M.Sc. (Medical Microbiology) course

Syllabus of First year subjects

1st year

BASICS OF ANATOMY (Paper 1)

General Anatomy

1. Anatomical terminology, Anatomical plane, Anatomical positions, Clinical positions, Terms related to movements
2. Basics of cytology: Structure of cell wall, Cell organelles,
3. Musculoskeletal system:
   (a) Bones & classification, Morphology, ossification functions, blood supply
   (b) Muscles, Morphology, classification blood supply, innervations, functions
4. Integumentary system: Thick Skin, Thin skin layers of dermis epidermis, Skin appendages, blood supply, innervations, functions
5. Cardiovascular system: Morphology of blood vessel, classification of blood vessels, blood capillaries, blood circulation, functions
6. Nervous system: Central Nervous system & Peripheral Nervous system, Gross basic Anatomy, Cranial nerves, Spinal nerves, Functions of nerves, Autonomic nervous system
7. Endocrine system: Classification, Hormone produces, Control of hormone secretion, basic functions
8. Lymphatic system: Formation of lymph, Lymphatic ducts, Thoracic duct, Lymph circulation, functions
9. Digestive system: Parts of digestive system, gross anatomy and functions
10. Excretory system: Parts of excretory system, gross anatomy of kidney, ureter, urinary bladder penis and their functions
11. Reproductive system: Male reproduction system- gross anatomy of testis, epididymis, vas-deferens, seminal vesicles and prostate. Female reproductive system- gross anatomy of ovaries, uterine tube, uterus, vagina, menstruation cycle
12. Basics of genetics: Cell division ,mitosis, meiosis, Cell cycle, Chromosomes

Gross Anatomy (Elementary Anatomy)

1. Superior Extremities
2. Inferiors Extremities
3. Thorax
4. Abdomen
5. Pelvis
6. Head, Neck & Fact Region

Anatomy of each part including functional, sectional and radiological anatomy

Principal, COMJNMH, Kalyani

Kallol Pal 21.8.19 HOD Microbiology COMJNMH, Kalyani

Recommended Books

1. Williams et al, *Gray's Anatomy*, Livingstone Churchill.
2. B. Young and J. *Heath, Wheaters' Functional Histology*, Livingstone Churchill
3. Ross M.H., *Histology*: A Text & Atlas, Williams & Wilkins.
4. Langman Jan, *Medical Embryology*, William and Wilkins.
5. Thompson J.S. & Thompson M.W., *Genetic in Medicine*, W.B. Saunders & Co. Philadelphia,
6. Stuin J & Carpenter MB, *Human Neuroanatomy*,
7. Richard S. Snell, *Clinical Neuroanatomy for Medical Students*, Willian and Wilkins

M.Sc. (Medical Microbiology) course
1st year
BASICS OF PHYSIOLOGY (paper 2)

1. **Cell Physiology**

   Cell Structure and membrane transport, Resting Membrane Potential, Composition of ECF and ICF, Nernst Equation, Equilibrium Potential, Goldmann Equation

2. **Nerve-Muscle and Biopotential**

   Neuron (structure, function and classification), Neuroglia, Action Potential, Neuromuscular junction, Skeletal Muscle (structure, mechanism of contraction and relaxation), Smooth Muscle (structure, mechanism of contraction and relaxation)

3. **Blood**

   Function and Composition, Erythrocytes, Haemoglobin, Blood groups, Leucocytes, Thrombocytes, Immunity

4. **Cardiovascular System**

   Cardiac Muscle, Physiological anatomy of heart and conduction system, Cardiac Action Potential, Normal ECG, Cardiac cycle, Heart sounds, Cardiac output and blood pressure, Coronary circulation

5. **Respiration**

   Functional anatomy of the respiratory system, Mechanism of breathing, Dead space, Surfactants

   Dynamic and static lung volumes and capacities, Transport of oxygen and carbon dioxide, Regulation of Respiration, Cyanosis, Hypoxia, Oxygen toxicity

