



மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்
MANONMANIAM SUNDARANAR UNIVERSITY

**SYLLABUS FOR DIPLOMA IN PRE-MEDICAL SCIENCE PROGRAM
OFFERED THROUGH DIRECTORATE OF VOCATIONAL EDUCATION (COMMUNITY
COLLEGES AND VOCATIONAL SKILL DEVELOPMENT CENTRES) FROM 2019 -
2020**



கல்விசார் நிலைக்குழுக் கூட்டம்

**MEETING OF THE STANDING COMMITTEE ON
ACADEMIC AFFAIRS HELD ON WEDNESDAY
THE 22nd JANUARY 2020**

DIPLOMA IN PRE-MEDICAL SCIENCE

முன்மருத்துவ அறிவியல் பட்டயம்

SCHEME OF EXAMINATION

Subject code	Title of the Paper	Credit	Hours	Passing Minimum
Semester I				
C19PM11/E19PM01	Anatomy and Physiology	6	90	40/100
C19PM12/E19PM02	Microbiology/Immunology	6	90	40/100
C19PM13/E19PM03	Medical Physics	6	90	40/100
C19CE10/E19CE10	Communicative English	6	90	40/100
C19PMP1/E19PMP1	Practical I-Physics / Organic Chemistry – LAB	4	120	40/100
Semester II				
C19PM21/E19PM04	Organic Chemistry / Bio-Chemistry	6	90	40/100
C19PM22/E19PM05	Biology / Medical Ethics	6	90	40/100
C19LS23/E19LS05	Life skill	6	90	40/100
C19PM24/E19PM06	Histology & Cell biology	6	90	40/100
C19PMP2/E19PMP2	Practical II-Biology /Cell-Biology LAB and Internship	8	120	40/100

Eligibility for admission: Pass in 12thstd examination conducted by the Govt. of Tamil Nadu Board of Secondary Education, Government of Tamil Nadu or any other equivalent examination.

Examination: Passing Minimum for each paper is 40%. Classification will be done on the basis of percentage marks of the total marks obtained in all the papers and as given below:

40 % but less than 50 % - Third class
 50 % but less than 60 % - Second class
 60 % and above - First class

Theory Paper

Internal Marks-25

External Marks-75

First Semester:-

Paper I - Anatomy and Physiology
 Paper II - Microbiology/ Immunology
 Paper III - Medical Physics
 Paper IV - Communicative English
 Paper V - Practical I-Physics/Organic Chemistry – LAB and Internship

Second Semester:-

- Paper VI - Organic Chemistry / Bio-Chemistry
- Paper VII - Biology / Medical Ethics
- Paper VIII - Life Skill
- Paper IX - Histology & Cell biology
- Paper X - Practical II-Biology /Cell-Biology LAB

(Semester Pattern for Community College Only)*SCOPE OF THE SUBJECT**

Pre-medical Sciences is an educational track a candidate can pursue after his school education prior to enroll into health science programs across USA, Canada, Europe, Caribbean, Australia and few countries in South East Asia. It involves activities that prepare a student for medical, veterinary, nursing or pharmacy schools, such as pre-med coursework, volunteer activities, clinical experience, research, and the application process for entry into a variety of first professional degree or graduate school programs that require premedical prerequisites. Medical Council of India also recommends such one year program post schooling for their entry into MBBS education in India.

ELIGIBILITY

He/she shall complete the age of 17 years on or before 31stDecember, of the year of admission He/she has to pass in the qualifying examination as under the higher secondary examination or the Indian School Certificate Examination which is equivalent to 10+2 Higher Secondary Examination after a period of 12 years study, the last two years of study comprising of Physics, Chemistry, Biology and Mathematics or any other elective subjects with English.

Candidate for admission to Diploma in Premedical Science course must have passed in the subjects of Physics, Chemistry, Biology & English individually and must have obtained a minimum of 50% marks taken together in Physics, Chemistry, and Biology at the qualifying examination (+2 or Intermediate or Pre-University). In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or Other Backward Classes, the marks obtained in Physics, Chemistry and Biology taken together in qualifying examination be 40% instead of 50% as above.

International students are also eligible to apply after A level of schooling or equivalent in their respective countries.

DURATION & INTAKE

The duration of the program is 12 months inclusive of seven core subjects and three practical's. The intake and selection of applicant is competitive and based on the eligibility criteria. There is no enrollment cutoff in number of enrollment.

