALTH:

At the end of the course, the student should be able to know the roles & responsibilities of Physiotherapist as the efficient member of society. Student should be able to apply the acquired knowledge to a practice oriented philosophy for optimization & betterment of health, which is done by better understanding the section & subsection of the societies, the national & international health policies, role of govt. & nongovernment Organizations. The student should be apply skills for promotion of health & rehabilitation communities like elderly, women's Health & Occupational Health etc.

PRINCIPLES OF BIOENGINEERING:

At the end of the course, the Students shall again knowledge and application of biomechanical principles related to orthotics & prosthetics. They will learn principles of the prescription & checkout procedures of aids & appliances as per the physical dysfunction of the person. They will get hands on experience of fabricate simple splints.

RESEARCH METHODOLOGY AND BIOSTATISTICS:

At the end of the course, the Students shall learn necessary concepts of statistics to enables them to realize a research project in the field of Physiotherapy. The Student will be able to identify appropriate statistical techniques reference, use of various software packages for analysis & data management. Interpretation of the results and its application in physiotherapy. Student will able to learn Fundamental of reading and understanding research methods, design and statistics.

COURSE OUTCOMES OF COMPULSORY ROTATORY INTERNSHIP:

1. At the end of the program, students will attain knowledge of consulting, diagnosing, providing appropriate treatment and management of all physical health disorders.
2. The students are also trained with additional Community based rehabilitation camps such as being a part of Multidisciplinary rural camps and Special physiotherapy camps.
3. The program equips the students with six months of compulsory internship under supervision, regular case presentations with clinical orientation training and a compulsory scientific research project.

COURSE OUTCOMES AT END OF THE PROGRAMME:

After the completion of UG (B.P.Th) programme, the above mentioned programme features in Krishna college of Physiotherapy enables the student to become a independent physiotherapist on successful completion of his/her programme to practice collaboratively in variety of health care set ups from Neonatal to Geriatric inclusive of specific personal training, sports fitness, critical care to community fitness and on the whole responsive to the current and future needs of the health care system.

POSTGRADUATE PROGRAMME : MPTh (MASTER OF PHYSIOTHERAPY)

The course is of two years duration advanced learning program in physiotherapy with 7 specialties namely :

1. Musculoskeletal sciences

2. Neurosciences
3. Pediatric neurological sciences
4. Cardiopulmonary sciences
5. Community health sciences
6. Oncology Physiotherapy
7. Sports Physiotherapy

COURSE OUTCOMES OF FIRST YEAR M.P.Th

The first year M.P.T course under 7 specialties which include the subject of Advanced therapeutics as per speciality and in addition Basic sciences, Basic therapeutics and Research Methodology are the three subjects which will be common to all 7 specialities.

1. To enrich clinical and therapeutic skills to adopt physiotherapy services by using theoretical and practical knowledge with consideration of patients and clinical judgement.
2. To develop physiotherapy skills and diagnosing different conditions by assessing, planning and rehabilitating patient and further followup evaluation.
3. To implement advanced skills in planning and tailor in effective, specific and safe physiotherapy treatment program.

Special emphasis is given to Biostatistics and Research methodology and for completing a scientific research project in the second year as per their elective subject. The main course outcomes are as follows:

1. To understand the statistical measures used for analysis and interpretation of research data.
2. Enhanced training to apply the information on research design and their implementation
3. To identify, read,critique research articles and understand and apply the principles of research to perform a guided research.

COURSE OUTCOMES OF SECOND YEAR M.P.Th:

It is as per the specialty with two subjects namely General physiotherapy and Advances in concerned Speciality Physiotherapy. An individual research project preferentially interventional study is mandatory to be competed before appearing for the examination.

1. The students learn and excel in various aspects of physiotherapy as per their speciality in theoretical and practical knowledge with a solid platform and tend to train them to be the best in the field.
2. To analyze and undertake data for research purpose and its documentation for long life learning in physiotherapy.
3. To develop educational experience for proficiency in profession and promote preventive and rehabilitative aspect on the society.
4. Be able to apply the knowledge for planning and evaluation of teaching methods in physiotherapy.

5. Be able to apply the knowledge on clinical education to spread awareness and guidance to common people about health and disease.

END OF THE PROGRAMME:

After the completion of PG (M.P.Th) programme, with the above mentioned programme features the post graduates will be equipped with advanced knowledge in respective speciality related to technical, problem solving and scientific skills to practice with evidence based physiotherapy practice through firm decision making process in assessment and treatment. Establish advance research hypotheses and undertake research works effectively within the health care sectors and community safely and efficiently inculcalting effective communication skills.

Krishna Institute Of Nursing Sciences, Karad.
Outcome Analysis
Basic B.Sc.Nursing

1.1.1. List of Programme outcomes (POs) and course outcome (COs)

Programme outcomes

COURSE OUTCOMES:

B.Sc Nursing FIRST YEAR:

ENGLISH

CO1.Speak and write grammatically correct English

CO2.Review of Grammar
CO3.Develop ability to read, understand and express meaningfully the prescribed
CO4.Develop writing skills
CO5.Develop skill in spoken English
CO6.Develop skill in listening comprehension

ANATOMY

CO1. Describe the anatomical terms, organization of human body and structure of cell, tissues, membranes and glands
CO2.Describe the structure & function of bones and joints
CO3.Describe the structure and function of muscles

CO4. Describe the structure and function of nervous system
CO5. Explain the structure and function of sensory organs
CO6. Describe the structure and function of circulatory and lymphatic system
CO7. Describe the structure and function of respiratory system
CO8. Describe the structure and function of digestive system
CO9. Describe the structure and function of excretory system
CO10. Describe the structure and function of endocrine system
CO11. Describe the structure and function of reproductive system

PHYSIOLOGY
CO1.Describe the physiology of cell, tissues, membranes and glands

CO2. Describe the bone formation and growth and movements of skeletal system
CO3.Describe the muscle movements and tone and demonstrate muscle contraction and tone
CO4.Describe the physiology of nerve stimulus, reflexes, brain, cranial and spinal nerves
CO5.Demonstrate reflex action and stimulus
CO6.Describe the physiology of blood and functions of Heart

CO7.Demonstrate blood cell count, coagulation, grouping, Hb, BP and pulse monitoring
CO8.Describe the physiology and mechanisms of respiration
CO9. Demonstrate spirometry
CO10.Describe the physiology of digestive system
CO11.Demonstrate BMR
CO12.Describe the physiology of excretory system
CO13.Describe the physiology of sensory organs
CO14.Describe the physiology of endocrine glands
CO15.Describe the Physiology of male and female reproductive system
CO16.Describe the physiology of Lymphatic and Immunological system

Nutrition
CO1.Describe the relationship between nutrition & health
CO2.Describe the classification, functions, sources and recommended daily allowances (RDA) of carbohydrates CO3.Describe the classification, functions, sources and recommended daily allowances (RDA) of fats CO4.Describe the classification, functions, sources and recommended daily allowances (RDA) of Proteins CO5.Describe the daily calorie requirement for different categories of people
CO6.Describe the classification, functions, sources and recommended daily allowances (RDA) of vitamins
CO7.Describe the classification, functions, sources and recommended daily allowances (RDA) of minerals
CO8. Describe the sources, functions and requirements of water & electrolytes
CO9. Describe the cookery rules and preservation of nutrients
CO10. Prepare and serve simple beverages and different types of foods
CO11.Describe and plan balanced diet for different categories of people
CO12.Describe the various national programmes related to nutrition
CO13.Describe the role of nurse in assessment of nutritional status and nutrition education

BIOCHEMISTRY

CO1. Describe the structure, composition and functions of cell

CO2. Differentiate between prokaryote and eukaryote cell
CO3. Identify techniques of microscopy
CO4. Describe the structure and functions of cell membrane
CO5. Explain the metabolism of carbohydrates
CO6. Explain the metabolism of Lipids
CO7. Explain the metabolism of Amino acids and Proteins
CO8. Describe types, composition and utilization of Vitamins & minerals

CO9. Describe Immuno-chemistry

NURSING FOUNDATION

CO1.Describe the concept of health, illness and health care agencies
CO2.Explain concept and scope of nursing
CO3.Describe values, code of ethics and professional conduct for nurses in India
CO4.Explain the admission and discharge procedure
CO5.Perform admission and discharge procedure
CO6.Communicate effectively with patient, families and team members and maintain effective human relations (projecting professional image)
CO7.Appreciate the importance of patient teaching in nursing
CO8.Explain the concept, uses, format and steps of nursing process
CO9.Documents nursing process as per the format
CO10.Describe the purposes, types and techniques of recording and reporting
CO11.Describe principles and techniques of monitoring and maintaining vital signs

CO12.Monitor and maintain vital signs
CO13.Describe the purpose and process of health assessment
CO14.Describe the health assessment of each body system
CO15.Perform health assessment of each body system
CO16.Identifies the various machinery, equipment, linen and their care
CO17.Describe the basic, physiological and psychosocial needs of patient
CO18.Describe the principles and techniques for meeting basic, physiological and psychosocial needs of patient
CO19.Perform nursing assessment, plan, implement and evaluate the care for meeting basic, physiological and psychosocial needs of patient
CO20.Describe principles and techniques for infection control and biomedical waste management in supervised clinical settings
CO21.Explain the principles, routes, effects of administration of medications
CO22.Calculate conversions of drugs and dosages within and between systems of measurements
CO23.Administer drugs by following routes-oral, intradermal, subcutaneous, intramuscular, intravenous, topical and inhalation
CO24.Describe the pre and post operative care of patients
CO25.Explain the process of wound healing
CO26.Explain the principles and techniques of wound care

CO27.Perform care of wounds
CO28.Explain care of patients having alterations in body functioning CO29.Explain care of terminally ill patient
CO30.Explain the basic concepts of conceptual and theoretical models of nursing

NURSING FOUNDATION – PRACTICAL
CO1.Performs admission and discharge procedure
CO2.Prepare nursing care plan as per the nursing process format
CO3.Communicate effectively with patient, families and team members
CO4.Maintain effective human relations
CO5.Develop plan for patient teaching
CO6.Prepare patient reports
CO7.Presents reports
CO8.Monitor vital signs
CO9.Perform health assessment of each body system
CO10.Provide basic nursing care to patients
CO11.Perform infection control procedures
CO12.Provide care to pre and post operative patients
CO13.Perform procedures for care of wounds
CO14.Administer drugs
CO15.Provide care to dying and dead
CO16.Counsel and support relatives

PSYCHOLOGY
CO1. Describe the history, scope and methods of psychology
CO2. Explain the biology of Human behaviour
CO3. Describe various cognitive processes and their applications
CO4. Describe motivation, emotions, stress, attitudes and their influence on behaviour
CO5. Explain the concepts of personality and its influence on behaviour
CO6. Describe psychology of people during the life cycle
CO7. Describe the characteristics of mentally healthy person
CO8. Explain ego defense mechanisms
CO9. Explain the Psychological assessments and role of nurse

MICROBIOLOGY
CO1. Explain concepts and principles of microbiology and their importance in nursing
CO2. Describe structure, classification morphology and growth of bacteria
CO3. Identify micro- organisms
CO4. Describe the methods of infection control
CO5. Identify the role of nurse in hospital infection control programme
CO6. Describe the different disease producing organisms
CO7.Explain the concept of immunity, hyper sensitivity and immunization

INTRODUCTION TO COMPUTERS
CO1. Identify & define various concepts used in computer
CO2. Identify application of computer in nursing

CO3. Describe and use the Disk operating system
CO4. Demonstrate skill in the use of MS Office
CO5. Demonstrate skill in using multi-media
CO6. Identify features of computer aided teaching and testing
CO7. Demonstrate use of internet and Email
CO8. Describe and use the statistical packages
CO9. Describe the use of Hospital Management System

SECOND YEAR

SOCIOLOGY
CO1.State the importance of sociology in nursing
CO2. Describe the interrelationship of individual in society and community
CO3. Describe the influence of culture on health and disease
CO4. Identify various social groups and their interactions
CO5. Explain the growth of population in India and its impact on health
CO6. Describe the institutions of family and marriage in India
CO7. Describe the class and caste system and their influence on health and health practices
CO8. Describe the types of communities in India, their practices and the impact on health
CO9. Explain the process of Social Change
CO10. Describe the social system and inter relationship of social organizations
CO11. Explain the nature and process of social control
CO12. Describe the role of the nurse in dealing with social problems in India

PHARMACOLOGY
CO1. Describe Pharmaco-dynamics, pharmaco-kinetics, classification and the principles of drug administration
CO2. Explain chemotherapy of specific infections, infestations and nurse's responsibilities
CO3. Describe antiseptics, disinfectants, insecticides and nurse's responsibilities
CO4. Describe the drugs acting on Gastro Intestinal system and nurse's responsibilities
CO5. Describe drugs used on Respiratory Systems and nurse's responsibilities
CO6. Describe drugs used on Urinary system and nurse's responsibilities
CO7. Describe drugs used in de-addiction, emergency, deficiency of vitamins & minerals, poisoning, for immunization and Immunosuppression and nurse's responsibilities
CO8. Describe the drugs used on skin and mucous membranes and nurse's responsibilities CO9. Describe Drugs used on Nervous System and nurse's responsibilities
CO10. Describe Drugs used on Cardio-vascular system and nurse's responsibilities
CO11. Describe drugs used for hormonal disorders and supplementation, contraception and medical termination of pregnancy and nurse's responsibilities
CO12. Demonstrate awareness of the common drugs used in alternative system of medicine

PATHOLOGY AND GENETICS
Section A - Pathology
CO1. Define the common terms used in pathology.
CO2. Appreciate the deviations from normal to abnormal structure and functions of the body system.
CO3. Explain Pathological changes in disease conditions of various systems

CO4. Describe various laboratory tests in assessment and monitoring of disease conditions
CO5. Describe the laboratory tests for examination of body cavity fluids, transudates and exudates
CO6. Describe the laboratory tests for examination of urine and faeces

SECTION – B GENETICS
CO1. Explain nature, principles and perspectives of heredity

CO2. Explain Maternal, prenatal and genetic influences on development of defects and diseases
CO3. Explain the screening methods for genetic defects and diseases in neonates and children
CO4. Identify genetic disorders in adolescents and adults
CO5. Describe the role of nurse in genetic services and counseling

MEDICAL SURGICAL NURSING
(ADULT INCLUDING GERIATRICS)-I
CO1. Appreciate the trends in medical and surgical nursing
CO2. Describe the role of a nurse in caring for adult patient in hospital and community CO3. Describe the concepts of medical surgical asepsis
CO4. Describe the common signs, symptoms, problems and their specific nursing interventions CO5. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of respiratory system
CO6. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of digestive systems
CO7. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with blood and cardiovascular problems
CO8. Describe the vascular conditions and its nursing management
CO Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of genito-urinary systems

CO9. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of male reproductive system
CO10. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of endocrine system
CO11. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of skin

CO12. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of musculo- skeletal system

CO13. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with disorders of immunological system

CO14. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients (adults including elderly) with communicable Diseases

CO15. Describe the organization and physical set up of operation theatre
• Identify the various instruments and equipments used for common surgical procedures

• Describe the infection control measures in the Operation Theatre
• Describe the role of the nurse in the Operation Theatre

MEDICAL SURGICAL NURSING (ADULT INCLUDING GERIATRICS)-I PRACTICAL (720 hours- II year)

General Medical ward
CO1. Provide nursing care to adult patients with medical disorders
CO2. Counsel and educate patients and families
General surgical ward
CO3. Provide pre and post operative nursing care to adult patients with surgical disorders
CO4.Counsel and educate patients and families
Cardiology Ward
CO5. Provide nursing care to patients with cardiac disorders
CO6.• Counsel and educate patients and families

Skin and communicable diseases
CO7. Identify skin problems
CO8. Provide nursing care to patients with skin disorders & communicable diseases
CO9. Counsel and educate patients and families
Orthopaedic Ward
CO10. Provide nursing care to patients with musculo-skeletal disorders
CO11. Counsel and educate patients and families
Operation Theatre
CO12. Identify instruments used in common operations
CO13. Participate in infection control practices in the operation theatre
CO14. Set-up the table/ trolleys for common operative procedures
CO15. Assist in giving anesthesia
CO16. Assist in the operative procedures
CO17. Provide perioperative nursing care

INTERNSHIP (250hrs, III year B.Sc Nursing)

PSO'S

Provide comprehensive care to patients with medical conditions Medical wards, CCU

PSO1. To gain proficiency in ICU nursing

PSO2. Develop advance skill in special procedures used in critical care unit
PSO3. Identify potential problems and provide care accordingly.
PSO4. Skill in setting and handling ventilator
PSO5. Administer injection in infusion pump
PSO6. Record accurately findings and medications
PSO7. Develop IPR with family members

Provide comprehensive care to patients with surgical conditions Surgical wards,ICU
PSO1. To gain proficiency in ICU nursing

PSO2. Develop advance skill in special procedures used in critical care unit
PSO3. Identify potential problems and provide care accordingly.
PSO4. Skill in setting and handling ventilator

PSO5. Administer injection in infusion pump
PSO6. Record accurately findings and medications
PSO7. Develop IPR with family members

Acquaint with OT technique
OT- Laparoscopic,orthopaedic, cardiac
PSO1. Identify instruments
PSO2. Assist in OT set up
PSO3. Supervise sterilization
PSO4. Assist in OT table layout
PSO5. Observe immediately after operation
PSO6. Supervise infection control

COMMUNITY HEALTH NURSING – I
CO1. Describe concept and dimensions of health
CO2. Describe determinants of health
CO3. Describe the concept, scope, uses methods and approaches of epidemiology
CO4. Describe Epidemiology and nursing manage-ment of common communicable diseases
CO5. Describe Epidemiology and nursing management of common Non-communicable diseases
CO6. Describe the concepts and scope of demography
CO7. Describe methods of data collection, analysis and interpretation of demographic data CO8. Identify the impact of population explosion in India CO9. Describe the methods of population control