6. **Gastrointestinal Tract**

   Functional anatomy, Salivary glands (secretion and function of saliva, deglutition), Stomach (composition, regulation of secretion and function of the gastric juice), Liver (secretion and function of bile), Pancreas (secretion and function), Intestines, Intestinal secretion (composition and function), Movements of Intestines, Hormones of GIT

7. **Excretory System**

   Function of kidney, Structure of nephron, Juxta glomerular apparatus, Formation of urine

   Counter current mechanism, Acidification of urine & role of kidney in maintenance of acid base balance, Renal function tests, Micturition

8. Autonomic Nervous System

Organization of the ANS, Chemo-transmitters, Effect of sympathetic and parasympathetic stimuli on different organ systems

9. Central Nervous System

General organization of CNS & PNS, Sensory system :(General sensations, receptors, sensory pathways, sensory areas of brain)

Motor system: (muscle spindle, Golgi tendon organ, reflex arc, corticospinal and extra-pyramidal tracts)

Brain: Functions of: Cerebellum, thalamus, hypothalamus, basal ganglia, limbic system, reticular activating system; Higher Function: Sleep

10. Special Senses

Eye (functional anatomy, refractory indices of media, rods and cones, role of vitamin A, visual pathway), Ear (structure of internal ear, mechanism of hearing), Taste (distribution and structure of taste buds and taste papillae, primary taste modalities, taste pathway), Smell (olfactory epithelium and pathway)

11. Endocrine System

Mechanism of action of hormones, Functions of the following glands: Pituitary, thyroid, parathyroid, adrenal (cortex and medulla), pancreas

12. Reproductive System

General organization of male and female reproductive systems, Male: Spermatogenesis and actions of male sex hormones, Female: Sexual cycles and actions of female sex hormones, pregnancy, parturition and lactation, Family planning

Reference Books (Latest Edition)

1. Guyton, A., *Text Book of Medical Physiology*, Elsevier Publication,
2. Ganong, W.F., *Reviews of Medical Physiology*, Lange Publication
3. Khurana, I., *Text Book of Physiology*, Elsevier Publication
4. Berne V, *Principles of Physiology*, Elsevier Mosby Publication.
5. Lippincott W &Wilkins, *Medical Physiology (Clinical Medicine)*, Rhodes &Bell.

M.Sc. (Medical Microbiology) course
1st year
BASICS OF BIOCHEMISTRY (paper 3)

Basic concepts of Biochemistry to be studied under the following headings:

1. Cell structure and function and transport through the biological membrane.
2. Chemistry of Bio molecules – carbohydrate, lipids, amino acids, proteins and nucleic acids.
3. Chemistry of Blood & haemoglobin.
4. Enzymes.
5. Bioenergetics and Biologic oxidation.
6. Metabolism of carbohydrates, Proteins, lipids and nucleotides.
7. Integration of metabolism.
8. Nutrition, Vitamins & minerals.
9. Molecular Biology.
10. Detoxification & Xenobiotics.
11. Oxygen derived free radicals.
12. Immunology.
13. Organ function tests.

Reference Books

1. LubertStryer (Ed.), *Biochemistry*, W.H. Freeman & Company, New York.
2. Lehninger , Nelson & Cox (Ed.), *Principles of Biochemistry*, CBS Publishers & Distributers.
3. Murray R.K. & P.A. Mayes (Ed.), *Harpers Biochemistry*, D.K. Granner,
4. Thomas M.Devlin (Ed.), *Textbook of Biochemistry with Clinical Correlations*, Wiley Liss Publishers.
5. Benjamin Lewin (Ed), *Genes VI*, Oxford University Press

M.Sc. (Medical Microbiology) course
1st year
RESEARCH METHODOLOGY+ ENVIRONMENTAL STUDIES (Paper 4)

RESEARCH METHODOLOGY

Unit – 1

Methods of collection of data, classifications and graphical representation of data. Binomial and normal probability distribution. Polygon, histogram, measure of central tendency. Significance of statistical methods, probability, degree of freedom, measures of variation - Standard deviation, Standard error.