Semester I

Course I

(C19PM11/E19PM01)ANATOMY AND PHYSIOLOGY

LEARNING OBJECTIVES

- To educate on the basic anatomy and physiology concepts
- To provide foundations for students in identifying the structure, function and clinical considerations of all the systems, including integumentary system, muscular system, bone system, nervous system, sensory organs, endocrine system, cardiovascular system, lymphatic system, respiratory system, digestive system, urinary system, reproductive system

LEARNING OUTCOMES

Upon completion of the course the students should be able to

- Use anatomical terminology to identify and describe locations of major organs of each system covered.
- Explain interrelationship among cellular, tissue and organ functions in each system
- Describe the interdependency and interactions of the systems.

UNIT I - Introduction To The Human Body

18 Hrs

Organization of the body- Anatomy and physiology, the levels of structural organization that make up the human body, homeostasis and disease, negative and positive feedback mechanisms to maintain homeostasis.

Cellular physiology- Cell structures and functions, maintaining homeostasis, cell to cell communication. **Skin and appendages-** Layers of the skin, accessory structures of the skin, functions of the integumentary system, disease and disorders of the integumentary system.

UNIT II - Anatomy And Physiology of Cells

18 Hrs

The cellular level of organization- Cell cycle check point, DNA replication, protein synthesis, cell growth and division, cellular differentiation.

Articulations- Bone tissue and the skeletal system. The functions of the skeletal system, Bone classification, Bone structure, Bone formation and development. **Calcium Homeostasis:** Interactions of the skeleton system and other organ systems, Axial skeleton, the appendicle skeleton, classification of joints, synovial joints. Disorders of cells and tissues.

UNIT III

18 Hrs

Anatomy and Physiology of Muscular, Nervous, Endocrine & Cardiovascular Systems

Muscular system - Overview of muscle tissues, cardiac muscle tissues and smooth muscles, skeleton muscles with associated diseases.

Nervous system – Anatomy and Physiology of Central Nervous System , Peripheral Nervous system Brain and Spinal cord with associated diseases.

Endocrine system- Location, relations, blood supply, nerve supply and lymphatic drainage of all glands with associated diseases.

Cardiovascular System- Normal position, external features, internal features, chambers blood vessels, venous drainage structures and disorders of heart.

UNIT IV

18 Hrs

The Lymphatic, Immune, Respiratory, Digestive & Genito-Urinary Systems

Lymphatic System - Gross anatomy of the major lymphatic, Location of the major groups of the lymph nodes with associated diseases.

Immune system - Immune system anatomy immune response against pathogens, disorders and various metabolisms.

Respiratory system - Structural Mechanism blood supply, nerve supply, lymphatic drainage position, Parts relation of lungs and associated Structure & Diseases.

Digestive System - Structure position relation blood supply nerve supply, lymphatic drainage of GIT with associated diseases.

Genito-Urinary system - Part position relation blood supply nerve supply, lymphatic drainage of Genito - Urinary system with associated diseases.

UNIT V

18 Hrs

The Special Senses (a) Gross Anatomy

(i) Eye ball, extra ocular muscles their nerve supply and actions (s) (ii) Ear (iii) Nose (iv) Tongue, its musculature blood supply and lymphatic drainage: Structure and functions of different senses, taste, smell, hearing and equilibrium, ear, physiology of hearing, organ of corti, physiology of equilibrium, Sight-eye, orbital cavity, eye lids, eye ball, retina, lens, rods and cons, pathways of vision, touch - skin, appendages of skin, glands, pain-nerve endings.

REFERENCE

- Guyton & Hall Textbook of Medical Physiology by John E.Hall. 12 th Edition. 2010.
- Gray's Anatomy for Students International Edition by Drake, 2014.
- Cunningham's Manual of Practical Anatomy G.L.Romanes Vols.I, II & III. Oxford University Press, 15th Edition (1996).
- Pathologic basis of diseases by Robbins and Cotran's. Volume 1& 2, 2014.