COMMUNITY HEALTH NURSING I - PRACTICAL
Build and maintain rapport

Identify demographic characteristics, health determinants and community health resources
Diagnose health needs of indivi-dual and families
Provide primary care in health centre
Counsel and educate indivi-dual, family and community

COMMUNICATION & EDUCATIONAL TECHNOLOGY
CO1. Describe the communication process
CO2. Identify techniques of effective communication
CO3. Establish effective inter-personal relations with patients, families & co-workers
CO4. Develop effective human relations in context of nursing
CO5. Develop basic skill of counseling and guidance
CO6. Describe the philosophy & principles of education
CO7. Explain the teaching learning process

CO8. Demonstrate teaching skill using various teaching methods in clinical, classroom and community settings
CO9. Prepare and use different types of educational media effectively
CO10. Prepare different types of questions for assessment of knowledge, skills and attitudes CO11. Teach individuals, groups, and communities about health with their active participation

ENVIRONMENTAL STUDIES

CO1. Describe nature of environmental studies
CO2. Explain uses of natural resource and the effects of exploitation
CO3. Describe the types of Ecosystems
CO4. Explain ecosystem diversity and Conservation of biodiversity
CO5. Explain Causes, effects and control measures of environmental Pollution
CO6. Describe the environmental social issues and the possible solutions
CO7. Explain the human population and its impact on health
CO8. Identify the local polluted sites and draw out the remedy measures

THIRD YEAR
MEDICAL SURGICAL NURSING
(ADULT INCLUDING GERIATRICS)- II

CO1. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with disorders of Ear Nose and Throat
CO2. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with disorders of Eye.
CO3. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and nursing management of patients with neurological disorders
CO4. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and nursing management of patients with disorder of female reproductive system

CO5. Describe the concept of reproductive health and family welfare programme
CO6. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with burns, reconstructive and cosmetic surgery
CO7. Describe the etiology, pathophysiology, clinical manifestations, diagnostic measures and management of patients with oncological conditions
CO8. Describe organization of emergency and disaster care services CO9. Describe the role of nurse in disaster management
CO10. Describe the role of nurse in management of common emergencies
CO11. Explain the concept and problems of ageing
CO12. Nursing care of the elderly
CO13. Describe organization of critical care units
CO14. Describe the role of nurse in management of patients in critical care units
CO 15. Describe the etiology, pathophysiology, clinical manifestations, assessment, diagnostic measures andmanagement of patients with occupational and industrial health disorder

MEDICAL SURGICAL NURSING
(ADULT AND GERIATRICS)- II- PRACTICAL
ENT

CO1. Provide care to patients with ENT disorders
CO2. Counsel and educate patient and families
Ophthalmology
CO3. Provide care to patients with Eye disorders
CO4. Counsel and educate patient and families
OT – Eye, ENT, Neuro
CO5. Identify instruments
CO6. Assist in OT set up
CO7. Supervise sterilization
CO8. Assist in OT table layout
CO9. Observe immediately after operation
CO10. Supervise infection controlNeurology
CO11. Provide care to patients with neurological disorders
CO12. Counsel and educate patient and families
Gynecology ward
CO13. Provide care to patients with gynecological disorders
CO14. Counsel and educate patient and families
Burns & plastic reconstructive surgery
CO15. Assess the severity of burns
CO16. Administer rehydration therapy
CO17. Provide care to patients with Burns
CO18. Counsel and educate patient and families
CO19. Observe reconstructive surgeryOncology Unit
CO20. Provide care to patients with cancer
CO21. Counsel and educate patient and families
Critical care unit (Neuro, general ICU)
CO22. Provide care to critically ill patients
CO23. Counsel patient and families for grief and bereavement
CO24. Develop skill in neurological assessment
CO25. Give care to the patient with head injury and spinal injury
CO26. Care with chest surgery and cranial surgery
Casualty/ Emergency
CO27. Provide care to patients in emergency and disaster situation
CO28. Counsel patient and families for grief and bereavement

CHILD HEALTH NURSING

CO1. Explain the modern concept of child care & principles of child health nursing
CO2. Describe national policy programs and legislation in relation to child health and welfare CO3. List major causes of death during infancy, early & late childhood
CO4. Describe the major functions and role of the paediatric nurse in caring for a hospitalized child.
CO5. Describe the principles of child health nursing
CO6. Describe the normal growth & development of children at different ages CO7. Identify the needs of children at different ages & provide parental guidance
CO8. Identify the nutritional needs of children at different ages and ways of meeting the needs CO9. Appreciate the role of play for normal & sick children

CO10. Appreciate the preventive measures and strategies for children
CO11. Provide care to normal & high risk neonates
CO12. Perform neonatal resuscitation
CO13. Recognize and manage common neonatal problems
CO14. Provide nursing care in common childhood diseases
CO15. Identify measures to prevent common childhood diseases including mmunization CO16. Manage the child with behavioural & social problems
CO17. Identify the social & welfare services for challengedchildren

CHILD HEALTH NURSING – PRACTICAL Paediatric Medicine Ward
CO1. Provide nursing care to children with various medical disorders Paediatric Surgery Ward

CO2. Counsel and educate parents
CO3. Recognize different paediatric surgical conditions/malformations
CO4. Provide pre and post operative care to children with common paediatric surgical conditions/malformation
CO5. Counsel and educate parentsPaediatric OPD/ Immunization room
CO6. Perform assessment of children: Health Developmental and anthropometric CO7. Perform immunization
CO8. Give Health Education/Nutritional Education
Paediatric medicine and surgery ICU
CO9. Provide nursing care to critically ill children
Internship
PSO'S
Paediatric Medicine Ward/ICU
PSO1. Provide comprehensive care to children with medical conditions
Paediatric Surgery Ward/ICU
PSO2. Provide comprehensive care to children with surgical conditions
NICU
PSO3**.** Provide intensive care to neonates
MENTAL HEALTH NURSING
CO1. Describe the historical development & current trends in mental health nursing CO2. Describe the epidemiology of mental health problems
CO3. Describe the National Mental Health Act, programmes and mental health policy CO4. Discuss the scope of mental health nursing
CO5. Describe the concept of normal & abnormal behavior
CO6. Define the various terms used in mental health nursing
CO7. Explain the classification of mental disorders
CO8. Explain psycho dynamics of maladaptive behaviour
CO9. Discuss the etiological factors, psychopathology of mental disorders CO10. Explain the principles and standards of Mental health Nursing CO11. Describe the conceptual models of mental health nursing
CO12. Describe the nature, purpose and process of assessment of mental health status
CO13. Identify therapeutic communication techniques
CO14. Describe therapeutic relationship
CO15. Describe therapeutic impasse and its intervention

CO16. Explain treatment modalities and therapies used in mental disorders and role of the nurse
CO17. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of patients with Schizophrenia, and other psychotic disorders
CO18. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of patients with mood disorders
CO19. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of patients with neurotic, stress related and somatization disorders
CO20. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of patients with substance use disorders
CO21. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of patients with spersonality, Sexual and Eating disorders

CO22. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management of childhood and adolescent disorders including mental deficiency
CO23. Describe the etiology, psychopathology, clinical manifestations, diagnostic criteria and management organic brain disorders CO24. Identify psychiatric emergencies and carry out crisis intervention
CO25. Explain legal aspects applied in mental health settings and role of the nurse CO26. Describe the model of preventive psychiatry
CO27. Describe community Mental Health services and role of the nurse

MENTAL HEALTH NURSING – PRACTICAL
Psychiatric OPD
CO1. Assess patients with mental health problems
CO2. Observe and assist in therapies
CO3. Counsel and educate patient and families
CO4. Assessment of children with various mental health problems
CO5. Counsel and educate children, families and significant others
Child Guidance clinic
CO1. Assess patient with mental health problems
CO2. To provide nursing care for patients with various mental health problems
CO3. Assist in various therapies
CO4. Counsel and educate patients, families and significant others
Inpatient ward
CO1. Assess patient with mental health problems
CO2. To provide nursing care for patients with various mental health problems
CO3. Assist in various therapies
CO4. Counsel and educate patients, families and significant others
Community Psychiatry
CO1. To identify patients with various mental disorders
CO2. To motivate patients for early treatment and follow up
CO3. Counsel and educate patient and family and community

Internship
Psychiatry ward

PSO1. Provide comprehensive care to patients with mental health problems

NURSING RESEARCH AND STATISTICS

CO1. Describe the concept of research, terms, need and areas of research in nursing CO2. Explain the steps of research process
CO3. Identify and state the research problem and objectives
CO4. Review the related literature
CO5. Describe the research approaches and designs
CO6. Explain the sampling process
CO7. Describe the methods of data collection
CO8. Analyze, Interpret and summarize the research data
CO9. Explain the use of statistics, scales of measurement and graphical presentation of data
CO10. Describe the measures of central tendency and variability and methods of correlation
CO11. Communicate and utilize the research findings

Fourth year

MIDWIFERY AND OBSTETRICAL NURSING

CO1. Recognize the trends and issues in midwifery and obstetrical nursing
CO2. Describe the anatomy and physiology of female reproductive system
CO3. Describe the diagnosis and management of women during antenatal period
CO4. Describe the physiology and stages of labour
CO5. Describe the management of women during intranatal period
CO6. Describe the physiology of puerperium
CO7. Describe the management of women during postnatal period
CO8. Describe the assessment and management of normal neonate
CO9. Describe the identification and management of women with high risk pregnancy
CO10. Describe management of abnormal labour and obstetrical emergencies
CO11. Describe management of postnatal complications
CO12. Identify the high risk neonates and their nursing management
CO13. Describe indication, dosage, action, side effects and nurses responsibilities in the administration of drugs used for mothers CO14. Appreciate the importance of family welfare programme
CO15. Describe the methods of contraception and role of nurse in family welfare programme

MIDWIFERY AND OBSTETRICAL NURSING – PRACTICAL

Antenatal clinic/OPD

CO1. Assessment of pregnant womenLabour room O.T
CO2. Assess woman in labour
CO3. Carry out pervaginal examinations
CO4. Conduct normal deliveries
CO5. Perform episiotomy and suture it
CO6. Resuscitate newborns
CO7. Assist with caesarean sections, MTP and other surgical procedures

Postnatal ward

CO8. Provide nursing care to postnatal mother and baby

CO9. Counsel and teach mother and family for parenthood
Newborn nursery
CO11. Provide nursing care to newborn at risk
Family planning clinic
CO 12. Counsel for and provide family welfare services

Internship Obstetrical Nursing
Labour ward Neonatal Intensive care unit (NICU) Antenatal Postnatal Newborn Nursery
PSO1. Provide comprehensive care to mothers and neonates

COMMUNITY HEALTH NURSING – II

CO1. Define concepts, scope, principles and historical development of Community Health and community health nursing CO2. Describe health plans, policies, various health committees and health problems in India
CO3. Describe the system of delivery of community health services in rural and urban areas
CO4. List the functions of various levels and their staffing pattern
CO5. Explain the components of health services
CO6. Describe alternative systems of health promotion and health maintenance CO7. Describe the chain of referral system
CO8. Describe Community Health Nursing approaches and concepts
CO9. Describe the roles and responsibilities of Community health nursing personnel
CO 10. Describe and appreciate the activities of community health nurse in assisting individuals and groups to promote and maintain their health
CO11. Describe national health and family welfare programmes and role of a nurse CO12. Describe the various health schemes in India
CO 13. Explain the roles and functions of various national and international health agencies
COMMUNITY HEALTH NURSING II – PRACTICAL
Identify community profile
CO1. Identify prevalent communicable and noncommunicable diseases
CO2. Diagnose health needs of Individual, families and community
CO3. Plan, provide and evaluate care
CO4. Participate in school health program
CO5. Participate in national health programs
CO6. Organize group for self help and involve clients in their own health activities CO7. Provide family welfare services
CO8. Counsel and educate individual, family and community
CO9. Collect vital health statistics
CO10. Maintain records & reports

Internship
Urban
PSO1. Provide comprehensive care to individual, family and community

MANAGEMENT OF NURSING SERVICES AND EDUCATION CO1. Explain the principles and functions of management

CO2. Describe the elements and process of management
CO3. Describe the management of nursing services in the hospital and community
CO4. Describe the concepts, theories and techniques of organizational behaviour and human relations
CO5. Participate in planning and organizing in –service education program
CO6. Describe management of Nursing educational institutions
CO7. Describe the ethical and legal responsibilities of a professional nurse CO8. Explain the nursing practice standards
CO9. Explain the Various opportunities for professional advancement

Post Basic B. Sc. Nursing

Programme Outcomes

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

PO 1. Assess health status, identify nursing needs, plan, implement and evaluate nursing care for Patients/clients that contribute to health of individuals, families and communities.

PO 2. Demonstrate competencies in techniques of nursing based on concepts and principles from selected areas of nursing, physical, biological and behavioural sciences.

PO 3. Participate as members of health team in the promotive, preventive, curative and restorative health care delivery system of the country.

PO 4. Demonstrate skills in communication and interpersonal relationship.

PO 5. Demonstrate leadership qualities and decision-making abilities in various situations.

PO 6. Demonstrate skills in teaching to individuals, groups in community health settings.

PO 7. Demonstrate managerial skills in community health settings.

PO 8. Practice ethical values in their personal and professional life.

PO 9. Participate in research activities and utilize research findings in improving nursing practice. PO 10. Recognize the need for continued learning for their personal and professional development

Course outcomes

NURSING FOUNDATION
Course outcomes
CO 1. Identify professional aspects of nursing.
CO 2. Explain theories of nursing.
CO 3. Identify ethical aspects of nursing profession.
CO 4. Utilize steps of nursing process.
CO 5. Identify the role of the nurse in various levels of health services.
CO 6. Appreciate the significance of quality assurance in nursing.
CO 7. Explain current trends in health and nursing.

NUTRITION & DIETETICS
Course outcomes

CO 1. Explain the principles and practices of nutrition and dietetics
CO 2. Plan therapeutic diets in different settings
CO 3. Identify nutritional needs of different age groups and plan diet accordingly CO 4. Prepare meals using different methods utilizing cookery rules

BIOCHEMISTRY & BIOPHYSICS
.Course outcomes

CO 1. Identify the basic principles of Biochemistry and Biophysics
CO 2. Synthesize the knowledge of these principles in various nursing situations

PSYCHOLOGY
Course outcomes

CO 1. Apply psychological principles while performing nursing duties

CO 2. Distinguish the psychological processes during health and sickness

CO 3. Analyze own behavior patterns

CO 4. Tabulate the psychological needs of the patients for planning nursing care CO 5. Participate in psychometric assessment of the client

MICROBIOLOGY

Course outcomes

CO 1. Identify common disease producing micro-organisms

CO 2. Explain the basic principles of microbiology and their significance in health and disease CO 3. Demonstrate skill in handling specimens

CO 4. Explain various methods of dis-infection and sterilization

CO 5. Identify the role of the nurse in hospital infection control system

MATERNAL NURSING

Course outcomes

CO 1. Describe the physiology of pregnancy, labour and puerperium.

CO 2. Manage normal pregnancy, labour and puerperium.

CO 3. Explain the physiology of lactation and advice on management of breast feeding.

CO 4. Be skilled in providing pre and post operative nursing care in obstetric conditions.

CO 5. Identify and manage high risk pregnancy, labor, puerperium and neonates including appropriate referrals.

CO 6. Propagate the concept and motivate acceptance of family planning methods.

CO 7. Teach, guide and supervise auxiliary midwifery personnel.

CHILD HEALTH NURSING

Course outcomes

CO 1. Explain the modern concepts of child care and the principles of child health nursing.

CO 2. Describe the normal growth and development of children at different ages.

CO 3. Manage sick as well as healthy neonates and children.

CO 4. Identify various aspects of preventive paediatric nursing and apply them in providing nursing care to children in hospital and community

MEDICAL AND SURGICAL NURSING

Course outcomes

CO 1. Explain relevant anatomy and physiology of various systems of the body.

CO 2. Explain pathophysiology of various disorders.

CO 3. Explain the actions, side effects and nursing implications in administering drugs for various disorders.

CO 4. Discuss the recent advancement in the treatment and care of patients with medical surgical conditions.

CO 5. Develop skill in giving comprehensive nursing care to patients following the steps of nursing process.

CO 6. Assist the patients and their families in identifying and meeting their own health needs.

CO 7. Appreciate the role of the nurse in the medical surgical health team.

ENGLISH

Course outcomes

CO 1. Ability to speak and write grammatically correct English

CO 2. Effective skill in reading and
understanding the English language
CO 3. Skill in reporting

SOCIOLOGY

Course outcomes

CO 1. Describe sociological concepts that are applicable to nursing

CO 2. Determine role of sociology in nursing as
related to social institutions in India CO 3. Develop
positive attitudes towards individual, family and
community

COMMUNITY HEALTH NURSING

Course outcomes

CO 1. Explain the concept of various factors contributing to health of individual, family and community.

CO 2. Identify the role of community health nurse.

CO 3. Describe national health care delivery system.

CO 4. Describe epidemiological methods and principles of prevention and control of illness in the community.

CO 5. Identify the role of personnel working in the community health set up.