Unit – 2

Sampling, sample size and power. Statistical inference and hypothesis. Tests for statistical significance: t-test, Chi-square test, confidence level, Null hypothesis.

Unit – 3

Analysis of Variance (one way and two way ANOVA). Factorial designs (including fraction factorial design). Theory of probability, Permutation and Combination, Ratios, Percentage and Proportion and Multiple comparison procedures.

Unit – 4

Non-parametric tests, Experimental design in clinical trials, Statistical quality control, Validation, Optimization techniques and Screening design. Linear regression and Correlation, least square method, significance of coefficient of correlation, nonlinear regression.

Unit – 5

Report Preparation: Types and Layout of Research Report, Precautions in Preparing the Research Report. Bibliography and Annexure in the Report: Their Significance, Drawing Conclusions, Suggestions and Recommendations to the Concerned Persons. Use of SPSS in Data Analysis.

Recommended Books

1. Cooper & Schindler, *Business Research Methods*, Tata McGraw Hill.
2. *Saunders Research Methods for Business Students*, Pearson Education, 2007.
3. Malhotra Naresh K., *Marketing Research*, Pearson Education.
4. Fisher, R.A., *Statistical Methods for Research Works*, Oliver & Boyd, Edinburgh.
5. Chow, *Statistical Design and Analysis of Stability Studies*, Marcel Dekker, New York.
6. Finney, D.J., *Statistical Methods in Biological Assays*, Hafner, New York.
7. Montgomery, D.C., *Introduction to Statistical Quality Control*, Willy.
8. Lipschutz, *Introduction to Probability and Statistics*, McGraw-Hill.

ENVIRONMENTAL STUDIES

Unit – 1

Multidisciplinary of EVS- Introduction, Definition, Scope, Importance, Need for public Awareness, Hospital Set Up, Interrelation between environment and Hereditary, Fossil fuels and detrimental effects, Relation between Environment and public health, Environment Protection Act, Scope of Environmental Studies, Relation between environment pollution and community health.

Unit – 2

Natural Resources- Renewable and Non Renewable resources, Natural resources and associated problems, forest resources, water resources, mineral resources, food resources, energy resources, land resources, role of an individual in conservation of natural resources, equitable use of resources for sustainable lifestyle.

Unit – 3

Ecosystem- Introduction ,Defination , Types, Ecosystem relation with humans, wildlife protection act, forest conservation act, ELL NINO consequences.

Unit – 4

Biodiversity- Introduction,Definition , Types, Human impact on biodiversity, Biome, Food chain, Consequences, Conservation

Unit – 5

Environment Pollution and Bio Medical Waste management 2016- Pollution definition and its types of Air, water , soil, marine, noise, odour, thermal, nuclear hazards, pollution of solid waste management, its causes and effects, measures of urban and industrial waste role of an individual, prevention of pollution, water prevention , control of pollution act, Disaster Management of flood, earthquake, cyclone, landslides, Biomedical waste management 2016 guidelines water quality , BOD, waste Disposal, Biomedical waste categories.

Unit -6

Social issues and Environment- Urban problems related to energy, water conservation, rain water harvesting, water shade management, resettlement and rehabilitation of people and its problem, concern of environment and ethics, climate change, global warming, acid rain and its effects, ozone layer depletion, nuclear accidents, waste land reclamation consumer reasons and waste product, environment waste act, of Air, prevention and control of pollution act of water, air , wildlife protection act, forest conservation act, issues involved in enforcement of environmental legislation, public awareness, Silent valley movement, chipko movement, Recent changes in Air, climate change, Chernobyl, Green house effect, ozone depletion, Minamata, Narmada bachaoaandolan, Environment policy of govt of waste Bengal,Human population.

Reference Books:

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1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R)