Course II

(C19PM12/E19PM02)INTRODUCTION TO MICROBIOLOGY AND IMMUNOLOGY

LEARNING OUTCOMES

The course in microbiology, describe how bacteria, fungi, protozoa and virus are built-up - have knowledge of the physiology of microbes and metabolism and genetic characteristics. To explain which strategy one using oneself of at drug treatment of infections caused by pathogenic microorganisms and the mode of action for drugs that are used at treatment of infections - carry out diagnostic tests for demonstrating of bacteria and susceptibility testing and be able to carry out a study of different bacteria tolerance against antibiotics.

On completion of the course in immunology, the student should be able to - account for how the different components of the immune system are formed and function and how they interact with one another to protect the individual against various types of foreign antigen - account for which recognition mechanisms the immune system utilises to identify and different between endogenous and foreign subjects.

CONTENT

The course in microbiology intends to provide knowledge of growth of microorganisms the structure and function of the immune system, relations between microorganisms and their hosts, impact of anti-infection drugs and development of new drugs. The course in immunology intends to provide knowledge about how the immune system is structure and the different strategies the immune system can use to protect the individual to protect the individual against various types of pathogens.

UNIT I

18 Hrs

HISTORY OF MICROBIOLOGY

Basic concepts- Spontaneous generation, Germ theory of diseases, Cell theory. Contributions of Antonie van leuwenhoek, Joseph Lister, Robert Koch, Louis Pasteur, Edward Jenner, Alexander Flemming. Development of pure culture methods. Cell ultra structure: Peptidoglycan structure and synthesis. Cytoplasmic matrix and components: Inclusion bodies.

UNIT II

18 Hrs

CULTURING OF MICROBES

Microbiological media, composition and types: selective and differential media Growth curve and growth kinetics. Influence of environmental factors for microbial growth. Nutritional groups of bacteria: Protein estimation- Maintenance and Preservation of cultures. Over view of Bacterial taxonomy- Bergey's manual of Systematic Bacteriology.

UNIT III

18 Hrs

ENUMERATION OF MICROBES

Definitions & Principles of Sterilization and disinfection- Methods of sterilization- Physical methods; Heat, Filtration, Radiation and Chemical methods; Ethanol, iodine solution, H₂O₂, Sodium Permanganate etc. Control of Sterilization and Testing of sterility. overview Estimation of Microbes- Direct Microscopic count, Turbidometric assay, TVC- Indirect Method- CO₂ liberation. Enumeration of Microbes; Serial Dilution Method, Microscopical Method and Plating Method. Microscope- Principles, Light microscope, Phase Contrast, Dark field, Bright field, Fluorescent, Interference microscope (Stereo microscope), Confocal, Inverted microscope, and Electron microscope (TEM and SEM). Measurement of Microorganisms- Micrometry. Staining- Simple, Gram, Acid Fast & Spore staining.

UNIT IV

18 Hrs

Historical perspectives in Immunology, Host-pathogen interactions, Introduction to the Immune System, Types, Cells and Organs of the Immune system

UNIT V

18 Hrs

Cell mediated Immune responses, Humoral immune responses, Immunologic tolerance, autoimmunity, Immunodeficiency & Immune therapy.

Text Book

- Basic Immunology: Functions and disorders of the Immune system, Abul K abbas, Andrew H Lichtman and Shiv Pillai, 3rd edition, 2009.
- Michael J. Pelczar, Jr. E.C.S. Chan, Moel: Microbiology Mc Graw Hill Book R. Krieg, 1986.

Reference Book

- Prescott, L.M J.P. Harley and C.A. Klein 1995. Microbiology 2nd edition Wm, C. Brown publishers.
- Immunology, Kuby, by Kindt, Goldsby, Osborne, Sixth Edition. 2007.
- Immunobiology, The Immune system in Health and Disease, Seventh Edition by Janeway, Travers et al, Garland Publishing, 2008.
- Immunology by Roitt's. 11th Edition. 2006.

Course III

(C19PM13/E19PM03)MEDICAL PHYSICS

OBJECTIVE OF THE COURSE

This Medical Physics course has been designed to teach physics to students who have career interests in biology, medicine and other life sciences. The main purpose is to provide an opportunity to learn practical applications of physics.

LEARNING OUTCOMES

A student with ultimate interest in medicine, after completing this course, is anticipated to be able to understand very clearly the concepts of: Medical physics is a discipline concerned with

- Application of physical concepts and methods to the understanding of human body.
- Introduction of new and more precise techniques into the investigation and treatment.
- Ensuring the availability and use of resources of physics in day –to –day medical field
- At the end of the course the student must have an in depth knowledge in the field of medicine.
- Have an understanding about the radiation applications in diagnosis and treatment and its impact on health care and health care delivery.