CO 6. Plan the work of community health nurse and supervise and train health workers

MENTAL HEALTH NURSING

Course outcomes

CO 1. Identify and describe the philosophy and principles of mental health nursing

CO 2. Describe the historical development of mental health and psychiatric nursing

CO 3. Classify mental disorders

CO 4. Develop skill in history taking and performing mental status examination

CO 5. Describe etiological factors, psycho-pathology, clinical features, diagnostic criteria and treatment methods used for mental disorders

CO 6. Manage the patients with various mental disorders

CO 7. Communicate
therapeutically with patients and
their families CO 8. Identify role
of the nurse in preventive
psychiatry

CO 9. Identify the legal aspects in practice of mental health and psychiatric nursing

INTRODUCTION TO NURSING EDUCATION

Course outcomes

CO 1. Describe the philosophy and principles of education

CO 2. Explain the teaching – learning process and curriculum development

CO 3. Develop the ability to teach, using various methods and media

CO 4. Describe the process of assessment

CO 5. Describe the administrative aspects of school of nursing

CO 6. Participate in planning and organizing an in-service education programme

CO 7. Develop basic skill of counseling and guidance

INTRODUCTION TO NURSING SERVICE ADMINISTRATION

Course outcomes

CO 1. Identify the principles of administration

CO 2. Describe the principles and techniques of supervision

CO 3. Explain the principles and methods of personnel management

CO 4. Explain the principles of budgeting

CO 5. Organize and manage a nursing unit effectively

CO 6. Identify dynamics of organizational behaviour, styles and functions of effective leadership

INTRODUCTION TO NURSING RESEARCH AND STATISTICS
Course outcomes

CO 1. Define the terms and concepts of nursing research

CO 2. Identify needs and scope of nursing research

CO 3. Identify and define a research problem

CO 4. Locate and list sources of literature for a specific study

CO 5. Describe different research approaches, methods of data collection and sampling techniques with a special reference to survey method

CO 6. Develop tool for data collection

CO 7. Enumerate steps of data analysis and present data summary in tabular form

CO 8. Use descriptive and co-relational statistics in data analysis

CO 9. Conduct a group research project

M.Sc. NURSING DEGREE COURSE

Programme outcome

On completion of the two years M.Sc. Nursing programme, the graduate will be able to:-

PO1.Utilize/apply the concepts, theories and principles of nursing science.
PO2. Demonstrate advance competence in practice of nursing.

PO3. Practice as a nurse specialist.
PO4. Demonstrate leadership qualities and function effectively as nurse educator and manager.

PO5. Demonstrate skill in conducting nursing research, interpreting and

utilizing the findings from health related research.

PO6. Demonstrate the ability to plan and effect change in nursing practice and in the health care delivery system.
PO7. Establish collaborative relationship with members of other disciplines.

PO8. Demonstrate interest in continued learning for personal and professional advancement.

Course outcomes

First Year -NURSING EDUCATION
CO1:Explain the aims of education, philosophies, trends in education and health: its impact on nursing education.

CO 2: Describe the teaching learning process.

CO 3 :Prepare and utilize various instructional media and methods in teaching learning process.

CO 4: Demonstrate competency in teaching, using various instructional strategies.

CO 5: Critically analyze the existing nursing educational programs, their problems, issues and future trends.

CO 6: Describe the process of curriculum development, and the need and methodology of curriculum change, innovation and integration.

CO 7: Plan and conduct continuing nursing education programs.

CO 8: Critically analyze the existing teacher preparation programs in nursing.

CO 9: Demonstrate skill in guidance and counseling.

CO 10 : Describe the problems and issues related to administration of nursing curriculum including selection and organization of clinical experience.

CO 11 Explain the development of standards and accreditation process in nursing education programs.

CO 12. Identify research priorities in nursing education.

CO 13. Discuss various models of collaboration in nursing education and services.

CO 14. Explain the concept, principles, steps, tools and techniques of evaluation.

CO 15. Construct, administer and evaluate various tools for assessment of knowledge, skill and attitude

ADVANCED NURSING PRACTICE

CO1.Appreciate and analyze the development of nursing as a profession.

CO2. Describe ethical, legal, political and economic aspects of health care delivery and nursing practice.

CO3. Explain bio-psycho-social dynamics of health, life style and health care delivery system.

CO4. Discuss concepts, principles, theories, models, approaches relevant to nursing and their application.

CO5. Describe scope of nursing practice.

CO6. Provide holistic and competent nursing care following nursing process approach.

CO7. Identify latest trends in nursing and the basis of advance nursing practice.

CO8. Perform extended and expanded role of nurse.

CO9. Describe alternative modalities of nursing care.

CO10. Describe the concept of quality control in nursing.

CO11. Identify the scope of nursing research.

CO12. Use computer in patient care delivery system and nursing practice.

CO13. Appreciate importance of self development and professional advancement.

CLINICAL SPECIALITY – I MEDICAL SURGICAL NURSING

CO1.Appreciate the trends & issues in the field of medical surgical nursing as a specialty.

CO2. Apply concepts & theories related to health promotion.

CO3. Appreciate the client as a holistic individual.

CO4. Perform physical, psychosocial assessment of medical surgical patients.

CO5. Apply nursing process in providing care to patients.

CO 6. Integrate the concept of family centered nursing care with associated disorders such as genetic, congenital and long term illness.

CO 7. Recognize and manage emergencies with medical surgical patients.

CO 8. Describe various recent technologies & treatment modalities in the management of critically ill patients.

CO 9. Appreciate the legal & ethical issues relevant to medical surgical nursing.

CO 10. Prepare a design for layout and management of medical surgical units.

CO 11. Appreciate the role of alternative system of medicine in care of patients.

CO 12. Incorporate evidence based nursing practice and identify the areas of research in the field of medical surgical nursing.

CO 13. Recognize the role of nurse practitioner as a member of medical surgical health team.

CO 14. Teach medical surgical nursing to undergraduate nursing students and in-service nurses

CLINICAL SPECIALITY - I OBSTETRICS AND GYNAECOLOGY NURSING

COI. Appreciate the trends in the field of midwifery, obstetrics and gynaecology as a specialty.

CO2. Describe the population dynamics and indicators of maternal and child health.

CO3. Describe the concepts of biophysical, psychological and spiritual aspects of normal pregnancy, labor and puerperium.

CO4. Provide comprehensive nursing care to women during reproductive period and newborns.

CO5. Integrate the concepts of family centered nursing care and nursing process approach in obstetrics and gynaecology nursing CO6. Identify and analyze the deviations from normal birth process and refer appropriately.

CO7. Describe the pharmacological agents, their effects during pregnancy, child birth, puerperium, lactation and the role of nurse.

CO8. Counsel adolescents, women and families on issues pertaining to pregnancy, child birth and lactation.

CO9. Describe the role of various types of complementary and alternative therapies in obstetrics and gynaecology nursing CO10. Incorporate evidence based nursing practice and identify the areas of research in the field of obstetrics and gynaecology nursing

CO11. Describe the recent advancement in contraceptive technology and birth control measures CO12. Appreciate the legal and ethical issues pertaining to obstetrics and gynaecology nursing.

CLINICAL SPECIALTY – I CHILD HEALTH (PAEDIATRIC) NURSING

CO1.Appreciate the history and developments in the field of pediatrics and pediatric nursing as a specialty.
CO2. Apply the concepts of growth and development in providing care to the pediatric clients and their families.
CO3. Appreciate the child as a holistic individual.
CO4. Perform physical, developmental, and nutritional assessment of pediatric clients.
CO5. Apply nursing process in providing nursing care to neonates & children.
CO6. Integrate the concept of family centered pediatric nursing care with related areas such as genetic disorders, congenital malformations and long term illness.
CO7. Recognize and manage emergencies in neonates.
CO8. Describe various recent technologies and treatment modalities in the management of high risk neonates.
CO9. Appreciate the legal and ethical issues pertaining to pediatric and neonatal nursing.
CO10. Prepare a design for layout and management of neonatal units.
CO11. Incorporate evidence based nursing practice and identify the areas of research in the field of pediatric / neonatal nursing.
CO12. Recognize the role of pediatric nurse practitioner and as a member of the pediatric and neonatal health team.
CO13. Teach pediatric nursing to undergraduate students & in-service nurses.

CLINICAL SPECIALITY – I
MENTAL HEALTH (PSYCHIATRIC) NURSING

CO1.Appreciate the trends and issues in the field of psychiatry and psychiatric nursing CO2. Explain the dynamics of personality development and human behaviour

CO3. Describe the concepts of psychobiology in mental disorders and its implications for psychiatric nursing CO4. Demonstrate therapeutic communication skills in all interactions

CO5. Demonstrate the role psychiatric nurse practitioner in various therapeutic modalities

CO6. Establish and maintain therapeutic relationship with individual and groups
CO7. Use assertive techniques in personal and professional actions
CO8. Promote self-esteem of clients, others and self
CO9. Apply the nursing process approach in caring for patients with mental disorders CO10. Describe the psychopharmacological agents, their effects and nurses role
CO11. Recognize the role of psychiatric nurse practitioner and as a member of the psychiatric and mental health team
CO12. Describe various types of alternative system of medicines used in psychiatric settings
CO13. Incorporate evidence based nursing practice and identify the areas of research in the field of
psychiatric nursing

CLINICAL SPECIALITY –I

COMMUNITY HEALTH NURSING

CO1.Appreciate the history and development in the field of community Health and community Health nursing.

CO2. Appreciate role of individuals and families in promoting health of the community.

CO3. Perform physical, developmental and nutritional assessment of individuals, families and groups. CO4. Apply the concepts of promotive, preventive, curative and rehabilitative aspect of the health while providing care to the people.

CO5. Apply nursing process approach while providing care to individuals, families, groups and community.

CO6. Integrate the concepts of family centered nursing approach while providing care to the community.

CO7. Recognize and participate in the management of emergencies, epidemics and disasters.
CO8. Apply recent technologies and care modalities while delivering community health nursing care.
CO9. Appreciate legal and ethical issues pertaining to community health nursing care.
CO10. Conduct community health nursing care project.

CO11. Participate in planning, implementation and evaluation of various national health and family welfare programmes at local, state and the national level.

CO12. Incorporate evidence based nursing practice and identify the areas of research in the community settings.

CO13. Participate effectively as a member of Community Health team.

CO14. Coordinate and collaborate with various agencies operating in the community by using

inter-sectoral approach.

CO15. Teach community health nursing to undergraduates, in- service nurse and the community health workers.

CO16. Demonstrate leadership and managerial abilities in community health nursing practice.

NURSING RESEARCH AND STATISTICS

CO1.Define basic research terms and concepts.

CO2. Review literature utilizing various sources.
CO3. Describe research methodology.

CO4. Develop a research proposal.

CO5. Conduct of a research study.

CO6. Communicate research findings.

CO7. Utilize research findings.

CO8. Critically evaluate nursing research studies.

CO9. Write scientific papers for publication
CO10.Explain the basic concepts related to statistics

CO11. Describe the scope of statistics in health and nursing

CO 12. Organize, tabulate and present data meaningfully

CO 13. Use descriptive and inferential statistics to predict results

CO14. Draw conclusions of the study and predict statistical significance of the results

CO15. Describe vital health statistics and their use in health related research

CO16. Use statistical packages for data analysis

Second Year
NURSING MANAGEMENT

CO1.Describe the philosophy and objectives of the healthcare institutions at various levels.

CO2. Identify trends and issues in nursing.

CO3. Discuss the public administration, healthcare administration vis a vis nursing

administration.

CO4. Describe the principles of administration applied to nursing.

CO5. Explain the organization of health and nursing services at the various levels/institutions.

CO6. Collaborate and co-ordinate with various agencies by using multi-sectoral approach.

CO7. Discuss the planning, supervision and management of nursing workforce of various healthcare settings.

CO8. Discuss various collaborative models between nursing education and nursing service to improve the quality of nursing care.

CO9. Identify and analyse legal and ethical issues in nursing administration.

CO10. Describe the process of quality assurance in nursing services.

CO11. Demonstrate leadership in nursing at various levels.

CLINICAL SPECIALITY – II
MEDICAL SURGICAL NURSING - CARDIOVASCULAR AND THORACIC NURSING

CO1.Appreciate trends and issues related to cardiovascular and thoracic nursing.

CO2. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of cardiovascular and thoracic conditions.

CO3. Participate in national health programs for health promotion, prevention and rehabilitation of patients with cardiovascular and thoracic conditions.

CO4. Perform physical, psychosocial & spiritual assessment

CO5. Assist in various diagnostic, therapeutic and surgical procedures

CO6. Apply nursing process in providing comprehensive care to patients with cardiovascular and thoracic conditions.

CO7. Demonstrate advanced skills/competence in managing patients with cardiovascular and thoracic conditions including advanced cardiac life support.

CO8. Describe the various drugs used in cardiovascular and thoracic conditions and nurses responsibility

CO9. Demonstrate skill in handling various equipments/gadgets used for critical care of cardiovascular and thoracic patients

CO10. Appreciate team work & coordinate activities related to patient care.

CO11. Practice infection control measures

CO12. Identify emergencies and complications & take appropriate measures CO13. Discuss the legal and ethical issues in cardiovascular and thoracic nursing.
CO14. Assist patients and their family to cope with emotional distress, grief, anxiety and spiritual needs.

CO15. Appreciate the role of alternative system of medicine in care of patient

CO16. Incorporate evidence based nursing practice and identify the areas of research in the field of cardiovascular and thoracic nursing

CO17. Identify the sources of stress and manage burnout syndrome among healthcare providers.

CO18. Teach and supervise nurses and allied health workers.

CO19. Design a layout of ICCU and ICTU and develop standards for cardiovascular and thoracic nursing practice.

CLINICAL SPECIALITY – II

MEDICAL SURGICAL NURSING – CRITICAL CARE NURSING CO1.Appreciate trends and issues related to Critical Care Nursing

CO2. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of critically ill patients.

CO3. Describe the various drugs used in critical care and nurses' responsibility.

CO4. Perform physical, psychosocial & spiritual assessment

CO5. Demonstrate advanced skills/competence in managing critically ill patients including advanced cardiac life support

CO6. Demonstrate skill in handling various equipments/gadgets used for critical care

CO7. Provide comprehensive care to critically ill patients

CO8. Appreciate team work & coordinate activities related to patient care

CO9. Practice infection control measures.

CO10. Assess and manage pain

CO11. Identify complications & take appropriate measures

CO12. Discuss the legal and ethical issues in critical care nursing

CO13. Assist patients and their family to cope with emotional and spiritual distress, grief and anxiety CO14. Assist in various diagnostic, therapeutic and surgical procedures

CO15. Incorporate evidence based nursing practice and identify the areas of research in the field of critical care nursing

CO16. Identify the sources of stress and manage burnout syndrome among healthcare providers.

CO17. Teach and supervise nurses and allied health workers

CO18. Design a layout of ICU and develop standards for critical care nursing practice.

CLINICAL SPECIALITY – II

MEDICAL SURGICAL NURSING – ONCOLOGY NURSING CO1.Explain the prevention, screening and early detection of cancer

CO2. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of oncological disorders of various body systems

CO3. Describe the psychosocial effects of cancer on patients and families

CO4. Demonstrate skill in administering/assisting various treatment modalities used for patients with cancer

CO5. Apply nursing process in providing holistic care to patients with cancer.

CO6. Apply specific concepts of pain management

CO7. Appreciate the care of death and dying patients and value of bereavement support CO8. Describe the philosophy, concept and various dimensions of palliative care
CO9. Appreciate the role of alternative systems of medicine in care of patients with cancer

CO10. Appreciate the legal & ethical issues relevant to oncology nursing

CO11. Recognize and manage oncological emergencies

CO12. Counsel the patients with cancer and their families

CO13. Incorporate evidence based nursing practice and identify the areas of research in the field of oncology nursing

CO14. Recognize the role of oncology nurse practitioner as a member of the oncology team

CO15. Collaborate with other agencies and utilize resources in caring for cancer patients.

CO16. Teach and supervise nurses and allied health workers

CO17. Design a layout and develop standards for management of oncology units/hospitals and nursing care.

MEDICAL SURGICAL NURSING – NEUROSCIENCES NURSING CO1.Appreciate trends and issues related to neurology and neurosurgical nursing CO2. Review the anatomy and physiology of nervous system

CO3. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of patients with neurological and neurosurgical disorders

CO4. Perform neurological assessment and assist in diagnostic procedures CO5. Describe the concepts and principles of neurosciences nursing

CO6. Describe the various drugs used in neurosciences and nurses responsibility. CO7. Assist in various therapeutic and surgical procedures in neuroscience nursing

CO8. Demonstrate advanced skills/competence in managing patients with neurological and neurosurgical disorder following nursing process approach

CO9. Identify psychosocial problems of patients with disabilities and assist patients and their family to cope with emotional and spiritual distress, grief and anxiety

CO10. Participate in preventive, promotive and rehabilitative services for neurological and neurosurgical patients.

CO11. Explain the legal and ethical issues related to brain death, organ transplantation and practice of neuroscience nursing

CO12. Incorporate evidence based nursing practice and identify the areas of research in the field of neuroscience nursing

CO13. Organize and contact in-service education program for nursing personnel CO14. Develop standards of care for quality assurance in neuroscience nursing practice

CO15. Identify the sources of stress and manage burnout syndrome among healthcare providers CO16. Teach and supervise nurses and allied health workers

CO17. Plan and develop physical layout of neuro intensive care unit

MEDICAL SURGICAL NURSING – NEPHRO-UROLOGY NURSING

CO1.Appreciate trends and issues related to nephro and urological nursing

CO2. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of nephro and urological conditions

CO3. Perform physical, psychosocial & spiritual assessment

CO4. Assist in various diagnostic, therapeutic and surgical interventions

CO5. Provide comprehensive care to patients with nephro and urological conditions

CO6. Describe the various drugs used in nephro and urological conditions and nurses responsibility. CO7. Demonstrate skill in handling various equipment/gadgets used for patients with nephro and urological conditions

CO8. Appreciate team work & coordinate activities related to patient care CO9. Practice infection control

measures

CO10. Identify emergencies and complications & take appropriate measures

CO11. Assist patients and their family to cope with emotional distress, grief, anxiety and spiritual needs
CO12. Discuss the legal and ethical issues in nephro and urological nursing

CO13. Identify the sources of stress and manage burnout syndrome among healthcare providers.

