

COURSE STRUCTURE : MEDICAL LAB TECHNOLOGY

| Semester No | Paper Code | Paper Name | Total Marks ESE | Pass marks (40%) | Total Marks CCE | Pass marks (40%) | Total Marks | Pass marks (40%) | |
|-------------------|-------------------|---------------------------------------|-----------------|------------------|-----------------|------------------|-------------|------------------|--|
| Semester 1 | BMLT 101 | Human Anatomy I | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BMLT 102 | Human Physiology I | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BMLT103 | Fundamentals of MLT | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BMLT 104 | Biochemistry | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BENG 105 | Communicative English I | 35 | 14 | 15 | 06 | 50 | 20 | |
| | BENV 106 | Environmental Sciences | 35 | 14 | 15 | 06 | 50 | 20 | |
| | BMICP 107 | Microbiology | 35 | 14 | 15 | 06 | 50 | 20 | |
| | BBIOP 108 | Biochemistry | 35 | 14 | 15 | 06 | 50 | 20 | |
| | | | Total | 420 | | 180 | | 600 | |
| | Semester 2 | | | | | | | | |
| | BMLT 201 | Human Anatomy II | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BMLT 202 | Human Physiology II | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BMLT 203 | Lab Management Skills | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BMLT 204 | Clinical Hematology | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BENG 205 | Communicative English II | 35 | 14 | 15 | 06 | 50 | 20 | |
| | BCBM 206 | Basic of Computer/Math for Biologists | 35 | 14 | 15 | 06 | 50 | 20 | |
| | BBLTP 207 | Practical Basic Lab Technology | 35 | 14 | 15 | 06 | 50 | 20 | |
| | BMLTP 208 | Practical Medical Lab technology | 35 | 14 | 15 | 06 | 50 | 20 | |
| | | Total | 420 | | 180 | | 600 | | |
| Semester 3 | | | | | | | | | |
| | BMLT 301 | Clinical Biochemistry | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BMLT 302 | Microbiology I | 70 | 28 | 30 | 12 | 100 | 40 | |
| | BMLT 303 | Basics of Immunology & Serology | 70 | 28 | 30 | 12 | 100 | 40 | |

Bachelor in Medical Lab Technology
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|-------------------|-----------|--|-----|----|-----|----|-----|----|
| | BMLT 304 | Blood Banking | 70 | 28 | 30 | 12 | 100 | 40 |
| | BENG 305 | Communicative English III | 35 | 14 | 15 | 06 | 50 | 20 |
| | BARI 306 | Analytical reasoning I | 35 | 14 | 15 | 06 | 50 | 20 |
| | BMLTP 307 | Serology Practical | 35 | 14 | 15 | 06 | 50 | 20 |
| | BMLTP 308 | Blood Banking Practical | 35 | 14 | 15 | 06 | 50 | 20 |
| | | Total | 420 | | 180 | | 600 | |
| Semester4 | | | | | | | | |
| | BMLT 401 | General Pathology & Clinical Pathology | 70 | 28 | 30 | 12 | 100 | 40 |
| | BMLT 402 | Cytopathology & Histopathology | 70 | 28 | 30 | 12 | 100 | 40 |
| | BMLT 403 | Microbiology II | 70 | 28 | 30 | 12 | 100 | 40 |
| | BMLT 404 | Biostatistics | 70 | 28 | 30 | 12 | 100 | 40 |
| | BENG 405 | Communicative English IV | 35 | 14 | 15 | 06 | 50 | 20 |
| | BARII 406 | Analytical reasoning II | 35 | 14 | 15 | 06 | 50 | 20 |
| | BMLTP 407 | Cytology Practical | 35 | 14 | 15 | 06 | 50 | 20 |
| | BMLTP 408 | Histology Practical | 35 | 14 | 15 | 06 | 50 | 20 |
| | | Total | 420 | | 180 | | 600 | |
| Semester 5 | | | | | | | | |
| | BMLT 501 | Immunology II | 70 | 28 | 30 | 12 | 100 | 40 |
| | BMLT 502 | Molecular Diagnostics | 70 | 28 | 30 | 12 | 100 | 40 |
| | BMLT 503 | Biomedical Instrumentation & Techniques. | 70 | 28 | 30 | 12 | 100 | 40 |
| | BMLT 504 | Cytogenetics & Tissue culture | 70 | 28 | 30 | 12 | 100 | 40 |
| | BMLTP 505 | Immunology Practical | 35 | 14 | 15 | 06 | 50 | 20 |

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|-------------------|--------------|--|-----|----|-----|----|-----|-----|
| | BMLTP 506 | Molecular Diagnostics practical | 35 | 14 | 15 | 06 | 50 | 20 |
| | | Total | 350 | | 150 | | | 500 |
| Semester 6 | | | | | | | | |
| | BMLT 601 | Scientific methodology, Biostatistics & Technical writing | 70 | 28 | 30 | 12 | 100 | 40 |
| | BMLT 602 | Medical Techniques: Social, Legal & ethical issues & community Health | 70 | 28 | 30 | 12 | 100 | 40 |
| | BMLT 603 | Dissertation | 100 | 40 | | | | |
| | | Total | 240 | | 60 | | 300 | |

Semester 2- Paper Code-Credits

| S.No | Paper Code | Paper Name | ESE | CCE | Total Marks |
|------|------------|-------------------------|-----|-----|-------------|
| 1 | BMLT 101 | Human Anatomy I | 70 | 30 | 100 |
| 2 | BMLT 102 | Human Physiology I | 70 | 30 | 100 |
| 3 | BMLT103 | Fundamentals of MLT | 70 | 30 | 100 |
| 4 | BMLT 104 | Biochemistry | 70 | 30 | 100 |
| 5 | BENG 105 | Communicative English I | 35 | 15 | 50 |
| 6 | BENV 106 | Environmental Sciences | 35 | 15 | 50 |
| 7 | BMLTP 107 | Microbiology | 35 | 15 | 50 |
| 8 | BBIOCP 108 | Biochemistry | 35 | 15 | 50 |
| | | | 420 | 180 | 600 |