UNIT I

18 Hrs

INTRODUCTION AND BASIC MEDICAL PHYSICS

Branches of Physics, basic measurements, units, scalar, vector and its types, concepts of force and mass, Newton's three laws, types of forces, uniform circular motion, centripetal acceleration, work and energy, introduction of Medical Physics- key activities of medical physicist & areas of specialty. Common temperature scales, Kelvin temperature scales, Types of thermometers, Thermal expansion, Transfer of heat. Nature Of waves, periodic waves, nature of sound, speed of sound, sound intensity, decibels, the Doppler effect, application of sound in medicine (Ultrasound, cavitron ultrasonic surgical aspirator, bloodless surgery with HIFU Doppler flow meter), Sensitivity of the human ear.

UNIT II

18 Hrs

MECHANICAL PROPERTIES OF FLUIDS

Pressure due to a fluid column; Pascal's law and its applications (Hydraulic lift and Hydraulic brakes). Effect of gravity on fluid pressure. Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity. Bernoulli's theorem and its applications. Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.

UNIT III**18 Hrs****FIBRE OPTICS AND OPTICS**

Mirror, Lenses and Optical Instruments: Reflection of light, plane mirror, spherical mirror, mirror equation, magnification equation, Snell's law and refraction of light, total internal reflection, lenses, formation of images by lenses, magnification equation, Physiological working of Human eye, defect and correction of vision, Compound microscope.

Fiber Optics and Holography Fundamental ideas about optical fiber, Types of fibers, Acceptance angle and cone, Numerical aperture, Propagation mechanism and communication in optical fiber. Attenuation, Signal loss in optical fiber and dispersion. Basic Principle of Holography, Construction and reconstruction of Image on hologram and applications of holography.

UNIT IV**18 Hrs****NUCLEAR PHYSICS AND RADIOACTIVITY**

Rutherford scattering and the nuclear atom, Pauli's Exclusion principle, x-rays, laser, medical application of the laser, nuclear structure, mass defects of the nucleus and nuclear binding energy, radioactivity, radioactive decay, radiation detectors, biological effects of ionizing radiation, nuclear fission, nuclear reactors, nuclear fusion, elementary particles (MRI, CT SCAN, Gamma camera, Pulse Oximeter) Visible, UV and IR Spectroscopy, X-Rays and Laser, Raman and NMR Spectroscopy, EEG, ERG, ECG, MEG, Gas Chromatography and Mass Spectrometry, Analyzing Instruments.

UNIT V**18 Hrs****INTRODUCTION TO BIOPHYSICS**

Nucleotides, Amino acids, Single letter code of amino acids, Sequences of DNA, RNA and Protein molecules, Pair wise and Multiple alignment of DNA, RNA and Protein molecule, Mutation, SNPs, Structure of proteins: Primary, Secondary, Tertiary Proteins-legand binding mode of action of Penicillin, Tetracycline, Actinomycin D & Doxorubicin.

REFERENCES

- Physics 9th Edition 9thth Edition by John D. Cutnell, Kenneth W, Jan 2015.
- Physics, 10th Edition John D. Cutnell, Kenneth W. Johnson, David Young, Shane Stadler, 2015.
- The essential Physics of Medical Imaging; Jerrold. T. Bushberg et.al, Lipcontt Williams & Wilkins 2002.
- Fundamentals of Optics by Jenkins A Francis and White E Harvey, McGRaw Hill Inc., New Delhi, 1976.
- Nucleic Acid structure by S. Neidle (ed.) (1987) VCH Publishing, Weinheim.
- Biophysics and Biophysical Chemistry by Debajyoti Das (1987), Academic Press

COURSE IV

(C19CE10/E19CE10) Communicative English

1. **Basic Grammar:**

- a. Review of grammar
- b. Remedial study of grammar
- c. Simple sentence
- d. Word passive voice etc.

2. **Bubbling Vocabulary:**

- a. Synonyms
- b. Antonyms
- c. One – work Institution

3. **Reading and Understanding English**

- a. Comprehension passage
- b. Précis – writing
- c. Developing a story from hints.