CO14. Appreciate the role of alternative system of medicine in the care of patient

CO15. Incorporate evidence based nursing practice and identify the areas of research in the field of nephro and urological nursing

CO16. Teach and supervise nurses and allied health workers

CO17. Design a layout of kidney transplant unit care, dialysis unit

CO18. Develop standards of nephro urological nursing practice

MEDICAL SURGICAL NURSING – ORTHOPEDIC NURSING CO1.Appreciate the history and developments in the field of orthopedic nursing CO2. Identify the psychosocial needs of the patient while providing holistic care

CO3. Perform physical and psychological assessment of patients with orthopedic conditions and disabilities

CO4. Describe the various disease conditions and their management CO5. Discuss various diagnostic tests required in orthopedic conditions

CO6. Apply nursing process in providing care to patients with orthopedic conditions and those requiring rehabilitation

CO7. Recognize and manage orthopedic emergencies

CO8. Describe recent technologies and treatment modalities in the management of patients with orthopedic conditions and those requiring rehabilitation

CO9. Integrate the concept of family centered, long term care and community based rehabilitation to patients with orthopedic conditions

CO10. Counsel the patients and their families with orthopedic conditions CO11. Describe various orthotic and prosthetic appliances

CO12. Appreciate the legal and ethical issues pertaining to patients with orthopedic conditions and those requiring rehabilitation

CO13. Appreciate the role of alternative system of medicine in care of patients with orthopedic conditions

CO14. Incorporate evidence based nursing practice and identify the areas of research in the field of orthopedic nursing

CO15. Recognize the role of orthopedic nurse practitioner and as a member of the orthopedic and rehabilitation team

CO16. Teach orthopedic nursing to undergraduate students and in-service nurses CO17. Prepare a design and layout of orthopedic and rehabilitative unit

MEDICAL SURGICAL NURSING – GASTROENTEROLOGY NURSING CO1.Appreciate trends and issues related to gastroenterology nursing

CO2. Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of gastrointestinal conditions

CO3. Participate in national health programs for health promotion, prevention and rehabilitation of patien with

gastrointestinal conditions
CO4. Perform physical, psychosocial & spiritual assessment
CO5. Assist in various diagnostic, therapeutic and surgical procedures
CO6. Provide comprehensive care to patients with gastrointestinal conditions
CO7. Describe the various drugs used in gastrointestinal conditions and nurses responsibility.

CO8. Demonstrate skill in handling various equipments/gadgets used for patients with gastrointestinal conditions

CO9. Appreciate team work & coordinate activities related to patient care CO10. Practice infection control measures

CO11. Identify emergencies and complications & take appropriate measures

CO12. Assist patients and their family to cope with emotional distress, grief and anxiety and spiritual nee
CO13. Discuss the legal and ethical issues in GE nursing

CO14. Identify the sources of stress and manage burnout syndrome among healthcare providers CO15. Appreciate the role of alternative system of medicine in the care of patient with GI disorders CO16. Incorporate evidence based nursing practice and identify the areas of research in the field of gastrointestinal nursing

CO17. Teach and supervise nurses and allied health workers

CO18. Design a layout of Gastroenterology intensive care unit (GEICU), liver care/transplant unit.

CLINICAL SPECIALITY – II OBSTETRICS AND GYNAECOLOGY NURSING CO1.Describe the epidemiology, etiology, pathophysiology and diagnostic assessment of women with obstetric and gynaecological conditions.
CO2. Perform physical, psychosocial, cultural and spiritual assessment.

CO3. Demonstrate competence in caring for women with obstetrical and gynaecological conditions CO 4. Demonstrate competence in caring for high risk newborn

CO 5. Identify and manage obstetrical and neonatal emergencies as per protocol.
CO 6. Practice infection control measures.

CO 7. Utilize recent technology and various diagnostic, therapeutic modalities in the management of obstetrical, gynecological and neonatal care

CO 8. Demonstrate skill in handling various equipments/gadgets used for obstetrical, gynaecological and neonatal care

CO 9. Teach and supervise nurses and allied health workers
CO 10. Design a layout of specialty units of obstetrics and gynecology

CO 11. Develop standards for obstetrical and gynaecological nursing practice CO 12. Counsel women and families

CO 13. Incorporate evidence based nursing practice and identify the areas of research in the field of obstetrical and gynaecology nursing

CO 14. Function as independent midwifery nurse practitioner

CLINICAL SPECIALITY – II PEDIATRIC (CHILD HEALTH) NURSING

CO1.Apply the nursing process in the care of ill infants to pre adolescents in hospital and community CO 2. Demonstrate advanced skills/competence in nursing management of children with medical and surgical problems

CO 3. Recognize and manage emergencies in children
CO 4. Provide nursing care to critically ill children

CO 5. Utilize the recent technology and various treatment modalities in the management of high risk children

CO 6. Prepare a design for layout and describe standards for management of pediatric units/hospitals CO 7. Identify areas of research in the field of pediatric nursing

CLINICAL SPECIALITY – II PSYCHIATRIC (MENTAL HEALTH) NURSING

CO1.Apply the nursing process in the care of patients with mental disorders in hospital and community CO 2. Demonstrate advanced skills/competence in nursing management of patients with mental disorders CO 3. Identify and care for special groups like children, adolescents, women, elderly, abused and neglected

people living with HIV/AIDS
CO 4. Identify and manage psychiatric emergencies
CO 5. Provide nursing care to critically ill patients with mental disorders

CO 6. Utilize the recent technology and various treatment modalities in the management of patients with mental disorders

CO 7. Demonstrate skills in carrying out crisis intervention

CO 8. Appreciate the legal and ethical issues pertaining to psychiatric nursing CO 9. Identify areas of research in the field of psychiatric nursing

CO 10. Prepare a design for layout and describe standards for management of psychiatric units/emergency
units/hospitals
CO 11. Teach psychiatric nursing to undergraduate students & in-service nurses

CLINICAL SPECIALITY – II COMMUNITY HEALTH NURSING

CO1.Appreciate trends and issues related to community health nursing- reproductive and child health, school health, occupational health, international health, rehabilitation, geriatric and mental health CO 2. Apply epidemiological concepts and principles in community health nursing practice CO 3. Perform community health assessment and plan health programme

CO 4. Describe the various components of reproductive and child health programme
CO 5. Demonstrate leadership abilities in organizing community health nursing services by using intersectoral
approach

CO 6. Describe the role and responsibilities of community health nurse in various National Health and Family Welfare Programmes
.

CO 7. Participate in the implementation of various national health and family welfare programme CO 8. Demonstrate competencies in providing family centered nursing care independently

CO 9. Participate/conduct research for new insights and innovative solutions to health problems CO 10. Teach and supervise nurses and allied health workers

CO 11. Design a layout of sub center /Primary health center/ Community health centre and develop standards for community health nursing practice

KRISHNA INSTITUTE OF MEDICAL SCIENCES DEEMED TO BE UNIVERSITY

KRISHNA INSTITUTE OF PHARMACY, KARAD

PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

1. Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

2. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply

information systematically and shall make defensible decisions.

4. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

5. Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. Pharmaceutical Ethics (concept of right and wrong conduct): Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.

10. Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

11. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Course Outcome Analysis

Pharmacy profession is one of the integral components of healthcare profession along with medical, dental, physiotherapy and nursing profession. Krishna Institute of Pharmacy (KIP) is constituent college of KIMS deemed to be university, established in 2017. The institute follows the curricular framework and structure prescribed by Pharmacy council of India as per B. Pharm regulations 2014. The PCI syllabus is followed in terms of duration, content, delivery and evaluation. Institute vision, mission and programme educational objectives are prepared and displayed. A course outcome is prepared for each subject focusing on

programme outcomes. KIP has stated program outcomes (POs), and course outcomes (COs) and is committed to provide value based quality education to produce competent and skilled professionals ready to accept global challenges. Course objectives are given in syllabus of each subject. Course outcomes are mapped with programme outcomes. Formative and summative methods are used for analysis of programme outcomes. Performance of students is regularly monitored by internal, university examination and viva voce. For weak performers remedial classes are conducted to improve their performance.

KIP has well structured feedback mechanism. Structured feedback is obtained from various stakeholders like students, parents, teachers, peers etc. and is analyzed by feedback committee comprising of head of institute as a chairman and senior faculties as members. Feedback from students is obtained after completion of each semester with respect to overall teaching learning methods, teaching pedagogy methods that are utilized, percentage of syllabus completed etc. Feedback from parents is obtained during parents meet with respect to infrastructure, facilities and overall development of candidate. Likewise, feedback from teachers is taken to focus overall facilities and development of students. Feedback obtained from each stakeholder is analyzed and action is taken. Curriculum/ syllabus is also presented to BOS and suggestions are taken into consideration so as to improve teaching learning process. Time to time feedback from management is also taken in college council meetings. Direct and indirect methods are used for assessment of learning outcomes. The direct methods includes multiple choice questions (MCQs), unit tests, sessional exams, tutorials, presentations, lab work, seminars, Problem- Based-Learning, activity hours, assignments, viva voce, intercollegiate competition and indirect method includes surveys, such as feedback from students, feedback from external examiners and evaluators and self-evaluations etc.

Domains: (UG) Domains

Domains	Cognitive	Affective	Psychomotor
Method of Assessment	MCQ SAQ LAQ Viva-voce	Group Discussion Seminars Activity Hours	Practicals Group Discussion

Modes of Assessment:

1. Formative:

1. Multiple choice questions

2. Seminars

3. Assignments

4. Tutorials

5. Journals

2. Summetive :

1. Multiple choice questions

2. SAQ

3. LAQ

4. Seminars

5. Assignments

6. Practicals and Viva Voce

Graduate Attributes(All faculties Common)

- Dymamic Professionalism
- Exemplory leadership
- Effective communication skills
- Scholarly Attitude
- Critical Thinking
- Enthuisiasm for Research
- Social Commitment
- Global Competencies

i) No. of Programme : 01

ii) No. of Course : 86

iii) Outcome Schemes : Formative and Summative

iv) Graduate Attributes Levels:

		Attainment of outcomes
Level 0	**Below 50% (failed)**	**Unable to acquire all competencies (Cos) of the respective course**
Level 1	**50% -59%**	**Have acquired all competencies (Cos) of the respective course**
Level 2	60% - 69%	
Level 3	70% and above	

COURSE OUTCOMES
Semester I

Course code	Name		COURSE OUTCOMES
6101-11T	Human Anatomy and Physiology I– Theory	1	Students able to define anatomy and physiology and should able to explain levels of structural organization and body system, homeostasis,basiclifeprocess.
		2	They able to draw structure and write functions of cell, transport across the cell membrane and able to classify tissues, structure location and functions of epithelial muscular and nervous and connective tissues
		3	They able to draw structure and functions of skin and able to locate bones of axial and appendicular skeletal system and their joints
		4	Students able to write information about body fluids and blood and lymphatic system.
		5	Students able to explain structure and functions of sympathetic and parasympathetic nervous system
		6	They able to confirm structure and functions of special senses.
6101-12T	Pharmaceutical Analysis I – Theory	1	Illuminate relevance & significance of Analytical Chemistry to Pharmaceutical Sciences.
		2	Clarify basic principles of data treatment and data handling.
		3	Explain basic concepts and principles of aqueous acid base titrations.
		4	Clarify need and basic principles of non-aqueous acid base titrations.
		5	Clarify different terms, types and basic principles of precipitation titrations.
		6	Explain concept and reaction conditions for Complexation.
		7	Understand the basic concepts and applications of redox reactions.
		8	Understand and explain the difference between precipitation and gravimetric analysis.
6101-13T	Pharmaceutics I – Theory	1	Students should be able to know history of profession of pharmacy, content of pharmacopoeia, monographs.
		2	Students should be able to distinguish between different dosage forms, know advantages and disadvantages of dosage forms.
		3	Students should be able to understand parts of prescription and way of handling the prescriptions along with errors in it.
		4	Students should be able to recognize factors affecting dose of drug and also able to calculate dose of drug.
		5	Students should be able to explain preparation methods of powders, liquid dosage forms, semisolid dosage forms, different solubility enhancement techniques.
		6	Students should be able to deal with pharmaceutical calculations, pharmaceutical incompatibilities and their measures.
6101-14T	Pharmaceutical Inorganic Chemistry – Theory	1	Students should be able to explain the role and sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals.
		2	Students should be able to categorize and identify different physiological ions, acid base balance and understand method of preparations, proties, assay, uses and importance of inorganic compounds.
		3	Students should be able to define and apply the knowledge of dental products, expectorants, emetics, haematinics and Antidote
		4	Students should be able to differentiate and describe gastrointestinal agents and justify the mechanism of actions of each class.
		5	Students should be able to solve the problems based on tonicity adjustments, isotonic solutions and produce buffers.
			Students should be able to state and predict the properties of radioactive rays and application of radioactive substance.

6101-15T	Communication skills – Theory *	1	Students should be able to discuss the medicinal and pharmaceutical importance of inorganic compounds.
		2	Students shall be able to relate to and apply the elements of communication (verbal and non-verbal) as well as communication styles.
		3	Students shall be able to assess the basic listening skills and their importance in day-to-day communication and apply written communication skills effectively.
		4	Students shall be able to explain and apply effective interview and presentation skills.
		5	Students shall be able to appraise their communication and justify their viewpoint by group discussion.
6101-16 RBT	Remedial Biology/	1	Students shall be able to classify and explain the salient features of five kingdoms and its economic importance.
		2	Students shall be able to describe the process involved in circulation, digestion and respiration
		3	Students shall be able to explain the basic process involved in excretion, functions of nervous system, chemical coordination & the process of human reproduction
		4	Students shall be able to enlist macro and micro nutrients, its functions and various mode of nutrition in plants.
		5	Students shall be able to understand and explain the process of respiration in plants. They shall be able to explain the growth and development in plants.
6101-16 RMT	Remedial Mathematics – Theory*	1	Students should be able to solve the numerical examples on partial fractions, limits, logarithms and functions and state the pharmaceutical applications of the same
		2	Students should be able to solve the numerical examples on matrices and determinants by applications of general rules of the same
		3	Students should be able to solve the numerical examples on differential calculus
		4	Students should be able to solve the numerical examples on analytical geometry and integration with pharmaceutical applications of the same
		5	Students should be able to solve the numerical examples on differential equations and pharmacokinetic applications of the Laplace transformation
6101-17P	Human Anatomy and Physiology – Practical	1	Students able to study different parts of microscope and perform microscopic study of epithelia connective muscular and nervous tissues
		2	Student able to identify axial and appendicular bones
		3	Students able to enumerate red and white blood count
		4	Students able to perform bleeding time, clotting time of their own blood samples
		5	Students able to estimate hemoglobin content of own blood sample
		6	Students able to determine heart rate, pulse rate and erythrocytes sedimentation rate (ESR)
		7	Students able to record blood pressure
6101-18P	Pharmaceutical Analysis I – Practical	1	Clarify and understand the correct use of laboratory equipments with calibration of various apparatus used in Analytical Chemistry laboratory together with safety measures to be followed.
		2	Develop practical hand in titrimetric analysis by estimation of analyte concentration in pure form and in formulation with thorough understanding of principle and procedure used in different titration methods such as aqueous, non-aqueous, precipitation, complexometric, redox titration methods.

		3	Perform and interpret limit tests
		4	Develop practical hand in preparation and standardization of titrates
		5	Develop practical hand in handling electrochemical analytical instruments like conductometer and potentiometer
6101-19P	Pharmaceutics I – Practical	1	Students should be able to understand the knowledge on preparatory pharmacy and professional way of preparing various dosage forms.
		2	Students should be able to have an idea about calculations and labeling of dosage forms.
		3	Students should be able to know and formulate biphasic liquid dosage forms such as emulsions, suspensions.
		4	Students should be able to understand principle, method of preparation, category during preparation of dosage forms like syrup, elixir, linctus, solutions.
		5	Students should be able to distinguish dosage forms for internal and external use, able to develop skill while packaging of powders and granules.
		6	Students should be able to calculate quantity of base requires on the basis of displacement value during preparation of suppositories, able to prepare and pack suppositories.
6101-20P	Pharmaceutical Inorganic Chemistry – Practical	1	Students should be able to acquire and apply the knowledge of limit test for presence of impurities in pharmaceutical samples.
		2	Students should be able to conduct the identification test for various inorganic compounds.
		3	Students should be able to prepare, submit and calculate the percentage yield of boric acid, potash alum and Ferrous Sulphate.
		4	Students should be able to conduct and find out the concentration of sugar and cholesterol in blood sample.
		5	Students should be able to investigate the acid neutralizing capacity of Aluminum hydroxide gel
		6	Students should be able to justify and describe the Swelling power of bentonite.
6101-21P	Communication skills – Practical*	1	Students shall be able to ask questions and understand the basic do's and don'ts of communication.
		2	Students shall be able to understand the importance of pronunciation with respect to consonant and vowel sounds.
		3	Students shall be able to comprehend by listening, convert direct to indirect speech and vice versa and identify different figures of speech.
		4	Students shall be able to understand effective writing skills and use it in day-to-day life.
		5	Students shall be able to understand effective interview handling skills.
		6	Students shall be able to apply proper email etiquette and understand about effective presentation skills.
6101-22RBP	Remedial Biology – Practical*	1	Students shall be able to explain the working of compound microscope. They should be able to perform different cutting and staining techniques.
		2	Students shall be able to perform and study the cell inclusions of stem, leaf, and root.
		3	Students shall be able to understand and explain the morphology of different plant parts.
		4	Students shall be able to identify different bones, perform blood pressure determination, blood group determination