Course details : Semester I**ITM-BMLT101 - Human Anatomy I**

| Sr. No | Subject Details | No.of Hrs | Mode/s of Teaching | Mode of Evaluation |
|--------|--|-----------|---------------------------|--------------------|
| 1 | Introduction to Anatomy: Cell, types of tissues, Skeletal System, structure of bones, types of bones, bones of cranium, face vertebral column upper and lower limbs. | 8 | Lectures Demonstration | Written |
| 2 | Organization of Human body : Different system of Human body & homeostasis. | 4 | Lectures Demonstration | Written |
| 3 | Cardiovascular System: Organization & Structure of the system (Heart) | 8 | Lectures Demonstration | Written |
| 4 | Blood : Blood – Composition, Different types of cells | 4 | Lectures Demonstration | Written |
| 5 | Lymphatic system: Organization & Structure of the system (Lymphvessels, lymph nodes & lymphoid organs) | 5 | Lectures Demonstration | Written |
| 6 | Endocrine System: Organization & structure of Various endocrine glands (Thyroid, Parathyroid. Adrenal glands, pituitary, pancreas & Sex glands) | 10 | Lectures Demonstration | Written |
| 7 | Respiratory System: system(Lungs) Organization& structure of respiratory | 6 | Lectures Demonstration | Written |
| | Total | 45 | | |

References: Chaurasia : Handbook of General Anatomy

Drake: Grays Anatomy for Student 3 E

ITM-BMLT102 - Human Physiology I

| Sr. No | Subject Details | No.of Hrs | Mode/s of Teaching | Mode of Evaluation |
|--------|-----------------|-----------|--------------------|--------------------|
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|---|--|----|---------------------------|---------|
| 1 | Introduction to Physiology : Scope and basic terminology. | 2 | Lectures Demonstration | Written |
| 2 | Cell : Functions of the cell, cell division; Elementary Tissues of the Humanbody. Transportation across cell membrane, Active, Passive ,Osmosis ,Phagocytosis | 8 | Lectures Demonstration | Written |
| 3 | Hematopoietic system : Physiology of the system(Blood and its components. Normal range and physiological variations of their count) | 5 | Lectures Demonstration | Written |
| 4 | Cardiovascular System :Physiology of the system(Heart, Blood supply to the heart, Major vessels in the system,blood circulation and purification, ECG: Definition, determination, significance, Systemic and pulmonarycirculation, Cardiac Cycle-basics, heart sounds, Blood Pressure and its regulation) | 8 | Lectures Demonstration | Written |
| 5 | Lymphatic system : Physiology of the system (Lymphoid Tissue Formulation, composition and circulation of lymph, Spleen) | 6 | Lectures Demonstration | Written |
| 6 | Endocrine System : Function of various endocrine glands. (Thyroid,Parathyroid. Adrenal glands, pituitary, pancreas & Sex glands) | 10 | Lectures Demonstration | Written |
| 7 | Respiratory System : Physiology of the system (mechanism, regulation Transportation of Respiratory Gases) | 6 | Lectures Demonstration | Written |
| | Total | 45 | | |

References: Khurana : Anatomy and Physiology

Drake: Grays Anatomy for Student 3 E

ITMU/BMLT103 – Fundamentals of MLT

| Sr. No | Subject Details | No.of Hrs | Mode/s of Teaching | Mode of Evaluation |
|---------------|---|------------------|---------------------------|---------------------------|
| 1 | Human Health : Health Concepts,Medical care in developing countries and safety regulations | 4 | Lectures Demonstration | Written |
| 2 | Medical care : In India & Medical laboratories of developing countries | 3 | Lectures Demonstration | Written |
| 3 | Clinical Laboratory : Organization of the clinical laboratory and role of medical laboratory technicians Functional components of clinical laboratories, cleanliness precautions to be taken with reference to the patients | 6 | Lectures Demonstration | Written |
| 4 | Communication : Communication between physician and patients, and the medical laboratory Professional | 6 | Lectures Demonstration | Written |
| 5 | Laboratory Management : Laboratory management, planning and Medical records | 4 | Lectures Demonstration | Written |
| 6 | Bio medical Waste Management : Safety measures and first aid | 6 | Lectures Demonstration | Written |
| 7 | Laboratory equipment : Common laboratory equipments and their operation.Cleaning and care of general laboratory glassware and | 6 | Lectures Demonstration | Written |

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| | equipment. Principles, functions and uses of balances, centrifuge machines, colorimeters and other equipments. | | | |
| 8 | General comments on Specimen : Blood, Urine, Stool & Semen | 8 | Lectures Demonstration | Written |
| | Total | 45 | | |

ITM-BMLT104 BASIC BIOCHEMISTRY

| S.no | Topic/Sub-Topic | No. of hours | Mode/s of Teaching | Mode of Evaluation |
|------|--|--------------|---------------------------|--------------------|
| 1 | Bioenergetic | 6 hours | Lectures Demonstration | Written |
| | 1.1 First and second laws of Thermodynamics. Definitions of Gibb's Free Energy, enthalpy and Entropy and mathematical relationship among them | 2 hours | Lectures Demonstration | Written |
| | 1.2 Standard free energy change and equilibrium constant | 1 hour | Lectures Demonstration | Written |
| | 1.3 Coupled reactions and additive nature of standard free energy change 1.4 Energy rich compounds: Phosphoenolpyruvate, 1,3-Bisphosphoglycerate, Thioesters, ATP | 3 hours | Lectures Demonstration | Written |

| no | Topic/Sub-Topic | No. of hours | Mode/s of Teaching | Mode of Evaluation |
|----|---|--------------|---------------------------|--------------------|
| 2 | Carbohydrates | 10 hours | Lectures Demonstration | Written |
| | 2.1 Families of monosaccharides: aldoses and ketoses, trioses, tetroses, pentoses, and hexoses. | 2 hours | Lectures Demonstration | Written |
| | 2.2 Stereo isomerism of | 1 hour | Lectures Demonstration | Written |