4. **Writing English**

- a. Writing Business letters.
- b. Paragraph writing
- c. Essay writing
- d. Dialogue writing

5. **Speaking English**

- a. Expressions used under different circumstances
- b. Phonetics

- Reference :**
1. V.H.Baskaran – “English Made Easy”
 2. V.H.Baskaran – “English Composition Made Easy”
(Shakespeare Institute of English Studies, Chennai)
 3. N.Krishnaswamy – “Teaching English Grammar”
(T.R.Publication, Chennai)
 4. “Life Skill” – P.Ravi, S.Prabakar and T.Tamzil Chelvam,
M.S.University, Tirunelveli.

Course V

Practical II

(C19PMP1/E19PMP1)PHYSICS/ORGANIC CHEMISTRY PRACTICALS

A) PHYSICS

1. Use of Vernier Callipers

(i) To measure diameter of a small spherical/cylindrical body.

(ii) To measure dimensions of a given regular body of known mass and hence find its density.

(iii) To measure internal diameter and depth of a given beaker/calorimeter and hence find its volume.

2. Use of screw gauge

(i) To measure diameter of a given wire, (ii) to measure thickness of a given sheet

3. To determine radius of curvature of a given spherical surface by a Spherometer.

4. Using a simple pendulum, plot L-T and L-T² graphs. Hence find the effective length of second's pendulum using appropriate graph.

5. To find resistance of given wire using meter bridge and hence determine the specific resistance of its material.

6. To verify the laws of combination (series/parallel)of resistance using a meter bridge.

7. To find the focal length of a convex lens by plotting graphs between u and v or between 1/u and 1/v.

8. To find the focal length of a convex mirror, using a convex lens.

9.To find the focal length of a concave lens, using a convex lens.

10.To draw the I-V characteristic curve of a p-n junction in forward bias and reverse bias.

11.To draw the characteristic of a zener diode and to determine its reverse break down voltage.

12.To study the characteristics curve of a common – emitter npn or pnp transistor and to find out the values of current and voltage gains.

CHEMISTRY

1. Experiments related to pH change

- Determination of pH of some solutions varied concentrations of acids, bases and salts using pH paper or universal indicator.
- Comparing the pH of solutions of strong and weak acid of same concentration.
- Preparation of buffers.

2. Chromatography

- Separate the colored components present in the mixture of red and blue inks by ascending paper chromatography and find their R_f values.

3. Preparation of Organic Compounds

Preparation of any three of the following compounds

- i) Acetanilide
- ii) Di-benzal acetone
- iv) Aniline yellow or 2 - Naphthol aniline dye.
- v) Iodoform
- vi) Aspirin

4. Tests for the functional groups present in organic compounds:

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (primary) groups.

5. Detection of nitrogen, sulphur, Chlorine, bromine, and iodine in an organic compound.
6. Characteristic tests of carbohydrates and proteins in pure samples and their detection in given food stuffs.
7. Characteristic tests of proteins in pure samples and their detection in given food stuffs.
8. Preparation of normal, molar, percent solutions and ppm.
9. Titrimetric analysis of Vitamin C.
10. Laboratory Accidents and First Aid

Semester II

Course VI

(C19PM21/E19PM04)ORGANIC CHEMISTRY & BIOCHEMISTRY

Learning Objectives:

This Organic Chemistry Course has been designed to teach organic chemistry to students who have career interests in biology, medicine and other life sciences. The main purpose is to provide an opportunity to learn practical applications of organic chemistry

A student with ultimate interest in medicine, after completing this course, is anticipated to be able to understand very clearly and she/he should be able to apply this knowledge of chemistry in the safe and cautious practice of medicine.

Learning Outcomes:

- Organic Chemistry provides training for students planning careers in the Medicines.
- The curriculum of the Department is designed to satisfy the diverse needs of these students.
- The student will be able to: name salts, acids, bases and covalent compounds and provide formulas for these given a molecular formula determine whether a bond is metallic, ionic, covalent or polar covalent.
- Identify and name the organic functional groups in a molecule.
- Naming organic compounds.
- Structure, function and interrelationship of bio molecules

UNIT I

18 Hrs

Organic Compounds- Nomenclature and Purification

Aliphatic Organic compounds, Saturated and unsaturated compounds, Aromatic compounds, Alicyclic compounds, Heterocyclic compounds, Naming practice for Bond line structure. Lewis dot structure. Purification of Organic compounds- Crystallization, Sublimation, Distillation, Steam distillation, Extraction with a Solvent, Chromatography, Test of Purity.