		5	Students shall be able to understand and determine tidal volume and other lung volumes using spirometry.

COURSE OUTCOMES
Semester II

Course code	Name	Course Outcomes	
6101-23T	Human Anatomy and Physiology II – Theory	1	Students able to describe organization of nervous system,classification and properties of nerve fibres,action potential, electrophysiology,action potential and able to describe central nervous system.
		2	Students able to acquire knowledge of anatomy and physiology of digestive respiratory and urinary system in the human body
		3	They able to study details about energy and metabolism
		4	Students able to classify hormones their mechanism of hormones and able to describe structure and functions of pituitary gland, thyroid, parathyroid, adrenal, pancreas, pineal gland and thymus.
		5	Students able to describe anatomy male and female reproductive system and able to write functions of male and female reproductive system
		6	Students able to explain genetics like chromosomes, genes DNA etc
6101-24T	Pharmaceutical Organic Chemistry I – Theory	1	Illuminate relevance & significance of Organic Chemistry to Pharmaceutical Sciences.
		2	Clarify basic principles concepts of organic chemistry.
		3	Explain basic functional groups & IUPAC Nomenclature of Organic Compounds.
		4	Clarify Isomerism & apply that knowledge in understanding the Structure Property Relationship.
		5	Clarify different reagents in Organic Reactions.
		6	Explain different Reaction Intermediates & their application in reaction mechanism
		7	Explain the factors affecting strength of acid & base.
		8	Comprehend & explain how Addition & Elimination Reactions are performed with respect to Alkenes and alkynes.
		9	Account for reactivity/stability of compounds
6101-25T	Biochemistry – Theory	1	Students should be able to explain the role and functions of biomolecules, bioenergetics and energy rich compounds.
		2	Students should be able to Sketch, describe the metabolic cycles of various nutrient bio molecules like carbohydrates, lipids, amino

			acids along with its energetic.
		3	Students should be able to apply the knowledge of metabolism to identify and discuss the disorders in pathological conditions
		4	Students should be able to compare the structure and function of DNA- RNA, Oxidative phosphorylation and Substrate Phosphorylation.
		5	Students should be able to describe and outline the protein synthesis, DNA replication.
		6	Students should be able to record the information about the organization of mammalian genome and functions of DNA in the synthesis of RNA and protein.
6101-26T	Pathophysiology – Theory	1	Students should be able to discuss the catalytic role of enzymes, importance of enzyme inhibitors and its therapeutic and diagnostic application.
		2	Students shall be able to explain the etiology, signs & symptoms. Pathogenesis, complications and treatment of cardiovascular disorders.
		3	Students shall be able to explain the etiology, signs & symptoms. Pathogenesis, complications and treatment of hematopoietic disorders, neuro disorders, endocrine disorders.
		4	Students shall be able to explain the etiology, signs & symptoms. Pathogenesis, complications and treatment of bone and joint disorders and principles behind progression of cancer
		5	Students shall be able to understand and discuss the pathophysiology of disorders like meningitis, typhoid, leprosy, tuberculosis, urinary tract infections, and sexually transmitted diseases like AIDS, syphilis and gonorrhea.
6101-27T	Computer Applications in Pharmacy – Theory *	1	Students should be able to recall and infer the fundamentals of computer, its components, data flow diagram, process life cycle, project management.
		2	Students should be able to identify and apply the knowledge of internet.
		3	Students should be able to know various applications of computers in pharmacy.
		4	Students should be able to know various web technologies, different databases and various applications of databases in pharmacy.
		5	Students should be able to know the number system, its conversions, calculations and the concept of information system and software used in different fields.
		6	Students should be able to explain bioinformatics databases and students should be able to describe the computers as data analysis in preclinical development along with laboratory information management system, Text information management system and chromatographic data analysis software. .
6101-28T	Environmen	1	Students able to define Environmental science, and write the scope

	tal sciences – Theory *	2	and importance of Environmental science. Students able to describe the multidisciplinary nature of environmental studies.
		3	Students should be able to explain natural resources along with its type.
		4	Students should be able to explain the concept of Ecosystem along with its structure, function and types in detail.
		5	Students should be able to describe and outline the types of environmental pollution including its causes, effects and control measures.
		6	Students should be able to apply the knowledge of environmental science in conservation of natural resources.
6101-29P	Human Anatomy and Physiology II –Practical	1	Students able to identify parts of special senses using specimen and models.
		2	Students able to identify parts of nervous system, digestive, cardiovascular, reproductive, endocrine system using specimen and models
		3	Students able to demonstrate functions of olfactory and examine different types of taste
		4	They able to perform color vision test
		5	They able to demonstrate reflex activity
		6	Students able to record body temperature and record body mass index
6101-30P	Pharmaceutical Organic Chemistry I– Practical	1	Explain correct use of various equipments& Safety measures in Pharmaceutical Chemistry laboratory.
		2	Explain significance of qualitative Analysis of organic compounds & synthesis of derivatives.
		3	Explain how to synthesize different organic compounds along with reaction & Mechanism.
		4	Construct different molecular models using ball and stick model
		5	Develop practical hand on preparation of sodium fusion extract and elemental analysis
6101-31P	Biochemistry – Practical	1	Students should be able to acquire knowledge of qualitative and quantitative estimation of the biological macromolecules
		2	Students should be able to conduct the qualitative analysis of carbohydrates and protein
		3	Students should be able to calculate the concentration of proteins by biuret assay method as well as carbohydrates by DNSA method.
		4	Students should be able to conduct and find out the concentration of sugar and cholesterol in blood sample.
		5	Students should be able to investigate the abnormal constituents in urine sample.
		6	Students should be able to justify and describe the effect of temperature and concentration on enzyme activity.
6101-32P	Computer Applications in Pharmacy – Practical*	1	Students should be able to design a questionnaire to gather information about particular disease.
		2	Students should be able to create a personal HTML Web page.
		3	Students should be able to retrieve information of drug and its

			adverse effects using online tools.
		4	Students should be able to create mailing labels, invoice tables, database to store patient information.
		5	Students should be able to design a form in MS Access to view, add, delete or modify patient record and also generate and print report from patient database.
		6	Students should be able to deal with exporting tables, queries, forms and reports to web pages and to XML Pages.

COURSE OUTCOMES
Semester III

Course code	Name	Course Outcomes	
6101-33T	**Pharmaceutical Organic Chemistry II – Theory**	1	Write methods of preparations, reactions and reaction mechanism of Benzene and its derivatives.
		2	Study effect of substitution on reactivity and orientation of monosubstituted benzene towards electrophilic substitution reaction.
		3	Outline methods of preparation, chemical reactions and uses of phenols, aromatic amines and aromatic acids.
		4	Explain reactions of fats and oils along with various analytical constants used for oil.
		5	Study preparation and chemical reactions of polynuclear hydrocarbons like Naphthalene, Anthracene and Phenanthrene etc.
		6	Describe theory's related to cycloalkanes.
6101-34T	Physical Pharmaceutics I – Theory	**1**	Students should be able to write the importance, factors affecting and applications of solubility of drugs or pharmaceuticals
		2	Students should be able to describe properties of states of matters like solid, gas , liquids and liquid crystals and laws governing the same
		3	Students should be able to report and measure the surface and interfacial tension and enumerate applications of the same.
		4	Students should be able to outline the concept of adsorption at various interfaces
		5	Students should be able to classify the complexes and enumerate the concept of protein binding
		6	Student should be able to explain the concept of Ph, buffers , isotonic solutions and applications of the same
6101-35T	Pharmaceutical Microbiology – Theory	**1**	Students shall be able to outline the methods of identification, cultivation and preservation of various micro-organisms and shall be able to understand and apply the microscopical methods.
		2	Students shall be able to explain the importance of sterilization in Microbiology and paraphrase the utility of the same in

			Pharmaceutical industry.
		3	Students shall be able to discuss the methods of identification and cultivation of fungi and viruses; they shall also be able to describe sterility testing methods for pharmaceuticals.
		4	Students shall be able to explain the design of aseptic area, enlist general aspects of environmental cleanliness and discuss microbiological standardization of pharmaceuticals.
		5	Students shall be able to state types and factors affecting microbial spoilage of pharmaceuticals and outline cell culture technology and its application in pharmaceutical industry.
6101-36T	Pharmaceutical Engineering – Theory	1	Students should be able to enumerate the theoretical concepts involved and able to write the construction, working, merits and demerits of equipment's used in flow of fluids, size reduction and size separation
		2	Students should be able to outline objectives, applications and theoretical considerations with description of construction , working , merits , demerits of equipment's used in heat transfer, evaporation and distillation
		3	Students should be able to describe applications, mechanisms, drying curves and construction , working, merits and demerits of equipment's used in drying as an unit operation
		4	Students should be able to write objectives, applications, mechanisms of solid- solid , solid-liquid, liquid-liquid mixing with construction, working merits and demerits of mixing equipment's
		5	Students should be able to discuss objectives, applications, theories, factors influencing and equipment's used filtration and centrifugation
		6	Students should be able to sketch the equipment's used in different unit operations with corrosion and its prevention
6101-37 P	Pharmaceutical Organic Chemistry II – Practical	1	Plan synthesis of various organic compounds.
		2	Prepare various simple organic compounds synthesized in one step.
		3	Write reaction and mechanism of some organic compounds.
		4	Explain some laboratory techniques like recrystallization and steam distillation.
		5	Determine various oil constants like Acid value, Saponification value and Iodine value.
6101-38 P		1	Students should be able to investigate and calculate solubility of

	Physical Pharmaceutics I – Practical		drug at room temperature and pka of drug by half neutralization method
		2	Students should be able to determine partition coefficient of given material and should write the applications of the same in relation with in vivo performance
		3	Students should be able to conduct the phenol –water system experimentally and surface tension by drop count and weight method with calculations of the same
		4	Students should be able to evaluate HLB number of surfactant and should determine Freundlich and Langmuir adsorption constants
		5	Students should be able to carry out and calculate critical micelle concentration of given surfactant and justify the applications of the same independently
		6	Students should be able to find out stability constant and donor acceptor ratio of complexes by pH titration method
6101-39 P	Pharmaceutical Microbiology – Practical	1	Students shall be able to understand and use laboratory equipment's like BOD incubator, laminar airflow, aseptic hood, autoclave etc. for microbiology practical.
		2	Students shall be able to sterilize glassware, prepare and sterilize nutrient media, subculture bacteria and fungi and prepare stabs and slants.
		3	Students shall be able to carry out Simple staining, Gram's staining, Acid fast staining and motility by hanging drop technique.
		4	Students shall be able to isolate the microbes by pure culture techniques like streak plate technique.
		5	Students shall be able to perform microbiological assay by cup plate method, they shall also be able to carry out the IMVIC test.
		6	Students shall be able to perform sterility tests for pharmaceuticals and bacteriological analysis of water.
6101-40 P	Pharmaceutical Engineering – Practical	1	Students should be able to carry out and calculate the radiation constants of brass, iron, unpainted and painted glass
		2	Students should be able to determine the efficiency of steam distillation apparatus and overall heat transfer coefficient by heat exchanger.
		3	Students should be able to conduct and construct drying curves and calculate various drying related parameters like moisture content, loss on drying, wet bulb and dry bulb temperature

		4	Students should be able to write construction and working of and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, dehumidifier, colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.
		5	Students should be able to carry out size reduction and size separation of given pharmaceutical samples and should be able to calculate related parameters
		6	Students should be able to determine rate of crystallization, mixing uniformity index and evaluate factors affecting on rate of filtration and evaporation

COURSE OUTCOMES
Semester IV

Course code	Name		Course Outcomes
6101-41T	Pharmaceutical Organic Chemistry III– Theory	1	Explain concept of optical and geometrical isomerism
		2	Explain the stereo chemical aspects of organic compounds and stereo chemical Reactions
		3	Explain synthesis, reactions and medicinal uses of five membered heterocyclic rings containing one heteroatom.
		4	Write synthesis, reactions and medicinal uses of five membered heterocyclic rings containing two heteroatom and six membered heterocyclic rings containing one heteroatom.
		5	Outline reactions, mechanism and applications of reaction of synthetic importance.
		6	Know the medicinal uses and other applications of organic compounds
6101-42T		1	Explain drug metabolic pathways, adverse effect and therapeutic value of the drugs.
		2	Know biosynthesis of catecholamine's and write

	Medicinal Chemistry I – Theory		classification, structure activity relationship (SAR), and mechanism of action and uses of drug acting on adrenergic system.
		3	Study biosynthesis of acetylcholine and outline classification, structure activity relationship (SAR), and mechanism of action and uses of drug acting on cholinergic system.
		4	Describe mechanism of action, classification, structure activity relationship (SAR) and uses of Sedatives and hypnotics, Antipsychotics and Anticonvulsants.
		5	Explain mechanism of action, classification of general anesthetics and Narcotic analgesics.
		6	Explain mechanism of action, classification of Non-steroidal anti-inflammatory drugs (NSAID's).
6101-43T	Physical Pharmaceutics II – Theory	1	Students should be able to enlist various properties and stability consideration of colloidal dispersions
		2	Students should be able to describe various flow properties of fluids and their applications in pharmaceutical product development
		3	Students should be able to write construction and working of single point and multipoint viscometers and describe the concept of thixotropy
		4	Students should be able to report fundamental concepts with theories involved in formulation and evaluation of suspensions and emulsions
		5	Students should be able to write various fundamental and derived properties of powders and their importance in pharmaceutical product development
		6	Students should be able to apply the concept of chemical kinetics for stability testing and determination of shelf life of pharmaceuticals with various degradation pathways and remedial measures for the same
6101-44T	Pharmacology I – Theory	1	Students shall be able to define standard terms used in pharmacology, history and scope of pharmacology. They shall be able to define and explain the different process, Therapeutic drug monitoring, Kinetics of elimination and excretion.
		2	Students shall be able to define pharmacodynamics, principle behind mechanism of action of drugs, concept of receptor action, different signal transduction mechanisms, differentiate between agonistic action & antagonistic action, adverse drug reactions, mechanism behind drug interactions & different phases of clinical trials.
		3	Students shall be able to describe the organization of autonomic nervous system, classification of cholinergic drugs, anti cholinergic, adrenergic & anti adrenergic drugs, pharmacological actions of acetylcholine, Atropine, Adrenaline, Propranolol. They shall be able to explain the drugs used for the

			management of myasthenia gravis & glaucoma, peripherally acting skeletal muscle relaxants and local anesthetics.
		4	Students shall be able to describe different excitatory and inhibitory neurotransmitters involved in Central nervous system actions, Pre anesthetic medications and actions of general anesthetics, classification and pharmacology of centrally acting skeletal muscle relaxants, antiepileptic drugs, actions of alcohol and disulfiram.
		5	Students shall be able to understand & discuss the classification and pharmacology of psychopharmacological agents, antiparkinsoism drugs & Alzheimer's curing drugs, CNS stimulants &nootropics, Opioid analgesics and antagonists.
6101-45T	Pharmacognosy and Phytochemistry I– Theory	1	Students shall be able to define and explain terms like definition, scope and history of Pharmacognosy, outline different sources of crude drugs, differentiate between organized and unorganized crude drugs, classify the crude drugs by various methods and describe various techniques for quality control of crude drugs.
		2	Students shall be able to explain the processes involved in cultivation; collection and processing of crude drugs understand about various plant hormones and their role in plant physiology and paraphrase polyploidy, mutation and hybridization with reference to medicinal plants.
		3	Students shall be able to discuss the method of plant tissue culture with respect to all the details like application of plant tissue culture; they shall be able to explain edible vaccines.
		4	Students shall be able to explain concepts, medication and treatments involved in alternative systems of medicine like ayurveda, homeopathy, siddha, Chinese and unanisytem of medicine, they shall be able to define, classify and explain properties and chemical tests for alkaloids, glycosides, flavonoids, tannins, volatile oils and resins.
		5	Students shall be able to paraphrase an in detail pharmacognostic account for drugs belonging to Fibers, hallucinogens, teratogens, natural allergens, carbohydrates, proteins and enzymes, lipids and marine drugs, they shall be able to explain chemistry, sources, preparation, evaluation , preservation, storage, therapeutic use and commercial utility of a few drugs in the aforementioned classes of crude drugs.
6101-46P		1	Plan synthesis of various organic compounds.
		2	Write reaction and mechanism of some organic compounds.

	Medicinal Chemistry I – Practical	3	Explain some laboratory techniques like recrystallization and steam distillation.
		4	To perform assay of given substances.
		5	Measure partition coefficient of some drugs.
6101-47P	Physical Pharmaceutics II – Practical	1	Students should be able to determine or estimate particle size and particle size distribution by microscopy and sieving technique
		2	Students should be able to determine or evaluate given pharmaceutical sample for derived properties like porosity and angle of repose
		3	Students should be able to calculate and carry out determination sedimentation volume of given pharmaceutical suspensions
		4	Students should be able to calculate and evaluate viscosity of given sample by Ostwald's viscometer
		5	Students should be able to compute reaction rate constant and apply the same in determination shelf life and half-life of pharmaceuticals
		6	Students should be able to handle or operate Brookfield viscometer for determination of viscosity of given pharmaceutical sample independently
6101-48P	Pharmacology I – Practical	1	Students shall be able to define and explain the concept of experimental pharmacology.
		2	Students shall be able to describe principle behind working of various instruments used in pharmacology.
		3	Students shall be able to explain different animals that can be use to conduct various experiments and CPCSEA guidelines.
		4	Students shall be able to explain different blood withdrawal techniques in animals and routes of drug administration
		5	Students shall be able to understand and perform animal simulated experiments and explain the effect of drugs in different systems of body.
6101-49P	Pharmacognosy and Phytochemistry I – Practical	1	Students shall be able to perform chemical analysis of tragacanth, acacia, agar, gelatin, starch, honey and castor oil
		2	Students shall be able to determine leaf constants like stomatal number, stomatal index, vein termination number, vein islet number and palisade ratio.
		3	Students shall be able to determine size of starch grains and phloem fibers by using eyepiece micrometer.
		4	Students shall be able to determine extractive values of crude drugs.
		5	Students shall be able to determine moisture content of crude drugs by loss on drying.
		6	Students shall be able to determine swelling index and foaming index of crude drugs.