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| | monosaccharides, epimers | | | |
| | 2.3 Mutarotation and anomers of glucose. Furanose and pyranose forms of glucose and fructose. Haworth projection formulae for glucose; chair and boat forms of glucose | 2 hours | Lectures Demonstration | Written |
| | 2.4 Sugar derivatives, glucosamine, galactosamine, muramic acid, N-acetyl neuraminic acid | 2 hours | Lectures Demonstration | Written |
| | 2.5 Disaccharides; concept of reducing and non-reducing sugars, occurrence and Haworth projections of maltose, lactose, and sucrose | 2 hours | Lectures Demonstration | Written |
| | 2.6 Polysaccharides, storage polysaccharides, starch and glycogen. Structural Polysaccharides, cellulose, peptidoglycan and chitin | 2 hours | Lectures Demonstration | Written |

References (Chapter 9, Lehninger Principles of Biochemistry by Nelson DL and Cox MM, 5th Ed., W.H. Freeman and Company, 2008, Pages: 293-321)

| S.no | Topic/Sub-Topic | No. of hours | Mode/s of Teaching | Mode of Evaluation |
|------|--|--------------|---------------------------|--------------------|
| 3 | Lipids | 10 hours | Lectures Demonstration | Written |
| | 3.1 Definition and major classes of storage and structural lipids. | 2 hours | Lectures Demonstration | Written |
| | 3.2 Storage lipids. Fatty acids structure and functions. Essential | 2 hours | Lectures Demonstration | Written |

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| | fatty acids. Triacyl glycerols structure, functions and properties. Saponification | | | |
| | 3.3 Structural lipids. Phosphoglycerides: Building blocks, General structure, functions and properties. Structure of phosphatidylethanolamine and phosphatidylcholine. Sphingolipids: building blocks, structure of sphingosine, ceramide. Special mention of sphingomyelins, cerebrosides and gangliosides | 3 hours | Lectures Demonstration | Written |
| | 3.4 Lipid functions: cell signals, cofactors, prostaglandins | 1 hours | Lectures Demonstration | Written |
| | 3.5 Introduction of lipid micelles, monolayers, bilayers | 2 hours | Lectures Demonstration | Written |

Reference: (Chapters 11&12, Lehninger Principles of Biochemistry by Nelson DL and Cox MM, 5th Ed., W.H. Freeman and Company, 2008, Pages: 363-379 &389-393).

| S.no | Topic/Sub-Topic | No. of hours | Mode/s of Teaching | Mode of Evaluation |
|------|---|--------------|---------------------------|--------------------|
| 4 | Proteins | 10 hours | Lectures Demonstration | Written |
| | 4.1 Functions of proteins | 1 hour | Lectures Demonstration | Written |
| | 4.2 Primary structures of proteins: Amino acids, the building blocks of proteins. General formula of amino acid and concept of zwitterion. Titration curve of amino acid and its significance | 2 hours | Lectures Demonstration | Written |

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| | | | | |
| | 4.3 Classification, biochemical structure and notation of standard protein amino acids Ninhydrin reaction. Natural modifications of amino acids in proteins hydrolysine, cystine and hydroxyproline | 2 hours | Lectures Demonstration | Written |
| | 4.4 Non protein amino acids: Gramicidin, beta-alanine, D-alanine and D- glutamic acid | 1 hour | Lectures Demonstration | Written |
| | 4.5 Oligopeptides: Structure and functions of naturally occurring glutathione and insulin and synthetic aspartame | 1 hour | Lectures Demonstration | Written |
| | 4.6 Secondary structure of proteins: Peptide unit and its salient features. The alpha helix, the beta pleated sheet and their occurrence in proteins | 1 hour | | |
| | 4.7 Tertiary and quaternary structures of proteins. Forces holding the polypeptide together. Human haemoglobin structure | 1 hour | | |
| | 4.8 Quaternary structures of proteins | 1 hour | | |

Reference: Chapter 4, Biochemistry by Voet, D. and Voet J.G., 3rd Ed., John Wiley and Sons, 2004: Pages: 65-78); Chapter 8, Biochemistry by Voet, D. and Voet J.G., 3rd Ed., John Wiley and Sons, 2004, Pages: 219-240; 265-266)

| S.no | Topic/Sub-Topic | No. of hours | Mode/s of Teaching | Mode of Evaluation |
|------|--|--------------|---------------------------|--------------------|
| 5 | Enzymes | 10 hours | Lectures Demonstration | Written |
| | 5.1 Structure of enzyme: Apoenzyme and cofactors, prosthetic group-TPP, coenzyme NAD,metal cofactors | 2 hours | Lectures Demonstration | Written |
| | 5.2 Classification of enzymes | 1 | Lectures Demonstration | Written |
| | 5.3 Mechanism of action of enzymes: active site, transition state complex and activation energy. Lock and key hypothesis, and Induced Fit hypothesis. Significance of hyperbolic, double reciprocal plots of enzyme activity, Km, and allosteric mechanism Definitions of terms – enzyme unit, specific activity and turnover number | 2 | Lectures Demonstration | Written |
| | 5.4 Multienzyme complex : pyruvate dehydrogenase; isozyme: lactate dehydrogenase | 2 | Lectures Demonstration | Written |
| | 5.5 Effect of pH and temperature on enzyme activity. Enzyme inhibition: competitive- sulfa drugs; non-competitive-heavy metal salts | 2 | Lectures Demonstration | Written |

Reference : (Chapter 8, Prescott, Harley and Klein's Microbiology by Willey MJ, Sherwood, LM & Woolverton C J. 7th Ed., McGrawHill, 2008, Pages: 117-182;Chapter 13, Biochemistry by Voet,D. and Voet J.G., 3rdEd., John

Wiley and Sons, 2004: Pages:459-471).

SUGGESTED READING

- 1.Campbell, MK (2012) Biochemistry, 7th ed., Published by Cengage Learning
- 2.Campbell, PN and Smith AD (2011) Biochemistry Illustrated, 4th ed., Published by Churchill Livingstone
- 3.Tymoczko JL, Berg JM and Stryer L (2012) Biochemistry: A short course, 2nd ed., W.H.Freeman
- 4.Berg JM, Tymoczko JL and Stryer L (2011) Biochemistry, W.H.Freeman and Company

ONLINE READING MATERIAL

1. Chapter on Structures and Functions of Biomolecules URL--<http://nsdl.niscair.res.in/handle/123456789/59>
2. Chapter on Enzymes in Microbial Physiology and Biochemistry URL-<http://nsdl.niscair.res.in/handle/123456789/392>

ITMU/BENG 105 Communicative English

Parts of speech: Noun, Pronoun, verb, adverb, adjective, preposition, conjunction, interjection.