UNIT II

18 Hrs

Organic Compounds -Reactions:

pH, Buffer, Acid and Bases, Zwitter ion. Preparation, Properties and uses- Alkane, Alkene, Alkyne, Aldehydes and ketones, Amines, Acids, phenols and Aryl Halides.

UNIT III

18 Hrs

Chemotherapy

Drugs-Classification of drugs: Organometallic drugs, Antipyretics & analgesics, Antimalarials & Antiprotozoals, Antiseptic & antifungals, Antibacterials & antibiotics.

UNIT IV

18 Hrs

Biomolecules - Carbohydrates and Proteins

Carbohydrate-Definition, Classification, Monosaccharide and their inter relationship, structure of sugar, Important derivatives of Monosaccharide, Disaccharides, and Trisaccharides, (Glucose, Fructose). Structure occurrence and biological importance of structural polysaccharides.

Proteins- Definition- Classification, source and functions of Common protein like egg albumin, insulin, casein, collagen, keratin, hemoglobin, test for proteins, Amino acid- Classification and formulae, Proteinaceous and non-Proteinaceous, Essential and Non-essential amino acids.

UNIT V

18 Hrs

Biomolecules-Lipids and Nucleic acids

Lipids- Definition and classification of lipids. Classification of fatty acids, physio-chemical properties of fatty acids, separation, distribution and characterization of fatty acids. Saponification and iodine number. Role of Lipids in cellular architecture and functions.

Nucleic acids- Structure and general composition of nucleic acids. Importance of nucleic acids in living system, Watson and crick model for DNA. Types of DNA and RNA.

Text Books:

- R. T. Morrison and R. N. Boyd, *Organic Chemistry*, 6th Edition, Printice-Hall Of India Limited, New Delhi, 1992.
- B. Y. Paula, *Organic Chemistry*, 3rd Edition, Pearson Education, Inc.(Singapore), New Delhi, reprint, 2002.
- T. W. Graham Solomons, *Organic Chemistry*, 6th edition, John Wiley and sons, 1996.
- Jerry March, *Advanced Organic Chemistry*, 4th Edition, John Wiley And Sons, New York, 1992.
- Francis A. Carey, *Organic Chemistry*, 3rd edition, Tata-McGraw Hill Publications, New Delhi, 1999.
- Lehninger Principles of Biochemistry (2012) by David L. Nelson and Michael M.Cox.CBS Publishers and distributors.
- Biochemistry (2015) by Jeremy M. Berg and John L.Tymocz. W.H.Freeman; 8 edition.

Course VII
(C19PM22/E19PM05)BIOLOGY & ETHICS

LEARNING OBJECTIVE

The course consists of complete knowledge of biological facts and functional organization of the life on earth. To elucidate the structure and functions of the cell organelles; to exemplify the concept of genetics, the principles of inheritance and the role of genes in determining characters; to understand the application of the innovative technology to manipulate living organisms or parts of organisms to make products useful to human.

On completion of the course in Ethics, the students should be able to learn about the basics of medical ethics and be oriented with the various interesting cases that would guide the student to follow ethical medical practice. Ethical and legal questions that confront patients, families, health professionals, attorneys, judges and policy makers will be explored by studying cases in detail to understand the value conflicts that arise and difficult decisions that must be made. The cases are analyzed from interdisciplinary and inter professional perspectives. Insights from philosophy, history, law, psychology, religion and public policy will be combined with examination of the professional roles and responsibilities of health professionals.

LEARNING OUTCOMES

At the end of this course, the student is expected to able to know and understanding on

- Major concepts of biological science.
- To use biological instrumentation and proper laboratory techniques.
- Students will able to recognize the relationship between structure and function at all levels: Molecular, cellular and organism.
- Organization of human body.
- To equipped with adequate knowledge so as to make ethically acceptable decisions in his/ her professional career.

UNIT I

18 Hrs

CELLULAR ORGANIZATION & BIOMOLECULES

Characteristics of living things- Theories on the origin of life- Overview of Prokaryotic and eukaryotic cells - Variation in cell size and shapes, organization and function-Cell wall and Cell organelles.