Course Outcome

Course code	Name		Course Outcomes
6101-50T	Medicinal Chemistry II – Theory	**1**	Students shall be able to explain different types of antihistaminic agents and their pharmacological activities.
		2	Students shall be able to discuss anti-neoplastic agents and their mechanism of action.
		3	Students shall be able to illustrate cardiovascular agents and their therapeutic value.
		4	Students shall be able to outline importance of hormones.
		5	Students shall be able to categorize antidiabetic agents, their metabolic pathways and adverse effects.
		6	Students shall be able to discuss local anesthetics, synthesis of drugs and to compare structure activity relationship of drugs.
6101-51T	Industrial Pharmacy – I (Theory)	**1**	Students should be able to record physical and chemical properties of a drug as a part of preformulation studies and should be able to describe its impact on stability and sterility of dosage form.
		2	Students should be able to report formulation considerations in parenterals and ophthalmics.
		3	Students should be able to outline the production facility required for manufacturing of parenterals and evaluation of the same.
		4	Students should be able to reproduce the formulation, manufacturing, and evaluation of aerosols along with its stability studies.
		5	Students should be able to describe merits and demerits of various packaging materials, their manufacturing and stability aspects.
		6	Student should be able to describe formulation considerations, defects, and quality control tests for tablets.
6101-55P	Industrial Pharmacy – I (Practical)	**1**	Students should be able to correlate the significance of preformulation considerations of drug or API in development of stable injection.
		2	Students should be able to manufacture and evaluate tablets belonging to various classes.
		3	Students should be able to understand technical aspects of formulation of ophthalmic preparation.
		4	Students should be able to evaluate glass container and understand the significance of the same.
		5	Students should be able to describe the fundamentals of formulation of cosmetics and should be able to formulate and label cold/vanishing cream.
		6	Students should be able to correlate the significance of preformulation considerations of drug or API in development of stable injection.

6101-52T	Pharmacology II – Theory	**1**	Students able to understand fundamental knowledge on classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications of drugs acting on cardiovascular system
		2	Students able to write classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications of drugs acting on urinary system
		3	Students able to discuss autacoids, its classification and therapeutic uses.
		4	Students able to understand fundamental knowledge on classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications of drugs acting on Endocrine system.
		5	Students able to understand fundamental knowledge on classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications of drugs such as steroids, estrogen, progesterone, contraceptives and drugs acting on uterus.
		6	Students able to understand mechanism of action drug and it's relevance in treatment of diseases. Students able to write types, principle and applications of bioassay of various drugs.
6101-56P	Pharmacology II – Practical	**1**	Students able to understand invitro pharmacology concepts and various physiological salt solutions.
		2	Students able to understand the effect of drugs on blood pressure, isolated heart and effect of diuretics on animals.
		3	Students able to understand & perform the dose response relationship (DRC) of cholinergic and anti cholinergic drugs
		4	Students able to understand & perform bioassay of various drugs by matching, interpolation, 3 point and 4 point methods.
		5	Students able to understand & determine PA2 and PD2 value of drugs by different methods.
		6	Students able to understand & determine spamogen, spasmolytic, anti inflammatory and analgesic effect of various drugs by different methods.
6101-53T	Pharmacognosy and Phytochemistry II– Theory	**1**	Students should able to describe Metabolic pathways. Students should able to understand utilization of radioactive isotopes in the investigation of Biogenetic studies.
		2	Students should able to classify the types of secondary metabolites. Students should able to explain chemistry, therapeutic uses commercial application of secondary metabolites.
		3	Students should able to understand different Isolation techniques, Identification and analysis of Phytoconstituents.
		4	Students should able to explain method of industrial production, estimation and utilization of phytoconstituents.
		5	Students should able to discuss and apply modern methods of extraction techniques.
		6	Students should able to describe application of latest techniques like spectroscopy, electrophoresis in the isolation, purification and identification of crude drugs.
6101-57P	Pharmacognosy and Phytochemistr	**1**	Students should able to properly cut the section, staining it. Students should able to understand importance of macroscopy and micoscopical characters of crude drug.

	y II– Practical		Students should able to identify crude drug by Morphological, Microscopical and powdered characteristic study.
		2	Students should able to carry out different extraction methods. Students should able to Isolate active constituents by using different chromatographic methods like Paper chromatography, Thin layer chromatography.
		3	Students should able to handle Clevenger apparatus and extraction of Volatile oil by stem distillation and hydro distillation methods. Students should able to isolate active constituents by Thin layer chromatography.
		4	Students should able to explain importance of chemical method of evolution of crude drug. Students should able to identify crude drug by chemical test.
6101-54T	Pharmaceutical Jurisprudence – Theory	**1**	Students shall be able to understand the Drugs and Cosmetics Act. 1940 and its rules 1945 and explain import, manufacture, sale of drugs as well as conditions for grant of license for the same.
		2	Students shall be able to explain various schedules, DMR, sale of drugs, labeling and packing of drugs and outline administrative aspects of D & C Act and Rules
		3	Students shall be able to explain the Pharmacy Act 1948 and related offences and penalties. Students shall be able to describe the objectives, licensing and manufacture of Ayurvedic, Homeopathic, Patent and Proprietary preparations and offences and penalties related to Medicinal and Toilet Preparation Act 1955 and Narcotic Drugs and Psychotropic Substances Act 1985 and Rules.
		4	Students shall be able to explain the salient features of Drugs and Magic Remedies Act & Prevention of Cruelty to Animals Act. They shall be able to understand and explain about the National Pharmaceutical Pricing Authority.
		5	Students shall be able to explain Pharmaceutical legislations, code of pharmaceutical ethics, Medical termination of pregnancy act, Right to information Act and Intellectual Property Rights.

Course Outcome
Sem VI

Course code	Name		Course Outcomes
6101-58T	Medicinal Chemistry III – Theory	**1**	Students shall be able to explain different types of antibiotics and their mechanism of action, SAR, metabolism and adverse effects.
		2	Students shall be able to discuss anti-tubercular agents and their pharmacological activities.
		3	Students shall be able to illustrate antifungal, anti protozoal, anthelmintics agents and their therapeutic value.
		4	Students shall be able to outline importance of sulphonamides and sulfones.
		5	Students shall be able to understand the importance of drug design and different techniques of drug design.
		6	Students shall be able to discuss synthesis of important drugs.
6101-64P	Medicinal Chemistry III – Practical	**1**	Students shall be able to acquire practical skills.
		2	Students shall be able to explain methods for synthesis and characterization of drugs.
		3	Students shall be able to discuss type of reaction and mechanism involved in the synthesis.
		4	Students shall be able to monitor reaction and check purity of synthesized product.
		5	Students shall be able to explain significance of assay of drugs.
		6	Students shall be able to draw structures of drug molecules using Chem Draw Software.
		7	Students shall be able to explain Lipinski RO5 Rule
		8	Students shall be able to understand use of drug design software for determination of physicochemical properties.
6101-59T	Pharmacology III – Theory	**1**	Upon completion of course students should able to understand tha pharmacological action, MOA, Interaction and possible side effects of drugs acting on Respiratory system and gastrointestinal tract.
		2	Upon completion of course students should able to discover the new updates on chemotherapeutic agents and preclinical & clinical research regularly. And to understand other aspects related with Chemotherapy.
		3	Upon completion of course students should able to know the pharmacology and rational use of various chemotherapeutic agents like antitubercular, antileprotic.etc.
		4	Upon completion of course students should able to elaborate the knowledge of malignancy and chemotherapeutic treatment of UTI and STD's. And understand the importance of immunopharmacology.
		5	Upon completion of course students should able to understand the preclinical safety and toxicological evaluation of drug & new chemical entity.
		6	Upon completion of course students should able to explore the knowledge of Chronopharmacology.
6101-65P	Pharmacology	**1**	Upon completion of course students should able to understand various dose related calculations in experimental pharmacology.

	III – Practical	**2**	Upon completion of course students should able to estimate serum biochemical parameters eg- SGOT, SGPT etc by using calorimeter.
		3	Upon completion of course students should able to determine toxicity of various drugs by using provided data.
		4	Upon completion of course students should able to determine acute skin and eye irritation or corrosion of test substance.
		5	Upon completion of course students should able to understand the various activities of drug like antiallergic activity, anti-ulcer activity etc by using pharmacological assay and models.
		6	Upon completion of course students should able to explore the knowledge biostatic methods in experimental pharmacology. eg- ANOVA, Chi square, Student's test etc
6101-60T	Herbal Drug Technology – Theory	**1**	Students shall able to understand concept of herb, herbal medicine, Herbal medicinal products and herbal preparation, able to understand processing of herbal raw material, must understood concept of Biopesticides, organic farming, Pest and Pest management. Able to explain alternative system of medicine, importance of ayurvedic formulations, method of preparation and standardization of ayurvedic formulations.
		2	Students should able to describe concept of nutraceuticals, able to explain definition, classification, types of herbal-drug interaction, should understand mechanism and effects of interactions.
		3	Students should able to know about definition, advantages and disadvantages, classification of herbal cosmetics, should learn about raw material used in skin care products, about excipients used in hair care products, about raw material used in oral care products.
		4	The students shall be able to explain the concept of evaluation of crude drugs and appreciate patenting and regulatory issues of natural products
		5	The students shall be able to understand about herbal drug industry in India and explain Good Manufacturing Practices for Indian System of Medicine.
6101-66P	Herbal Drug Technology – Pactical	**1**	Students shall be able to perform preliminary phytochemical screening of crude drugs.
		2	Students shall be able to determine alcohol content in asava and arishtha..
		3	Students shall be able to evaluate excipients of natural origin.
		4	Students shall be able to incorporate prepared and standardized extracts in cosmetic formulations and formulations like mixtures, syrups and tablets.
		5	Students shall be able to perform monograph analysis.
6101-61T	Biopharmaceutics and Pharmacokinetics (Theory)	**1**	Students shall be able to determine aldehyde content, phenol content and total alkaloids in the given sample.
		2	Students should be able to describe various metabolic pathways , renal and non-renal routes of drug elimination
		3	Students should be able to report concept of bioavailability , in vitro dissolution models and in vitro- in vivo correlation
		4	Students should be able to calculate and analyze primary and secondary pharmacokinetic parameters after IV bolus administration following one compartment model
		5	Students should be able to analyze kinetics of multiple dosing and should calculate loading and maintenance dose

		6	Students should be able to describe and assess causes of non-linearity and methods of estimation of various constants involved in the same
6101-62T	Pharmaceutical Biotechnology – Theory	**1**	The students shall be able to understand the importance of immobilized enzymes, biosensors, protein engineering, genetic engineering and applications of Biotechnology.
		2	The students shall be able to explain the applications of genetic engineering in production of Pharmaceutical Products.
		3	The students shall be able to describe immunity and its components, hypersensitivity reactions, preparation of vaccines and related products and hybridoma technology.
		4	The students shall be able to explain about immunoblotting techniques, microbial genetics, microbial biotransformation and mutation.
		5	The students shall be able to appreciate use of micro-organisms in fermentation technology.
6101-63T	Quality Assurance – Theory	**1**	Students should be able to understand the cGMP aspects in a pharmaceutical industry
		2	Students should be able to appreciate the importance of documentation
		3	Students should be able to understand the scope of quality certifications applicable to pharmaceutical industries
		4	Students should be able to understand the responsibilities of QA & QC departments

Course Outcome
Sem VII

Course code	Name		Course Outcomes
6101-67T	Instrumental Methods of Analysis – Theory	**1**	Students should be able to explain different types of electromagnetic radiations and its applications in drug analysis.
		2	Students should be able to discuss principle, instrumentation and applications of UV visible spectroscopy, fluorimetry, IR spectroscopy, flame Photometry.
		3	Students should be able to discuss principle, instrumentation and applications of nepheloturbidometry.
		4	Students should be able to explain chromatographic separations and analysis of drugs.
		5	Students should be able to discuss principle, instrumentation, advantages and applications of different chromatographic techniques.
		6	Students should be able to discuss quantitative and qualitative analysis of drugs using various analytical instruments.
6101-71P	Instrumental Methods of Analysis – Practical	1	Students should be able to determine absorption maxima and effect of solvents on absorption maxima of organic compounds.
		2	Students should be able to able to perform simultaneous estimation of Ibuprofen and Paracetamol by UV spectroscopy
		3	Students should be able to perform assay of Paracetamol by UV spectroscopy
		4	Students should be able to estimate different compounds by colorimetry and flourimetry and flame photometry
		5	Students should be able to estimate quenching of fluorescence.
		6	Students should be able to determine chlorides and sulphates by nephloturbidometry.
		7	Students should be able to separate and identify amino acids and sugars by paper and thin layer chromatography.
		8	Students should be able to separate plant pigments by column chromatography
		9	Students should know instrumentation, working and applications of HPLC and GC.
6101-68T	Industrial Pharmacy II – Theory	1	Students should be able to know the process of pilot plant and scale up of pharmaceutical dosage forms.
		2	Students should be able to understand the process of technology transfer from lab scale to commercial batch.
		3	Students should be able to know different Laws and Acts that regulate pharmaceutical industry.
		4	Students should be able to understand the approval process and regulatory requirements for drug products.
		5	Students should be able to know quality management systems.
		6	Student should be able to know concept of total quality management.
6101-69T	Pharmacy Practice	1.	Students shall be able to define hospital, explain its organization. They shall be able to define and explain the hospital pharmacy, its layout and roles & responsibilities of hospital pharmacist. They shall be able to describe classification of Adverse drug reaction and drug interactions, ADR reporting and management.
		2.	Students shall be able to classify and explain different drug distribution methods in a hospital. They shall be able to define hospital formulary and its method of preparation, therapeutic drug monitoring, significance of patient medication history interview and management of community pharmacy.

		3.	Students shall be able to describe the organization and functions of Pharmacy therapeutics committee, drug and poison information services. They shall be able to explain different steps involved in patient counseling, pharmacist, responsibilities of pharmacist in community health education and training. They shall explain the importance of communication skills required to communicate with prescribers and patients.
		4.	Students shall be able to describe the scope of clinical pharmacy, roles and responsibilities of clinical pharmacist in drug therapy monitoring, ward round participation. They shall be able to explain the dosing pattern and drug therapy based on disease condition and rational use of over the counter drugs.
		5.	Students shall be able to understand & discuss the inventory control and management in a hospital. They should be able to explain ABC analysis based on stock and interpret clinical laboratory investigations including hematology, urine analysis, and blood chemistry. Students shall be able to explain the role of hospital advisory committee.
6101-70T	Novel Drug Delivery system – Theory	**1**	Students should be able to write various natural barriers of the body for novel drug delivery system.
		2	Students should be able to write advantages and disadvantages of various novel drug delivery systems
		3	Students should be able to enumerate the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation
		4	Students should be able to list out various approaches for development of novel drug delivery systems.
		5	Students should be able to classify the controlled and novel drug delivery systems
		6	Students should be able to enumerate approaches, advantages and disadvantages of vesicular drug delivery system

Assessment Method Used for Analyzing the PO and CO

Programme outcome	B. Pharmacy Sem I	B. Pharmacy Sem II	B. Pharmacy Sem III	B. Pharmacy Sem IV	B. Pharmacy Sem V	B. Pharmacy Sem VI
Closed book test	√	√	√	√	√	√
Open book test	√	√	√	√	√	√
PBL	√	√	√	√		
Practical assignment laboratory reports	√	√	√	√	√	√
Oral Presentations			√	√	√	√
Seminars		√	√	√	√	√
Viva	√	√	√	√	√	√
Pedagogic	√	√	√	√	√	√

KRISHNA INSTITUTE OF MEDICAL SCIENCES "DEEMED TO BE UNIVERSITY"KARAD

(Declared under section 3 of the UGC Act, 1956 vide Notification No F.9-15 /2001-U.3 of the MHRD, Govt of India)

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Program Outcomes & Program Specific Outcomes

M. Sc. Biotechnology (5101)

1. **Microbiology and Biotechnology Knowledge:** Possess knowledge and comprehension of the core and basic and applied knowledge associated with the Microbiology and Biotechnology industries like Food industry, Dairy industry, Fermentation industries, Public Health laboratories, Biomedical science research laboratories, R & D centers of pharmaceutical industries.

2. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

4. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern Microbiology, Biotechnology related computing tools with an understanding of the limitations.

5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. **Biotechnology & Microbiology Ethics:** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. Communication: Communicate effectively with the colleagues, superior authorities, subordinates and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

9. Environment and sustainability: Understand the impact of the Microbiological and Biotechnological solution in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

10. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Course Outcomes of M. Sc. Biotechnology (5101)
M. Sc. BiotechnologySemester I

Subject Code	Name of the Course (Subject)	Course Outcomes
5101-11	Foundation of Biochemistry for Biotechnologist	1) Students would be well versed on the fundamental principles of Biochemistry. 2) Students would have through knowledge of structures and functions of Bio-macromolecules like proteins, carbohydrates, lipids, Nucleic acids (DNA and RNA) . 3) Student would also be well versed with structure and functions of vitamins as well as chemistry bacterial cell wall.
5101-12	Cell Biology and Biostatistics	1) Students would have through knowledge of structural organization of prokaryotic and eukaryotic cells. 2) Students would gain knowledge of structure and functions of biological membranes and solute transport through them. 3) Students would also be well versed with the fundamental principles and examples of cell biosignalling and cell differentiation processes. 4) Students would be able to apply statistical methods to handle biological bulky data and will be able to interpret the results.
5101-13	Microbiology and Immunology-I	1) Students would learn about the landmarks in the field of Microbiology and would gain knowledge regarding scope of microbiology. 2) Students would know different types of microorganisms, their isolation techniques and different methods of controlling growth of microorganisms. 3) Students would also gain knowledge regarding different bacterial and vital staining procedures. 4) Students would also have knowledge regarding various components of immune system and defense mechanism.
5101-14	Biochemical, Biophysical, Immunochemical and Biotechnological Techniques	1) Student would be able to understand the difference between UV visible and fluorescence spectroscopy & colorimetry. 2) Student would be able to describe the basic principle, technique and applications of different types chromatographic techniques like paper, ion exchange and affinity chromatography.