Exercises for all parts of speech

Past tense, present tense

Positive, Comparative and superlative form of adjectives.

Make sentences

Vocabulary building: synonyms, antonyms

Use of older, elder, near, next, farther, further

Letter writing:

Apology letter

Request for leave

Acknowledgement letter

Request for permission

Request for information

Friendly letters

Suggested reading

Wren & Martin

ITM-BENV 106 ENVIRONMENTAL SCIENCES

Definition, Scope and Importance

Natural Resources: Renewable and Nonrenewable Resources

Unit I – Forest, Water and Mineral resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act. Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems and relevant Act. Use and exploitation, environmental effects of extracting and using mineral resources.

Unit II- food, Energy and Land resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging , salinity. Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Land as a resource, land degradation, man induced landslides soil erosion and desertification.

UNIT III- ECOSYSTEM

Concept, Structure and Function of and ecosystem

Producers, consumers and decomposers. Energy flow in the ecosystem, Ecological succession

Food chains, food webs and ecological pyramids. Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.

Unit IV- Biodiversity and its Conservation

Introduction - Definition: genetic. species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use. productive use, social ethics, aesthetic and option values, Biodiversity at global, National and local levels, India as mega-diversity nation, Hot spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wild life, conflict,dangered and endemic species of India, Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.

UNIT V- Causes, effect and control measures of

Air water, soil, marine, noise, nuclear pollution and Human population, Solid waste management: Causes, effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution, Disaster Management: floods, earthquake, cyclone and landslides.

Suggested reading : Text book of Environmental Sciences- Erach Bharucha, UGC University Press

PRACTICALS

ITM-BMLT 107 : MICROBIOLOGY

| S.No | Name of Practical | Hours | Method |
|------|---|----------|-----------|
| 1 | Basic Lab glassware: Test tubes, screw capped tubes, pipette, Pasteur pipettes, Erlenmeyer flask, Eppendorf tubes, pipette tips, cover slip and slides. | 10 hours | Practical |
| 2 | Basic Lab instrumentation: Autoclave, incubator, Hot air oven, pH meter, Centrifuge, Laminar air flow.Separatory funnel, centrifuge, pH meter, Electric balance, hot plate | 5 hours | Practical |
| 3 | Serial dilution with methyl orange indicator | 3 hours | Practical |
| 4 | Principles & Working of the pH meter | 3 hours | Practical |
| 5 | Determination of pH of water samples from | 3 hours | Practical |

| | | | |
|---|---|---------|-----------|
| | different sources. | | |
| 6 | Determination of pH of various solutions using a pH meter – NaOH, sulphuric acid, distilled water | 3 hours | Practical |

ITMU/BBIOCP 108 : BIOCHEMISTRY

| S.No | Name of Practical | Hours | Method |
|-------------|---|--------------|---------------|
| 1 | Basic Lab requirements Volumetric flask, falcons, mortar and pestle, watch glass, wash bottle, beaker, measuring cylinder, dropper, burette, spatula, reagent bottle, test tube stand, pipette stand, tripod stand, Bunsen burner, wire gauze, crucible, funnel, centrifuge tubes | 5 hours | Practical |
| 2 | Instruments Separatory funnel, centrifuge, pH meter, Electric balance, hot plate | 4 hours | Practical |
| 3 | Determination of pH of various solutions using a pH meter – NaOH, sulphuric acid, distilled water | 3 hours | Practical |
| 4 | Preparation of Normal solution- NaOH | 3 hours | Practical |
| 5 | Preparation of percentage/ vov-vol solutions- Sulphuric acid | 3 hours | Practical |
| 6 | Paper Chromatography- Isolation of the pigments from leaves of Raddish | | |

Semester 2- Paper Code-Credits

| S.No | Paper Code | Paper Name | ESE | CCE | Total Marks |
|------|------------|---------------------------------------|-----|-----|-------------|
| 1 | BMLT 201 | Human Anatomy II | 70 | 30 | 100 |
| 2 | BMLT 202 | Human Physiology II | 70 | 30 | 100 |
| 3 | BMLT 203 | Lab Management Skills | 70 | 30 | 100 |
| 4 | BMLT 204 | Clinical Hematology | 70 | 30 | 100 |
| 5 | BENG 205 | Communicative English II | 35 | 15 | 50 |
| 6 | BCBM 206 | Basic of Computer/Math for Biologists | 35 | 15 | 50 |
| 7 | BBLTP 207 | Practical Basic Lab Technology | 35 | 15 | 50 |
| 8 | BMLTP 208 | Practical Medical Lab technology | 35 | 15 | 50 |
| | | | 420 | 180 | 600 |

Course details -Semester II**ITM-BMLT- 201- Human Anatomy II**

Learning Objective: This module is a general introduction to the anatomy of the human body with respect to digestive, nervous and urinary system. The module also gives insight to importance of sensory organs to the human body.

Learning outcomes: After completion of the module students will be able to understand anatomy of digestive, nervous and urinary system of human body. The students will also learn the importance of human sensory organs

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Digestive System: Anatomy of the system (Mouth- tongue, teeth ,Salivary glands ,Pharynx ,Oesophagus ,Stomach, Small Intestine, Large intestine, rectum and anal canal, pancreas, Liver ,Biliary tract- bile ducts and gall bladder) | 10 hours | Lecture/ power point | Written |
| 2 | Nervous System : Anatomy of the system (Brain, spinal cord & Peripheral nerves) | 9 hours | Lecture/ power point | Written |
| 3 | Urinary System : Anatomy of the system(Kidney, nephron,ureters. urinary bladder and urethra) | 9 hours | Lecture/ power point | Written |
| 4 | The Special Senses : Anatomy of Skin, Ear, Eye, Nose & Tongue | 10 hours | Lecture/ power point | Written |
| 5 | Reproductive System : Anatomy of Male & female reproductive system | 7 hours | Lecture/ power point | Written |

ITM-BMLT- 202- Human Physiology II

Learning Objective : This module is a general introduction to the physiology of the human digestive, nervous and urinary system. It also includes the physiological aspects of skin, eye, ear, nose and tongue as human sensory organs.