UNIT II

18 Hrs

BASIC CONCEPTS OF BIO MOLECULES AND STRUCTURAL BIOLOGY

Bio molecules and their significance - Carbohydrates, Proteins, Amino acids, Nucleic acids and Lipids; Classification and Structures of Carbohydrates; Classification and Structures of Proteins - Primary, Secondary, Tertiary and Quaternary; Classification, Structure and Function of Lipids and Fatty acids; Nucleic acids- Structure of DNA and RNA and function.

UNIT III**18 Hrs****INTRODUCTION TO GENETICS AND DISORDERS**

Simple Mendelian traits in man; Multiple alleles - ABO blood groups in man problems; Rh-factor in human- Erythroblastosis foetalis; Sex linked inheritance in man-Haemophilia, Colour blindness and Hypertrichosis; Non disjunction and Syndromes in man- Klinefelter's syndrome, Turner's syndrome and Down's syndrome; Inborn errors of metabolism in man- Phenylketonuria, Alkaptonuria and Albinism.

UNIT IV**18 Hrs****ORGANIZATION OF HUMAN BODY**

Digestion and Excretion: Digestion, Absorption, Mammalian kidney - Urine formation- waste elimination; Blood and Circulation: Composition of Blood- Blood groups- Function- Structure of mammalian heart; Respiration in Mammals: Transport of Gases - Exchange of Gases - Neural and Chemical regulation of respiration; Nervous system and sense Organs: Nerve conduction-synapse- Neurotransmitters- Neurons-Central and Peripheral Nervous system; Functional morphology of Reproductive organs: Gametogenesis.

UNIT V**18 Hrs****MEDICAL ETHICS**

Introduction, Autonomy, Competence, and decision making capacity. Informed Consent and Malpractice, Beneficence, Non- maleficence, Living will, End-of-Life Issues. The Doctor and Society, Doctor/Doctor Relationships, Reproductive Issues, Doctor / Patient relationship. Reportable Illnesses, HIV-Related Issues, STDs, Confidentiality and Medical Records, Organ and Tissue Donation. Experimentation, Famous Cases.

REFERENCE

- Biology: Life On Earth By Teresa Audesirk/ Gerald Audesirk/ Bruce E. Byers . Published By Prentice Hall – Edition 7 – 2005
- Biology: Life On Earth With Physiology (11th Edition) 10th Edition By Teresa Audesirk/ Gerald Audesirk/ Bruce E. Byers . ISBN-13: 978-0321794260 (2015).
- Biology by Sylvia Mader (Author), Michael Windelspecht 12th Edition (2015) ISBN-13: 978-0078024269
- Practical decision making in health care ethics: cases and concepts - by Raymond. J. Devettere. 1995.
- Ethics in Medicine - by Milton. D. Heifetz. 1996.
- 100 Interesting cases in Medical Ethics- by Conrad Fischer. 2006.

Course VIII
(C19LS23/E19LS05) LIFE SKILL

I Life Coping or adjustment

- (a) External and internal influence in one's life
- (b) Process of coping or adjustment
- (c) Coping with physical change and sexuality
- (d) Coping with stress, shyness, fear, anger for life and criticism.

II Attitude

- (a) Attitude
- (b) Self acceptance, self – esteem and self actualization
- (c) Positive thinking

III Problem Solving

- (a) Goal Setting
- (b) Decision Making
- (c) Time Management and stress Management.

IV Computers

- (a) Introduction to Computers
- (b) M.S.Office
- (c) Power Point

V Internet

- (a) Introduction to internet
- (b) E – mail
- (c) Browsing

References:

- 1) Life Skill Programme course I & II by Dr. Xavier Alphona MCRDCE Publications. R.K.Mutt Road, Chennai – 28
- 2) ஆளுமை பண்பு வளர்த்தல் மற்றும் தகவல் தொடர்பு by M.Selvaraj Community College, Palayamkottai
- 3) “Life Skill” –P.Ravi, S.Prabakar & T.Tamil Chelvam, M.S. University, Tirunelveli

Course IX

(C19PM24/E19PM06)INTRODUCTION TO HISTOLOGY & CELL BIOLOGY

OBJECTIVE OF THE COURSE

This course is taught as an interdisciplinary course and is aimed to provide a broad foundation of knowledge in cell and tissue biology. The course attempts to present the information in a manner that will serve as an effective building block for understanding the cellular basis of pathology, physiology, endocrinology and other medical science subjects.