		3) Student would gain knowledge regarding fundamental principles behind centrifugation and electrophoresis. 4) Student would be able to get the thorough knowledge of ESR, NMR and various principles and instrumentation behind them. 5) Student would be well versed with the knowledge of x- ray and radioisotopes, radiography and the dangers, safety precautions associated with them. 6) Student would understand the principles and applications of SDS- PAGE, Southern blotting .
5101-15	Practical Course I	1) Students would be able to prepare the various nutrient media, sugar media and media for Biochemical tests. 2) Students would be able to perform the staining of endospores, nuclear material and capsule of bacteria. 3) Students will be able to perform the various techniques of isolation , biochemical characterizationand enumeration of microorganisms. 4) Students will get insight of industrial work culture by visiting industry.
5101-16	Practical Course II	1) Students will know the techniques of qualitative and quantitative estimation of proteins, lipids, carbohydrates, DNA, RNA and will be carry out the estimations independently. 2) Students will learn to apply the statistical methods on biological data and interpret the results. 3) Students will be able to perform the electrophoresis and chromatographic techniques.
01	Ability Enhancement Compulsory Course (AECC) **Yoga and Meditation**	1) Students will be able to perform the yoga postures and meditate. 2) Students will learn to maintain the mental hygine by performing yoga posture and meditation

M. Sc. BiotechnologySemester II

Subject Code	Name of the Course (Subject)	Course Outcomes
5101-21	Cell Physiology and Metabolism	1) Students would know the basic concept of metabolism and understand the metabolic pathway and their functioning in the body . 1) Students would be able to illustrate the metabolism of carbohydrate through various anabolic and catabolic pathways like glycolysis, Kreb's cycle, glycogen metabolism etc. 2) Students will learn how amino acid and proteins are catabolised 4) Students would be well versed with entropy to law of thermodynamics and free energy and it's relation to chemical 5) Students would be able to understand, able to describe coupled reactions and their role in metabolism and chemiosmotic hypothesis of ATP synthesis.
5101-22	Molecular Biology and Biotechnology	1) Students will get thorough knowledge of mechanisms of DNA application, transcription and translation in prokaryotes and eukaryotes. 2) Students will have a deep insight into the genetic code and regulation of gene expression giving emphasis on operon models, in prokaryotes and chromatic remolding, DNA binding transactivators and coactivators with intracellular signaling in eukaryotes. 3) Students will know about various types of DNA damage and DNA repair mechanisms that occur in prokaryotic and eukaryotic cells. 4) Students will also able to understand mutations, types of mutations and methods of detection of mutation, recombination and DNA transfer methods like transformation, conjugation, transduction, electroporation, transfection. Students will also know about protoplast and spheroplast fusions etc. 3) Students will also know about Archaebacteria and will be able to understand Archaebacterial genetics
5101-23	Microbiology and Immunology – II	1) Students will gain knowledge regarding basics of food and milk microbiology, virology and medical microbiology.

		2) Students will also be well versed regarding abnormal manifestation of immune response like autoimmune diseases. 3) Students will understand role of HLA antigens in transplantation and graft rejection. 4) Students will also gain knowledge regarding role of immune modulators, vaccines and types of vaccines.
5101-24	Foundation for use of Computers, Communications, Scientific Writing and Presentation	1) Students would know the fundamentals of computer hardware & software. 2) Students would be well versed with how to write and publish the scientific paper/ document. 3) Students would gain information about communication cycle, types of communication, verbal & nonverbal communication, writing skills.
5101-25	Practical Course III	1) Students will be able to perform and know the applications of various serological diagnostic tests viz. RA, ASO, CRP, SLE etc. 2) Students will be able to isolate and identify some heterotrophic bacteria. 3) Students will be able to study the various growth patterns of microbialcells.
5101-26	Practical Course IV	1) Students will be able to identify different components of living cells and macromolecules like DNA, RNA, plasmids and their extraction procedures. 2) Students will be able to perform the isolation of drug resistant and nutritionally deficient mutants. 3) Students will be able to carry out immobilization of enzymes, microbial cells.
02	Skill Enhancement Compulsory Course (SECC) **A Soft Skills and Personality Development**	1) Students will be able to set their goals and plan for career. 2) Students will learn how to cope up with the stress rescuing from conflicts. 3) Student will enhance their communicative abilities and presentation skills.

M. Sc. Biotechnology Semester III

Subject Code	Name of the Course (Subject)	Course Outcomes
5101-31	Environmental Biotechnology	1) Competently explain various aspects of environmental microbiology and microbial ecology to become familiar with current research in environmental microbiology 2) Student will be able to understand the various methods of microbial bioleaching of ores, bioremediation processes, microbial degradation of xenobiotics and their environmental hazards. 3) Students will be well versed with basic concepts and basic design of biosensors, their principles and their applications. 4) Students will have detail knowledge about the solid waste treatment methods and liquid waste treatment methods & various aspects of waste disposal & control.
5101-32	Plant Tissue Culture	1) Students will get thorough knowledge about the basic concepts of plant tissue culture , asceptic techniques ,cell growth requirements and principles of plant tissue culture 2) students will know the basics of micropropagation technique in plant tissue culture. 3) students will become conversant with the basic layout and design ,equipment requirements of plant tissue culture laboratory and contamination problems in plant tissue culture and their control 4) students will get trained in the required expertise for working in a commercial plant tissue culture laboratory 5) Students will know about different plant transformation technologies.
5101-33	Industrial Fermentations	1) Students will get introduced with protein structure prediction and drug designing. 2) Students will be well versed with the screening techniques, Microbial assays, Primary & secondary metabolites. 3) Students will gain the knowledge of design of fermentors, types of fermentors , equipments, instruments used, sterilization processes. 4) Students will well versed with fermentation media, innoculum preparation, Scale up processes

		5) Students will be well versed with the various downstream processes of fermentation industries.
5101-34	Bioinformatics for Biotechnologist	1) Students will acquire the knowledge of computers, operating system, internet resources. 2) Students will get introduced with tools and techniques of information technology, Metabolimics and Phylogenetic analysis . 3) Students will acquire the knowledge of biological databases, Methods of sequence alignment, Genomics and Proteomics 4) Students will get introduced with basic of 'C' language and structured query language.
5101-35	Practical Course V	1) Students will be able to understand the setting up and operating a plant tissue culture laboratory. 2) Students will get acquainted with basic hands on skills for in vitro plantlet manipulation in micropropagation techniques. 3) Students will be able to independently search, store, retrieve and analyze the biological data.
5101-36	Practical Course VI	1) Students will be able to screen out industrially important microbial strains like organic acid producers, antibiotic producers, amine producers, enzyme producers . 2) Students will be able to determine BOD and COD removal efficiency of waste water treatment plant 3) Students will be able to produce biofertilizer (Azo, Rhizo) on the laboratory scale. 4) Students will be able to work in fermentation industry particularly in production units, micro-labs and Quality Control departments.
03	Ability Enhancement Compulsory Course (AECC) **Leadership Development**	1) Students will learn how to do the team work. 2) Students will be ableto take wise and prompt decision making ability. 3) Student will be able to handle the workload effectively.

M. Sc. Biotechnology Semester IV

Subject Code	Name of the Course (Subject)	Course Outcomes
5101-41	Enzyme Technology	1) Student would able to describe structure, functions and the mechanism of action of enzymes, kinetics of enzyme catalysed reactions and enzyme inhibitions and their regulatory process. 2) Students would understand the methods of immobilization of enzyme and applications of immobilized enzymes. 3) Students would be well versed with methods of large scale production of enzymes. 4) Students will have thorough understanding of the rate of reactions, order of reactions , inhibitions and their kinetics. 5) Students would gain the knowledge of enzyme catalysis, isoenzymes, multienzymes and multienzyme complexes
5101-42	Animal Tissue Culture	1) Student will get introduced to basics of animal tissue culture techniques, media used in Animal cell cultures 2) Students will get conversant with the techniques of maintenance & preservation of animal cell cultures, cell separation methods and cell quantitations. 3) Students will also gain thorough knowledge about primary and secondary cell line, safety measures in laminar hood with levels of safety. 4) Students will learn about laboratory equipments and laboratory design, stem cell technology and IVF technology.
5101-43	Recombinant DNA Technology	1) Students will be imparted with the knowledge of basic recombinant DNA technology. 2) Students would get knowledge about construction and screening of genome libraries and c DNA libraries. 3) Students will get a thorough knowledge about advanced techniques used in rDNA technology like PFGE, RFLP, RAPD etc.

			4) Students would know about applications of recombinant DNA technology in the field of medicine and industry 5) Students will have the basic understanding of gene therapy systems, protein engineering and metabolic engineering 6) Students will also have a insight into the ethical issues involved in genetic engineering.
5101-44		Pharmaceutical Microbiology and Biotechnology	1) Students will gain the knowledge regarding role of microorganisms in pharmaceutical and biotech industries, biotransformation and steroids productions. 2) Students would gain knowledge about production of Recombinant DNA drugs and designing of drug delivery system. 3) Students will get knowledge about production of various types of amino acids, vitamins and secondary plant metabolites. 4) Students will have a deep insight into the production of antibiotics, ergot, alkaloids .
5101-45		Practical Course VII	1) Students will be able to isolate purify and quantify the industrial important enzymes. 2) Students will acquire knowledge and skills of enzymatic assays – protease, lipase, cellulase, amylase and invertase and would able to carry out enzymatic assays independently in the laboratory 3) Students will get basic knowledge of safety measures to be taken in while working in ATC laboratory, cell quantification, animal cell culture techniques, establishing primary animal cell lines 4) Students will get conversant with the use of PCR techniques through the demonstration.
5101-46		Project Work	After completion of project work, writing project report and presentation of project work student will be well versed with: 1) How to select the project topic. 2) How to make literature survey. 3) How to set up experimental design to investigate the problem and able to record and interpret the results. 4) How to write the project report in the proper format – Title, Introduction, Aims & Objectives, Materials & Methods, Results & Discussion, Summary and Conclusion. 5) How to cite references and to prepare bibliography. 6) How to write acknowledgements. 7) How to present and defend the project report orally. 8) Students will have all the basic knowledge of writing a scientific paper in proper format.
5101-47		Vocational Training (Industrial Training)	1) Students will get hands-on training to work in the reputed industries before getting placed. 2) The students will be exposed to all the industrial work culture so as to adopt all the skills required for working in the industry. 3) The students will be imparted with the knowledge of soft skills, communication skills, professional attitude while working in the industries.
	04	Skill Enhancement Compulsory Course (SECC)	1) Students will get the knowledge of types of databases and their data formats.

	Biotechnology Data Care Management (02 Credits)	2) Students will learn the importance of various omics, data generation techniques, data management strategies

Program Outcomes & Program Specific Outcomes
M.Sc. Microbiology (5201)

1. **Microbiology and Biotechnology Knowledge:** Possess knowledge and comprehension of the core and basic and applied knowledge associated with the Microbiology and Biotechnology industries like Food industry, Dairy industry, Fermentation industries, Public Health laboratories, Biomedical science research laboratories, R & D centers of pharmaceutical industries.

2. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

4. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern Microbiology, Biotechnology related computing tools with an understanding of the limitations.

5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

6. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. **Biotechnology & Microbiology Ethics:** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. **Communication:** Communicate effectively with the colleagues, superior authorities, subordinates and with society at large, such as, being able to comprehend and write effective reports, make effectivepresentations and documentation, and give and receive clear instructions.

9. **Environment and sustainability:** Understand the impact of the Microbiological and Biotechnological solution in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

10. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

COURSE OUTCOMES of M.Sc. Microbiology (5201)
M. Sc. MicrobiologySemester I

Subject Code	Name of the sub Course (Subject)	Course Outcomes
5201-11	Foundation of Biochemistry for Microbiologist	4) Students would be well versed on the fundamental principles of Biochemistry. 2) Students will have through knowledge of structures and functions of Bio-macromolecules like proteins, carbohydrates, lipids, Nucleic acids (DNA and RNA). Students will be well versed with structure and functions of vitamins, and chemistry of cell walls of bacteria, actinomycetes & yeasts.
5201-12	Foundation of Cell Biology and Biostatistics for Microbiologist	1) Students will have through knowledge of structural organization of prokaryotic and eukaryotic cells 2) Students will gain knowledge of structure and function of biological membranes and solute transport through them. 3) Students will also be well versed with the fundamental principles and examples of cell biosignalling and cell differentiation processes 4) Students will be able to apply statistical methods to handle biological bulky data and will be able to interpret the results. .
5201-13	Medical Microbiology and Immunology-I	1) Students will acquire the knowledge of pathogenesis of infectious diseases, epidemiology, Dental and periodontal diseases and medical mycology. 2) Students will be able to describe components of immune system and how cells and organs of immune system play an important role in the immune responses of the host. 3) Students will have the knowledge of cytokines, chemokines and their receptors.
5201-14	Biochemical, Biophysical Immunochemical and Microbiological Techniques	1) Student would be able to understand the difference between UV visible and fluorescence spectroscopy & colorimetry. 2) Student will be able to describe the basic principle, technique and applications of different types of chromatographic techniques like paper, ion exchange and affinity chromatography. 3) Student will gain knowledge regarding fundamental principles of centrifugation and electrophoresis. 4) Student will be able to get the thorough knowledge of ESR, NMR and various principles and instrumentation behind them.

		5) Student would be well versed with the knowledge of x- ray and radioisotopes, radiography and the dangers, safety precautions associated with them 6) Student will understand the principles and applications of SDS-PAGE, Southern blotting .
5201-15	Practical Course I	1) Students will be able to carry out isolation of various types of bacteria, yeast, molds and bacteriophages. 2) Students will also be able to carry out isolation of pathogens. 3) Students will be able to carry out enrichment and isolation of Acidophilic, Alkalophilic, Osmophilic, Thermophilic and Halophilic microorganisms.
5201-16	Practical Course II	1) Students will know and able to perform the techniques of qualitative and quantitative estimation of proteins, lipids, carbohydrates, DNA, RNA and shall be able to carry out the estimations independently. 2) Students will learn to apply the statistical methods on biological data and interpret the results. 3) Students will be able to perform the electrophoresis and chromatographic techniques
01	Ability Enhancement Compulsory Course (AECC) **Yoga and Meditation**	2) Students will be able to perform the yoga postures and meditate. 2) Students will learn to maintain the mental hygine by performing yoga posture and meditation

M.Sc. MicrobiologySemester II

Subject Code	Name of the Course (Subject)	Course Outcomes
5201-21	Microbial physiology and metabolism	1) Students will be able to illustrate various anabolic and catabolic pathways of carbohydrates, lipids, proteins and amino acids. 2) Students would be able to illustrate the various catabolic pathways of carbohydrate proteins and amino acids. 3) Students would be able to understand, able to describe various mechanisms of ATP synthesis by metabolism and chemiosmotic hypothesis of ATP synthesis. 4) Students will have knowledge about phototactic, chemotactic and magnetotactic bacteria
5201-22	Microbial Genetics and Molecular biology	1) Students will get thorough knowledge of mechanisms of DNA replication, transcription and translation in prokaryotes and eukaryotes 2) Students will have a deep insight into the genetic code and regulation of gene expression giving emphasis on operon models, in prokaryotes and chromatic remolding, DNA binding transactivators and coactivators with intracellular signaling in eukaryotes. 3) Students will know about various types of DNA damage and DNA repair mechanisms that occur in prokaryotic and eukaryotic cells. 4) Students will also able to understand mutations, types of mutations and methods of detection of mutation, recombination and DNA transfer methods like transformation, conjugation, transduction, electroporation, transfection. Students will also know about protoplast and spheroplast fusions etc. 5) Students will also know about Archaebacteria and will be able to understand Archaebacterial genetics.
5201-23	Medical Microbiology and Immunology – II	1) Students will gain knowledge regarding various microbial diseases - etiology, epidemiology, prevention and control and diagnostic techniques. 2) Students will also have knowledge about how immune responses are given by host to viral, bacterial and fungal infections and to tumors. 3) Students would also have knowledge regarding role of HLA antigens in transplantation and graft rejection. Students will be able to understand abnormal manifestations of immune response in the form of autoimmune diseases. 4) Students will also gain knowledge regarding immune deficiency diseases.

		5) Students will gain knowledge regarding recently emerged viral diseases like Ebola, Swine-flu.
5201-24	Fundamentals for use of computers and communication skills and scientific writing and presentation.	1) Students would know the fundamentals of computer hardware &software. 2) Students will become well versed with how to write and publish the scientific paper/ document. 3) Students shall gain information about communication cycle, types of communication, verbal & nonverbal communication, writing skills.
5201-25	Practical Course III	1) Students will be able to perform and know the applications of various serological diagnostic tests viz. RA, ASO, CRP, SLE etc. 2) Students will be able to carry out immobilization of enzymes, microbial cells. 3) Students will be able to study the various growth patterns of microbial cells
5201-26	Practical Course IV	1) Upon competition of this course students will be able to carry out independently isolation of DNA as well as plasmids from bacteria and yeasts. 2) Students will be able to perform the isolation of drug resistant and nutritionally deficient mutants.
02	Skill Enhancement Compulsory Course (SECC) **A Soft Skills and Personality Development**	4) Students will be able to set their goals and plan for career. 5) Students will learn how to cope up with the stress rescuing from conflicts. 6) Student will enhance their communicative abilities and presentation skills.