Learning outcomes : After completion of the module students will be able to understand physiology of digestive, nervous and urinary system of human body. The additional outcome form the module would be the importance of sensory organs with respect to human physiology ; maintaining body temperature.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Digestive System: Physiology of digestion (Function and importance of digestive organs) | 9 hours | Lecture/ power point | Written |
| 2 | Nervous System : Physiology of the system (Neurones, the nerve impulse, types of nerves, the synapse and neurotransmitters, function of CSF, Brain-blood supply to the brain, cerebrum, brain stem, cerebellum and Spinal Cord functions of sensory and motor nerve tracts. | 9 hours | Lecture/ power point | Written |

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| 3 | Urinary System : Physiology of the system(Formation of urine Ultra filtration, criteria for filtration, GFR, Plasma fraction. mechanisms of Re absorption Glucose urea, HCl, amino acids etc. Properties and composition of normal urine, urine output, abnormal constituents in urine, Mechanism of urine concentration , water balance and urine output, electrolyte balance, pH balance, Micturition) | 9 hours | Lecture/ power point | Written |
| 4 | The Special Senses : Physiology of skin,Ear,Eye,Nose & tongue(Skin : Regulation of Body Temperature by physical chemical and nervous mechanisms,Eye:function of Retina,Ear :hearing & balance ,Nose :Sense of smell, Tongue :Sense of taste) | 9 hours | Lecture/ power point | Written |
| 5 | Reproductive System : Physiology of male & female reproductive system | 9 hours | Lecture/ power point | Written |

ITM-BMLT- 203- Lab Management Skills

Learning Objective: This module is a general introduction to computers, anatomy of computers, and different applications of computers. It gives them knowledge about MS. Office and its use. The second part provides the insights to importance of communication and its types. The module also introduces laboratory software and its application.

Learning outcomes: The module gives general introduction to computers & communication types. After successful completion of this module the students would be able to use MS office application and INTERNET. They would be able to understand and use different forms of communication. The additional outcome would be learning the use of laboratory software.

Teaching Methodology :

Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Introduction to computers : History of computers: Type, functions and Generation of computers, Function and components of a computer ,Input and Output devices,Auxiliary storage device | 4 | Lecture/ power point | Written |
| 2 | INTRODUCTION TO WINDOWS :Starting Windows, Handling the mouse & windows controls ,Using menus and dialog boxes | 3 | Lecture/ power point | Written |

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| 3 | M.S. OFFICE : Basics | 2 | Lecture/ power point | Written |
| 4 | M.S.WORD: Basic, Making new document, editing, formatting the text, text border, color, spacing, copying the text, undo, redo, and repeat. Formatting: paragraph alignment, line spacing, paragraph spacing, paragraph indents, Borders paragraph border, shading, spelling and grammar, | 8 | Lecture/ power point | Written |
| 5 | M.S. Excel : Introduction to Electronic Spreadsheets, Excel Basics ,Formatting the worksheet ,Formula, Function and Graph | 7 | Lecture/ power point | Written |
| 6 | M.S. Power Point :,Introduction to Presentations ,Presentation Basics ,Presentation Packages ,Menus and Tool bars ,Editing, Formatting and Displaying | 8 | Lecture/ power point | Written |
| 7 | Internet : Use and applications | 4 | Lecture/ power point | Written |
| 8 | Communication in English : Introduction ,Importance & Uses. | 2 | Lecture/ power point | Written |
| 9 | Communication skills : Listening, Learning & Speaking.Types & importance of communication,Barriers to communication | 4 | Lecture/ power point | Written |
| 10 | Pathology and laboratory software: Uses and application | 3 | Lecture/ power point | Written |

ITM-BMLT- 204 - Clinical Hematology

Learning Objective: The module is designed to provide introduction to hematology. It also gives insight about blood collection and routine tests performed in hematology section with result interpretation.

Learning outcomes: The course gives general introduction to hematology and routine tests used in hematology. After successful completion of this module the students would be able to identify principles and procedures of hematology tests and clinical significance of results; and evaluate normal and abnormal erythrocyte morphology and related diseases. The student will evaluate normal and abnormal leukocyte morphology and related diseases.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Introduction Specimen collection & laboratory | 4 | Lecture/ power point | Written |

| | | | | |
|---|---|----|----------------------|---------|
| | Lab preparations in Hematology. | | | |
| 2 | Routine Hematological tests: Determination of hemoglobin concentration and hematocrit. | 5 | Lecture/ power point | Written |
| 3 | Calculations of red blood cell Automated systems in hematology. indices :MCV, MCH and MCHC. | 4 | Lecture/ power point | Written |
| 4 | Automated systems in hematology :Study of blood smear, Reticulocyte count, and erythrocyte sedimentation rate (ESR), Eosinophil count, Platelet count. | 5 | Lecture/ power point | Written |
| 5 | Blood Coagulation :Mechanism of blood coagulation , Coagulation Factors ,Lab methods used in investigation of Coagulation Disorders ,Bleeding Time, Clotting Time , Prothrombin Time ,Activated partial thromboplastin time, ,Platelet Function Test ,Clot Retraction ,Plasma Recalcification Time ,Prothrombin Consumption Index , Estimation Of Fibrinogen ,Clot Lysis Time ,Hemophilia And Its Laboratory Parameters | 10 | Lecture/ power point | Written |
| 6 | Anemia : Introduction, Classification and Lab diagnosis of : Iron Deficiency Aneamia Hemolytic Aneamia ,Megaloblastic Anemia ,Sickle cell Anemia | 7 | Lecture/ power point | Written |
| 7 | Abnormal Conditions Of Blood Cell :Polycythemia Vera, Leucocytosis ,Monocytosis , Leucopenia , Neutropenia,Lymphopenia , Agranulocytosis ,Infectious mononucleosis LEUKEMIA : Definition,FAB classification of leukemia Acute and Chronic Leukemia,Leukemoid blood reactions | 10 | Lecture/ power point | Written |

ITM-BENG 205 – Communicative English II

Learning Objective: The module is designed to provide introduction to Communicative English. It also gives scope to develop proficiency in the language and will help increase the usage of better vocabulary.