LEARNING OUTCOMES

Towards the end of the course the outcome should reveal the students knowledge and understanding on

- Tissues as Building Blocks
- Understanding Development and Evolution
- Easily recognize different types of tissue
- Predict and understand organ behavior and function
- Provides important insight into the development of disease.

UNIT I

18 Hrs

INTRODUCTION TO HISTOLOGY

Microscope: Physical properties of light – reflection, transmission, absorption, refraction, diffraction, concepts in microscopy- resolution, contrast, magnification, sensitivity. Light microscopes – Compound microscope, Dark field microscope, Phase contrast microscopy, Fluorescent microscope and Confocal microscope. Sample preparation for light microscope - fixation, staining, and histological techniques. Electron microscope - SEM, TEM – Sample preparation for electron microscope.

UNIT II

18 Hrs

CELL STRUCTURE AND TISSUES

Cell membrane, Cell organelles, Nucleus, Chromosomes and Cell division. Tissues- Classification, Functions of Epithelia & Glands. Connective tissue- Intercellular Ground substance, Fibres, Cells, Blood and Adipose tissue.

UNIT III**18 Hrs****CARTILAGE, BONE, MUSCLE AND NERVOUS TISSUE**

Hyaline, Fibro and Elastic Cartilage. Bone- Basic fact Bone, Structure, Formation of Bone, Blood supply of Bone. Muscle- Skeletal, Cardiac & Smooth Muscle. Nervous- Neuron Structure, Tissues in Nervous system, Peripheral Nerves, Sensory Receptors, Neuromuscular junctions and Neuroglia.

UNIT IV**18 Hrs****ORGANS ASSOCIATED WITH DIGESTIVE TRACT**

The teeth, the tongue, Salivary glands, the Oesophagus, the stomach, the small intestine, the large Intestine, Endocrine cells of the gut, the liver & the pancreas.

UNIT V**18 Hrs****RESPIRATORY, CARDIOVASCULAR AND URINARY SYSTEM**

Nasal cavities, Pharynx, Larynx, Trachea, Bronchi and lungs. Cardiovascular system- Arteries, Arterioles, Veins, Venules, Capillaries, Sinusoids and Heart. The Kidneys-Basic structure, Ureters, Urinary bladder and Urethra. Skin-Structure, Cell types, Function and Appendages of the skin- Hairs, Nails and Glands. The Kidneys-Basic structure, Ureters, Urinary bladder and Urethra. Skin-Structure, Cell types, Function and Appendages of the skin- Hairs, Nails and Glands.

REFERENCE

- Histology: A text & atlas, 3rd edition (1995), M.H. Ross, E.& L.J Williams & Wilkins Romell, G.I. Kaye.
- Atlas of Histology with functional correlation. Di Fiore's International Edition 9th (2000).
- Textbook of Human Histology (4th Edition) Inderbir Singh Jaypee Brother, 2002.
- Basic Concepts In Cell Biology & Histology: A Student's Survival Guide I by Robert Klein/ James C. McKenzie – Published by McGraw-Hill/ Appleton & Lange – Edition 1 - ISBN: 0-0703-6930-5.

Course X

Practical II

(C19PMP2/E19PMP2)BIOLOGY/CELLBIOLOGY PRACTICAL AND INTERNSHIP

List of Experiments

- Prepare a temporary mount of Onion Root Tip to study Mitosis.
- Separate Plant pigments through Paper chromatography.
- Test for the presence of Sugar, Starch, Proteins and Fats. To detect them in suitable plant and animal materials.
- To test the presence of Urea, Sugar, Albumin, Chloride, Creatinine, Protein and Bile salts in urine.
- Collect and study soil from at least two different sites and study them for Texture, Moisture content, pH and Water holding capacity of soil.
- Collect water from two different water bodies around you and study them for pH, Clarity and Presence of any living organisms.
- Preparation of temporary stained slide of Human blood.
- ABO-Blood Grouping.
- Preparation of temporary stained slide of Squamous epithelium.
- Observable Human Phenotypic Characters & Correlation Coefficient.
- Preparation of Cultural medium for Micro organism
- Sampling Handling
- Pure culture of bacteria.
- Simple Staining
- Gram Staining
- Serial Dilution Technique