M. Sc. Microbiology Semester III

Subject Code	Name of the Course (Subject)	Course Outcomes
5201-31	Food and Dairy Microbiology	1) Students will gain the knowledge regarding microbial flora of milk. 2) Student would able understand the microbial spoilage of foods, microbial spoilage of milk and other foods and food borne diseases 3) Students will gain knowledge about food preservation techniques. 4) Students will able to know how to investigate the food borne disease outbreaks 5) Students will have knowledge of the fermented food and milk products and Indian fermented and other fermented foods.
5201-32	Microbial Technology – I	1) Students will be well versed with the screening techniques, Microbial assays, Primary &secondary metabolites. 2) Students will gain the knowledge of design of fermentors, types of fermentors , equipments, instruments used, sterilization processers. 3) Students will be well versed with fermentation media, inoculum preparation, Scale up Processes and with the various downstream processes of fermentation industries.
5201-33	Environmental and Applied Microbiology	1) Student will be able to understand the various methods of microbial bioleaching of ores, bioremediation processes by microorganisms and their applications in degradation of xenobiotics. 2) Students will be well versed with basic concepts and basic design of biosensors. 3) Students will also acquire the knowledge of Biomagnification and Eutrophication

		4) Students will have detail knowledge about the solid waste treatment methods and liquid waste treatment methods & various aspects of waste disposal & control.
5201-34	Bioinformatics for Microbiologist	1) Students will acquire the knowledge of computers, operating system, internet resources. 2) Students will get introduced with tools and techniques of information technology, Metabolimics and Phylogenetic analysis . 3) Students will acquire the knowledge of biological databases, Methods of sequence alignment, Genomics and Proteomics 4) Students will get introduced with basic of 'C' language and structured query language. 5) Students will get introduced with protein structure prediction and drug designing.
5201-35	Practical Course V	1) Students will be able to carry out physicochemical analysis of milk and food. 2) Students will know how to carry out the microbiological examination of food, milk and milk products. 3) Students shall be able to independently search, store, retrieve and analyze the biological data 4) Student will get acquainted with all the basic background needed for working in Food and Dairy industry.
5201-36	Practical Course VI	1) Students will be able to demonstrate various microbial interactions such as commensalism, ammensalism , mutualism etc. 2) Students will be able to screen out industrially important microbial strains like organic acid producers, antibiotic producers, protease producers, enzyme producers. 3) Students will be able to determine BOD and COD removal efficiency of waste water treatment plant. 4) Students will be able to produce biofertilizer(Azo, Rhizo) on the laboratory scale. 5) Students will be able to work in fermentation industry particularly in production units, micro-labs and Quality Control departments.
03	Ability Enhancement Compulsory Course (AECC) **Leadership Development**	1) Students will learn how to do the team work. 2) Students will be ableto take wise and prompt decision making ability. 3) Student will be able to handle the workload effectively.

M. Sc. Microbiology Semester IV

Subject Code	Name of the Course (Subject)	Course Outcomes
5201-41	Enzymology	1) Student would able to describe structure, functions and the mechanism of action of enzymes, kinetics of enzyme catalysed reactions and enzyme inhibitions and their regulatory process. 2) Students would have the knowledge of immobilization of enzyme and exposure of wide applications of enzymes and future potential uses of enzymes. 3) Students would be well versed with kinetics of soluble and immobilized enzymes. 4) Students would gain the knowledge of enzyme catalysis, isoenzymes, multi enzymes and multi enzyme complexes.
5201-42	Microbial Technology II	1) Students will gain deep theoretical knowledge about the industrial production of yeast, yeast products, mushrooms , polysaccharides, pigments, bioinsecticides etc. 2) Students will be well versed with the instrumentation used in fermentation industry. 3) Students will learn about the applications of computer in fermentation industry which will be increasing his skills for working in industry.
5201-43	Recombinant DNA Technology	1) Students would have the knowledge of basic principles and methods of recombinant DNA technology. 2) Students will get thorough knowledge about construction and screening of genome libraries and c DNA libraries. 3) Students will get a thorough knowledge about advanced techniques used in rDNA technology like PFGE, RFLP, RAPD etc. 4) Students will acquire knowledge about applications of recombinant DNA technology in the field of medicine and industry 5) Students will have the basic understanding of gene therapy systems, protein engineering and metabolic engineering 6) Students will also have a insight into the ethical issues involved in genetic engineering.
5201-44	Pharmaceutical Microbiology	1) Students will gain the knowledge regarding Drug discovery and drug development. 2) Students will get knowledge about production of various types of enzymes, amino acids, vitamins, and organic acids. 3) Students will have a deep insight into the antimicrobial agents and their mode of action.
5201-45	Practical Course VII	1) Students will acquire knowledge and skills of enzymatic assays – protease, lipase, cellulase, pectinase , chitinase, glucose oxidase and would able to carry out enzymatic assays independently in the laboratory. 2) Students will be able to perform independently DNA restriction digestion and DNA ligation techniques and PCR techniques.

		3) Students will get conversant with the use of PCR techniques through the demonstration. 4) Students will be able to perform enzyme kinetics.
5201-46	Project Work	After completion of project work, writing project report and presentation of project work student will be well versed with: 1) How to select the project topic. 2) How to make literature survey. 3) How to set up experimental design to investigate the problem and able to record and interpret the results. 4) How to write the project report in the proper format – Title, Introduction, Aims & Objectives, Materials & Methods, Results & Discussion, Summary and Conclusion. 5) How to cite references and to prepare bibliography. 6) How to write acknowledgements. 7) How to present and defend the project report orally. 8) Students will have all the basic knowledge of writing a scientific paper in proper format.
5201-47	Vocational Training (Industrial Training)	1) Students will get hands-on training to work in the reputed industries before getting placed. 2) The students will be exposed to all the industrial work culture so as to adopt all the skills required for working in the industry. 3) The students will be imparted with the knowledge of soft skills, communication skills, professional attitude while working in the industries.
04	Skill Enhancement Compulsory Course (SECC) **Biotechnology Data Care Management (02 Credits)**	1) Students will get the knowledge of types of databases and their data formats. 2) Students will learn the importance of various omics, data generation techniques, data management strategies

Program Outcomes & Program Specific Outcomes
M.Sc. Pharmaceutical Microbiology (5401)

1. Microbiology and Biotechnology Knowledge: Possess knowledge and comprehension of the core and

basic and applied knowledge associated with the Microbiology and Biotechnology industries like Food industry, Dairy industry, Fermentation industries, Public Health laboratories, Biomedical science research laboratories, R & D centers of pharmaceutical industries.

2. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.

3. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
4. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern Microbiology, Biotechnology related computing tools with an understanding of the limitations.
5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
6. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

7. **Biotechnology & Microbiology Ethics:** Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

8. **Communication:** Communicate effectively with the colleagues, superior authorities, subordinates and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
9. **Environment and sustainability:** Understand the impact of the Microbiological and Biotechnological solution in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
10. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

COURSE OUTCOMES of M.Sc. Pharmaceutical Microbiology (5401)

M. Sc. Pharmaceutical Microbiology Semester I

Subject Code	Name of the sub Course (Subject)	Course Outcomes

5401-11	Foundation of Cell Biochemistry and Macromolecules	1) Students would be well versed on the fundamental principles of Biochemistry. 2) Students will have through knowledge of structures and functions of Bio- macromolecules like proteins, carbohydrates, lipids, Nucleic acids (DNA and RNA). 3) Students will be well versed with the functions of vitamins of cofactors and vitamins.
5401-12	Fundamentals of Cell Biology and Biostatistics	1) Students will have through knowledge of structural organization of prokaryotic and eukaryotic cells. 2) Students will gain knowledge of structure and function of biological membranes and solute transport through them. 3) Students will also be well versed with the fundamental principles and examples of cell signaling. 4) Students will be able to apply statistical methods to handle biological bulky data and will be able to interpret the results. .
5401-13	Essentials of Microbiology and Immunology	1) Students would learn about the landmarks in the field of Microbiology and would gain knowledge regarding scope of microbiology. 2) Students would know different types of microorganisms, their isolation techniques and different methods of controlling growth of microorganisms. 3) Students would also gain knowledge regarding different bacterial and vital staining procedures
5401-14	Tools and Techniques in Biosciences	1) Student would be able to understand the difference between UV visible and fluorescence spectroscopy & colorimetry. 2) Student will be able to describe the basic principle, technique and applications of different types of chromatographic techniques like ion exchange, HPLC, RPLC and various spectroscopic, electrophotetic and centrifugation technique. 3) Student will be able to get the thorough knowledge of ESR, NMR and various principles and instrumentation behind them. 4) Student would be well versed with the knowledge of x- ray diffraction and radioisotopic radiographic technique.

5401-15	Practical Course I	1) Students will be able to carry out certain commonly used staining techniques. 2) Students will be able to carry out isolation of various types of bacteria, yeast, molds and bacteriophages. 3) Students will also be able to carry out isolation of pathogens. 4) Students will be able to carry out enrichment and isolation of Psychrophilic, Osmophilic, Thermophilic and Halophilic microorganisms. 5) Students will be able to perform sterility tests as well as antibiotic sensitivity tests. 6) Students will be able to perform SPC of bacteria and fungi.
5401-16	Practical Course II	1) Students will know and able to prepare buffers & molar solutions and perform the techniques of quantitative estimation of proteins, lipids, carbohydrates, DNA, RNA, Sodium & Potassium and shall be able to carry out the estimations independently. 2) Students will learn to apply the statistical methods on biological data and interpret the results. 3) Students will be able to perform the electrophoresis and chromatographic techniques. 4) Students will able to determine the acid value, saponification value and iodine number of fats independently.
01	Ability Enhancement Compulsory Course (AECC) **Yoga and Meditation**	1) To enable the students to have good health. 2) To learn to maintain the mental hygiene by performing yoga posture and meditation.

M.Sc. Pharmaceutical Microbiology Semester II

Subject Code	Name of the Course (Subject)	Course Outcomes
5401-21	Cell Physiology and Metabolism	1) Students will be able to illustrate various anabolic and catabolic pathways of carbohydrates, lipids, proteins and amino acids. 2) Students would be able to illustrate the various catabolic pathways of carbohydrate proteins and amino acids. 3) Students would be able to understand, able to describe various mechanisms of ATP synthesis by metabolism and chemiosmotic hypothesis of ATP synthesis. 4) Students will have knowledge about phototactic, chemotactic and magnetotactic bacteria.
5401-22	Molecular Biology	1) Students will get thorough knowledge of mechanisms of DNA replication, transcription and translation in prokaryotes and eukaryotes. 2) Students will have a deep insight into the genetic code and regulation of gene expression giving emphasis on operon models, in prokaryotes and chromatic remolding, DNA binding transactivators and coactivators with intracellular signaling in eukaryotes. 3) Students will know about various types of DNA damage and DNA repair mechanisms that occur in prokaryotic and eukaryotic cells. 4) Students will also able to understand mutations, types of mutations and methods of detection of mutation, recombination and DNA transfer methods like transformation, conjugation, transduction, electroporation, transfection. Students will also know about protoplast and spheroplast fusions etc. 5) Students will also know about Archaebacteria and will be able to understand Archaebacterial genetics.
5401-23	Medical Microbiology	1) Students will gain knowledge regarding various microbial diseases - etiology, epidemiology, prevention and control and diagnostic techniques. 2) Students will also have knowledge about how immune responses are given by host to viral, bacterial and fungal infections and to tumors. 3) Students would also have knowledge regarding role of HLA antigens in transplantation and graft rejection. Students will be able to understand abnormal manifestations of immune response in the form of autoimmune diseases. 4) Students will also gain knowledge regarding immune deficiency diseases. 5) Students will gain knowledge regarding recently emerged viral diseases like Ebola, Swine-flu.

5401-24	Fundamentals for Communications Skills, Scientific Writing and Presentation	1) Students would know the fundamentals of computer hardware & software. 2) Students will become well versed with how to write and publish the scientific paper/ document. 3) Students shall gain information about communication cycle, types of communication, verbal &nonverbal communication, writing skills.
5401-25	Practical Course III	1) Students will be able to perform and know the applications of various serological diagnostic tests viz. RA, ASO, CRP, SLE etc. 2) Students will be able to carry out immobilization of enzymes, microbial cells. 3) Students will be able to study the various growth patterns of microbial cells
5401-26	Practical Course IV	1) Upon competition of this course students will be able to carry out independently isolation of DNA as well as plasmids from bacteria and yeasts. 2) Students will be able to perform the isolation of drug resistant and nutritionally deficient mutants.
02	Skill Enhancement Compulsory Course (SECC) **A Soft Skills and Personality Development**	1) Students will be able to set their goals and plan for career. 2) Students will learn how to cope up with the stress rescuing from conflicts. 3) Student will enhance their communicative abilities and presentation skills.

M. Sc. Pharmaceutical Microbiology Semester III

Subject Code	Name of the Course (Subject)	Course Outcomes
5401-31	Immunology	1) Students will able to describe components of immune system and how cells and organs of immune system play and important role in immune responses of the host. 2) Students will also gain the knowledge regarding immunodeficiency diseases.
5401-32	Fermentation Technology and Process Design	1) Students will be well versed with the screening techniques, Microbial assays, Primary & secondary metabolites. 2) Students will gain the knowledge of design of fermentors, types of fermentors , equipments, instruments used, sterilization processers. 3) Students will be well versed with fermentation media, inoculum preparation, Scale up processes and with the various downstream processes of fermentation industries.
5401-33	Microbial diversity and Extremophiles	1) Students will have the knowledge of extreme environments and the microbes of extreme environments 2) Students will acquire knowledge on some of the remarkable physiological adaptations that helps microorganisms to succeed in extreme conditions. 3) Students will have the knowledge of the origin and diversity of microbes adapted to extreme environments. 4) Students will have the knowledge of biotechnological applications of extremophiles. 5) Students will be well versed with the various types of microbial interaction that occur in nature. 6) Students will know about the diversity of microorganism.
5401-34	Bioinformatics	1) Students will acquire the knowledge of computers, operating system, internet resources. 2) Students will get introduced with tools and techniques of information technology, Metabolimics and Phylogenetic analysis . 3) Students will acquire the knowledge of biological databases, Methods of sequence alignment, Genomics and Proteomics 4) Students will get introduced with basic of 'C' language and structured query language. 5) Students will get introduced with protein structure prediction and drug designing.
5201-35	Practical Course V	1) Students will be able to carry out physicochemical analysis of milk and food 2) Students will know how to carry out the microbiological examination of food, milk and milk products.

		3) Students shall be able to independently search, store, retrieve and analyze the biological data 4) Student will get acquainted with all the basic background needed for working in Food and Dairy industry.
5201-36	Practical Course VI	1) Students will be able to demonstrate various microbial interactions such as commensalism, ammensalism , mutualism etc. 2) Students will be able to screen out industrially important microbial strains like organic acid producers, antibiotic producers, protease producers, enzyme producers. 3) Students will be able to determine BOD and COD removal efficiency of waste water treatment plant 4) Students will be able to produce biofertilizer(Azo, Rhizo) on the laboratory scale. 5) Students will be able to work in fermentation industry particularly in production units, micro-labs and Quality Control departments.
03	Ability Enhancement Compulsory Course (AECC) **Leadership Development**	1) Students will learn how to do the team work. 2) Students will be ableto take wise and prompt decision making ability. 3) Student will be able to handle the workload effectively.

M. Sc. Pharmaceutical Microbiology Semester IV

Subject Code	Name of the Course (Subject)	Course Outcomes
5401-41	Enzymology	1) Student would able to describe structure, functions and the mechanism of action of enzymes, kinetics of enzyme catalysed reactions and enzyme inhibitions and their regulatory process. 2) Students would have the knowledge of immobilization of enzyme and exposure of wide applications of enzymes and future potential uses of enzymes. 3) Students would be well versed with kinetics of soluble and immobilized enzymes. 4) Students would gain the knowledge of enzyme catalysis, isoenzymes, multi enzymes and multi enzyme complexes.
5401-42	Quality Management and IPR	1) Students will have knowledge about the process of patent filling and patent infringement. 2) Students will have knowledge about the patent design. 3) Students will have knowledge about the rules and regulations of biosafety.
5401-43	Genetic Engineering	1) Students would have the knowledge of basic principles and methods of recombinant DNA technology. 2) Students will get thorough knowledge about construction and screening of genome libraries and c DNA libraries. 3) Students will get a thorough knowledge about advanced techniques used in rDNA technology like PFGE, RFLP, RAPD etc. 4) Students will acquire knowledge about applications of recombinant DNA technology in the field of medicine and industry 5) Students will have the basic understanding of gene therapy systems, protein engineering and metabolic engineering 6) Students will also have a insight into the ethical issues involved in genetic engineering
5401-44	Pharmaceutical Microbiology	1) Students will gain the knowledge regarding Drug discovery and drug development 2) Students will get knowledge about production of various types of enzymes, amino acids, vitamins, and organic acids. 3) Students will have a deep insight into the antimicrobial agents and their mode of action.
5401-45	Practical Course VII	1) Students will acquire knowledge and skills of enzymatic assays – protease, lipase, cellulase, pectinase , chitinase, glucose oxidase and would able to carry out enzymatic assays independently in the laboratory. 2) Students will be able to perform independently DNA restriction digestion and DNA ligation techniques and PCR techniques. 3) Students will get conversant with the use of PCR techniques through the demonstration. 4) Students will be able to perform enzyme kinetics.

5401-46	Project Work	After completion of project work, writing project report and presentation of project work student will be well versed with: 1) How to select the project topic. 2) How to make literature survey. 3) How to set up experimental design to investigate the problem and able to record and interpret the results. 4) How to write the project report in the proper format – Title, Introduction, Aims & Objectives, Materials & Methods, Results & Discussion, Summary and Conclusion. 5) How to cite references and to prepare bibliography. 6) How to write acknowledgements. 7) How to present and defend the project report orally. 8) Students will have all the basic knowledge of writing a scientific paper in proper format.
5401-47	Vocational Training (Industrial Training)	1) Students will get hands-on training to work in the reputed industries before getting placed. 2) The students will be exposed to all the industrial work culture so as to adopt all the skills required for working in the industry. 3) The students will be imparted with the knowledge of soft skills, communication skills, professional attitude while working in the industries.
04	Skill Enhancement Compulsory Course (SECC) **Biotechnology Data Care Management (02 Credits)**	1) Students will get the knowledge of types of databases and their data formats. 2) Students will learn the importance of various omics, data generation techniques, data management strategies