Learning outcomes: After successful completion of this module the students would be able to understand and write the language with confidence which would help in their personality development.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Vocabulary building: Synonyms & antonyms | 5 | Lecture/ power point | Written |
| 2 | Parts of speech: Noun, pronoun, verb, adverb, adjective, conjunction, interjection & prepositions and Exercises | 10 | Lecture/ power point | Written |
| 3 | Reading Comprehension | 4 | Lecture/ power point | Written |
| 4 | Sentences: Simple, compound, Complex | 3 | Lecture/ power point | Written |
| 5 | Essay writing | 4 | Lecture/ power point | Written |

Suggested Reading : Wren & Martin

ITM-BCBM- 206 – Basics of Computer & Math for Biologists

Learning Objective: The module is designed to provide introduction to Basic math and provides practical approach to hone your computer skills.

Learning outcomes: After successful completion of this module the students would be able to use basic computers to make their projects, presentations and perform statistical functions.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|--|----------|----------------------|--------------------|
| 1 | Basic integrals | 5 | Lecture/ power point | Written |
| 2 | Basic statistics: Mean, median, mode | 5 | Lecture/ power point | Written |
| 3 | Word, power point, excel | 10 | Lecture/Practical | Written |
| 4 | Internet and its advantages & disadvantages ** Scholarly article search engine, sites | 8 | Lecture/Practical | Written |

Suggested Reading: Comdex Computer Course Kit- Vikas Gupta , Dreamtech Press

Practicals

ITM-BBLTP- 207 – Basic Lab Technology

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|------------------|--------------------|
| 1 | Spots and techniques Cotton plugs preparation Method of sterilization Autoclaving Microscope Media Plating methods | 8 | Practical | Written/Practical |
| 2 | Media preparation | 8 | Practical | Written/Practical |
| 3 | Plating techniques, slant preparation | 6 | Practical | Written/Practical |
| 4 | Stab culture | 4 | Practical | Written/Practical |
| 5 | Isolation of bacteria from air, soil, water | 6 | Practical | Written/Practical |
| 6 | Preparation of blood smear | 2 | Practical | Written/Practical |
| 7 | Identification of blood group (Kit) | 4 | Practical | Written/Practical |
| 8 | Amylase test | 2 | Practical | Written/Practical |
| 9 | Protein estimation by Folin Ciocalteu Reagent (Lowry method) | 2 | Practical | Written/Practical |
| 10 | Buffer Preparation (Sodium) | 2 | Practical | Written/Practical |

ITM-BBLTP- 208 – Medical Lab Technology

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|------------------|--------------------|
| 1 | Spots Anatomical structures: Heart Kidney Eye Skeleton | 15 | Practical | Written/Practical |
| 2 | Preparation of blood smear | 5 | Practical | Written/Practical |
| 3 | Identification of different kinds of blood cells | 6 | Practical | Written/Practical |
| 4 | Isolation of blood plasma | 6 | Practical | Written/Practical |
| 5 | Blood clotting and anti-coagulation with EDTA | 3 | Practical | Written/Practical |

| | | | | |
|---|--|---|-----------|-------------------|
| 6 | Height, weight measurement and BMI calculation | 2 | Practical | Written/Practical |
|---|--|---|-----------|-------------------|

Course Details : Semester III

| S.No | Paper Code | Paper Name | ESE | CCE | Total Marks |
|------|------------|---------------------------------|-----|-----|-------------|
| 1 | BMLT 301 | Clinical Biochemistry | 70 | 30 | 100 |
| 2 | BMLT 302 | Microbiology I | 70 | 30 | 100 |
| 3 | BMLT 303 | Basics of Immunology & Serology | 70 | 30 | 100 |
| 4 | BMLT 304 | Blood Banking | 70 | 30 | 100 |
| 5 | BENG 305 | Communicative English III | 35 | 15 | 50 |
| 6 | BARI 306 | Analytical reasoning I | 35 | 15 | 50 |
| 7 | BMLTP 307 | Practical Serology | 35 | 15 | 50 |
| 8 | BMLTP 308 | Practical Blood Banking | 35 | 15 | 50 |
| | | | 420 | 180 | 600 |

ITM-BMLT- 301- Clinical Biochemistry

Learning Objective: The module gives an introduction to clinical biochemistry. It gives emphasis on normal & abnormal body processes. It also gives insight about routine biochemical tests and profile testing.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 44 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Normal and abnormal Biochemical processes of the body | 8 hours | Lecture/ power point | Written |

| | | | | |
|---|---|----------|----------------------|---------|
| | 1.1) Basic physiology and biochemistry of the body ,Interrelated metabolic processes of the body Function of various organs and their clinical assessment, Biochemical changes in the body under pathologic conditions | | | |
| 2 | Routine Biochemical tests 2.1 Phosphatases, transaminases, lactic dehydrogenase, creatinine kinase, electrolytes, blood gases and bicarbonate, determination of serum/plasma bicarbonate. | 10 hours | Lecture/ power point | Written |
| 3 | Biochemical Test Profile 3.1 Liver tests, Renal tests, Endocrine function tests, Lipid profile, Transaminase, LDH,CPK, CPK-MB, SGPT/SGOT,Amylase , GTT. | 8 hours | Lecture/ power point | Written |
| 4 | Principles of analytic techniques 4.1 Basic steps in analytical chemistry,Titrimetry, Photometry, electro chemistry, immunochemistry, separation and analysis of organic compounds. | 8 hours | Lecture/ power point | Written |
| 5 | Hormonal Studies and clinical endocrinology 5.1 Thyroid, Pancreas,Adrenall and sexual glands, hormones and its diagnostic significance. | 6 hours | Lecture/ power point | Written |
| 6 | Electrophoresis Introduction and types, Protein and DNA electrophoresis | 4 hours | Lecture/ power point | Written |

ITM-BMLT- 302- Microbiology I

Learning Objective: The module gives an introduction to microbiology. It gives insight into general microbiology, morphology & physiology of Bacteria along with bacterial genetics.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 48 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | <p>Introduction to Microbiology</p> <p>1.1) History & scope of Microbiology, Major contribution of scientists– Robert Koch, Louis Pasteur.</p> | 8 hours | Lecture/ power point | Written |
| 2 | <p>Morphology of Bacteria</p> <p>2.1 Prokaryotes & Eukaryotes, Bacterial cell structure and function : Cell membranes – plasma membranes and internal membrane systems, Cytoplasmic matrix – Inclusion bodies, ribosome.</p> <p>2.2 Bacterial chromosome and plasmids, Cell Wall – gram positive & gram negative, Components external to cell wall – Capsule, Slime Layer, S Layer, Pili, Fimbriae, Flagella and endospores.</p> | 10 hours | Lecture/ power point | Written |
| 3 | <p>Physiology of Bacteria</p> <p>3.1 Microbial Nutrition, cultivation, isolation and preservation: Nutritional requirements & nutritional types, nutrient uptake mechanism,</p> <p>3.2 Bacterial Growth curve, , Batch culture. Continuous culture. Synchronous culture (definition and brief description). Physical factors influencing growth - Temperature. pH, osmotic pressure, salt concentration.</p> | 8 hours | Lecture/ power point | Written |
| 4 | <p>Bacterial genetics</p> <p>4.1 Bacterial genome & their functions, Replication, Drug resistance : mechanism.</p> | 8 hours | Lecture/ power point | Written |

| | | | | |
|---|--|---------|----------------------|---------|
| 5 | Stains and staining 5.1 Acidic and Basic dyes;Principles of staining, simple staining, negative staining, differential staining, gram and acid fast staining, flagella staining, capsule and endospore staining. | 6 hours | Lecture/ power point | Written |
| 6 | Culture Media & culture methods Types of media, Methods of isolating pure cultures,Anaerobic culture methods. | 6 hours | Lecture/ power point | Written |
| 7 | Sterilization & disinfection Physical and chemical methods | 2 hours | Lecture/ power point | Written |

ITM-BMLT- 303- Basics of Immunology & Serology

Learning Objective: The module gives an introduction to basic concepts of immunity and its types.

It also provides insights about the principles of antigen – antibody reactions & use of these reactions in sero – diagnosis.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 32 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Introduction to immunology 1.1) Types of immunity. | 4 hours | Lecture/ power point | Written |
| 2 | Structure & functions of the immune system 2.1 HLA. | 4 hours | Lecture/ power point | Written |
| 3 | Immune Response 3.1 Humoral and Cell mediated. | 4 hours | Lecture/ power point | Written |

| | | | | |
|---|---|---------|----------------------|---------|
| 4 | Antigens 4.1 Types & structure. Antigenicity and immunogenicity. | 3 hours | Lecture/ power point | Written |
| 5 | Antibodies 5.1 Structure and classes of antibodies, monoclonal antibodies. | 6 hours | Lecture/ power point | Written |
| 6 | Complement system. | 3 hours | Lecture/ power point | Written |
| 7 | Antigen-Antibody reactions I 7.1 Agglutination, Precipitation, Neutralization, CFT. | 4 hours | Lecture/ power point | Written |
| 8 | Antigen-Antibody reactions II 8.1 RIA, Immunofluorescence, ELISA. | 4 hours | Lecture/ power point | Written |

ITM-BMLT- 304- Blood Banking

Learning Objective: The module gives an introduction to basic procedures and techniques used in a blood bank. The module also gives insights about blood typing, compatibility testing and complications in case of blood transfusion.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 27 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Blood bank 1.1) Introduction & routine laboratory procedures. | 4 hours | Lecture/ power point | Written |
| 2 | Blood collection | 4 hours | Lecture/ power point | Written |

| | | | | |
|---|---|---------|----------------------|---------|
| | 2.1 Procedures, processing & component preparation. | | | |
| 3 | Blood donor Management 3.1 Donor motivation & selection, phlebotomy, post donation care and outdoor blood donation camps. | 8 hours | Lecture/ power point | Written |
| 4 | Lab reagents 4.1 Preparation, Reporting of heamagglutination reaction. | 4 hours | Lecture/ power point | Written |
| 5 | Blood Transfusion 5.1 Principles & Practice. | 3 hours | Lecture/ power point | Written |
| 6 | Transfusion reaction Hemolytic disease of the newborn | 4 hours | Lecture/ power point | Written |

ITM-BENG- 305 – Communicative English III

Learning Objective: The module is designed to provide introduction to Communicative English. It also gives scope to develop proficiency in the language and will help increase the usage of better vocabulary.

Learning outcomes: After successful completion of this module the students would be able to understand and write the language with confidence which would help in their personality development.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|--|----------|---------------------|--------------------|
| 1. | Sentence formation | 5 | Lecture/Power point | Written |
| 2 | Details of tenses | 5 | Lecture/Power point | Written |
| 3. | Essay writing | 5 | Lecture/Power point | Written |
| 4. | Listening comprehensions. | 5 | Lecture/Power point | Written |
| 5 | Dictations, Reading Skills -Types Of Reading | 5 | Lecture/Power point | Written |

ITM-BARI- 306 – Analytical Reasoning I

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Verbal Reasoning: • Analogy | 2 | Lecture/ power point | Written |
| 2 | • Classification | 3 | Lecture/ power point | Written |
| 3 | • Word formation | 2 | Lecture/ power point | Written |
| 4 | • Statement and conclusions | 5 | Lecture/ power point | Written |
| 5 | • Syllogism • Statement and assumptions • Statement and arguments | 6 | Lecture/ power point | Written |
| 6 | • Coding Decoding • Blood Relations • Passage and conclusions | 7 | Lecture/ power point | Written |

Practicals**ITM-BMLTP- 307 – Practical Serology****Standard of passing:**

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|-------------------------|----------|------------------|--------------------|
| 1 | Syllabus same as Theory | 35 | Practical | Written/Practical |

ITM-BMLTP- 308 – Practical Blood banking**Standard of passing:**

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|-------------------------|----------|------------------|--------------------|
| 1 | Syllabus same as Theory | 35 | Practical | Written/Practical |

Course Details :Semester IV

| S.No | Paper Code | Paper Name | ESE | CCE | Total Marks |
|------|------------|--|-----|-----|-------------|
| 1 | BMLT 401 | General Pathology & Clinical Pathology | 70 | 30 | 100 |
| 2 | BMLT 402 | Cytopathology & Histopathology | 70 | 30 | 100 |
| 3 | BMLT 403 | Microbiology II | 70 | 30 | 100 |
| 4 | BMLT 404 | Biostatistics | 70 | 30 | 100 |
| 5 | BENG 405 | Communicative English IV | 35 | 15 | 50 |
| 6 | BARII 406 | Analytical reasoning II | 35 | 15 | 50 |
| 7 | BMLTP 407 | Cytology Practical | 35 | 15 | 50 |
| 8 | BMLTP 408 | Histology Practical | 35 | 15 | 50 |
| | | | 420 | 180 | 600 |

ITM-BMLT- 401- General Pathology & Clinical Pathology

Learning Objective: The module gives an introduction to fundamentals of basic and modern Pathology .It gives emphasis on routine body fluid examination.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 30 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|------------------|----------|------------------|--------------------|
|------|------------------|----------|------------------|--------------------|

| | | | | |
|---|--|---------|----------------------|---------|
| 1 | Introduction to Pathology | 2 hours | Lecture/ power point | Written |
| 2 | Normal composition of body fluids (semen, sputum, exudate, transudate) CSF, Synovial and serous fluids. | 6 hours | Lecture/ power point | Written |
| 3 | Examination of Urine 3.1 Formation of urine , Physical, Chemical & Microscopical examination. | 6 hours | Lecture/ power point | Written |
| 4 | Examinations of body fluids 4.1 CSF, Pleural, peritoneal & pericardial fluid, choalveolar lavage fluid, hydatid cyst fluid, Joint fluid. Physical, chemical & Microscopical examination. | 8 hours | Lecture/ power point | Written |
| 5 | Examination of Semen 5.1 Physical, Chemical & Microscopical examination | 4 hours | Lecture/ power point | Written |
| 6 | Examination of Stool Physical, Chemical & Microscopical examination | 4 hours | Lecture/ power point | Written |

ITM-BMLT- 402- Cytopathology & Histopathology

Learning Objective: The module gives an introduction to fundamentals of basic and modern Pathology .

It gives emphasis on routine body fluid examination, cytological and histopathological techniques.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 28 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Introduction to histology and histopathology Techniques in histopathology | 6 hours | Lecture/ power point | Written |

| | | | | |
|---|---|----------|----------------------|---------|
| 2 | Laboratory equipment for histology and cytology Their use and care. | 2 hours | Lecture/ power point | Written |
| 3 | Laboratory Techniques in Histology 3.1 Logging of specimen, preparation of tissues, Processing of tissues, routine staining procedures in histo technology, special stains and staining techniques, stains for particular substances, frozen section techniques, Handling and embedding of small tissue fragments | 10 hours | Lecture/ power point | Written |
| 4 | Laboratory techniques in Diagnostic exfoliative cytology 4.1 Preparation of specimens for cytological evaluation, cytological stains and staining techniques, characteristics of benign and malignant cells . | 10 hours | Lecture/ power point | Written |

ITM-BMLT- 403- Microbiology II

Learning Objective: The module gives an introduction to systemic bacteriology, parasitology, mycology and virology .

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 46 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Systemic Bacteriology 1.1 Identification of Bacteria Morphology, Cultural | 10 hours | Lecture/ power point | Written |

| | | | | |
|---|--|----------|----------------------|---------|
| | <p>and biochemical reactions(Sugar fermentation,IMVIC test,Nitrate reduction test,Urease test, Catalase test, oxidase test and H₂S production).</p> <p>1.2 Laboratory identification of Gram positive – Streptococcus, Staphylococcus, Bacillus, Mycobacterium, Corynebacterium, Gram negative– E-coli, Klebsiella, Salmonella, Shigella, Vibrio, Pseudomonas.</p> | | | |
| 2 | <p>Parasitology</p> <p>Introduction to Parasitology,Host – Parasite Interactions.Classification of Parasites.</p> | 6 hours | Lecture/ power point | Written |
| 3 | <p>Protozoa</p> <p>3.1 General Pathogenic and non pathogenic protozoa, Lifecycle,morphology, disease & lab diagnosis of Intestinal Amoebae(E. Histolytica),Flagellates of intestine/genitalia(Giardia lamblia,Trichomonas vaginalis),MalarialParasite(Plasmodium vivax,Differences between P. vivax, P. malaria, P. falcipaum & P.ovale)</p> | 8 hours | Lecture/ power point | Written |
| 4 | <p>Nematodes & Helminthes</p> <p>4.1 General Properties,Life cycle,morphology, disease and lab diagnosis of Intestinal Nematodes (Ascaris),Tissue nematode s(W. Bancrofti),Brief discussion about Enterobius vermicularis (Thread worm) and Ancylostoma duodenale (Hook worm),Cestodes (T. Solium),Trematodes .</p> | 10 hours | Lecture/ power point | Written |
| 5 | <p>Mycology</p> <p>5.1General properties of fungi, cultivation methods,Cutaneous &Sub cutaneous and Systemic Mycosis,Lab diagnosis of fungalInfections,Opportunistic fungal infections.</p> | 6 hours | Lecture/ power point | Written |

| | | | | |
|---|--|---------|----------------------|---------|
| 6 | Virology General properties, Classification & cultivation of viruses(Animal inoculation technique, Embryonated Egg inoculation technique, Tissue culture technique),Viral replication (lytic & lysogeny), Study of HIV and Hepatitis viruses. | 6 hours | Lecture/ power point | Written |
|---|--|---------|----------------------|---------|

ITM-BMLT- 404- Biostatistics

Learning Objectives: The module gives an introduction to management concepts, biostatistics and research methodology. It gives emphasis on biomedical waste management.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 37 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Biostatistics 1.1 Introduction to biostatistics, as a science,as figure,scope, common terms. | 8 hours | Lecture/ power point | Written |
| 2 | Source & presentation of data Types of data, Qualitative & quantitative, methods of data collection and presentation. | 10 hours | Lecture/ power point | Written |
| 3 | Measures of dispersion: 3.1 Range , Mean deviation & standard deviation. | 8 hours | Lecture/ power point | Written |
| 4 | Population & Sampling 4.1 Sampling frame, Sampling methods and errors. | 8 hours | Lecture/ power point | Written |
| 5 | CHI Square method | 3 hours | Lecture/ power point | Written |

ITM-BENG- 405 – Communicative English IV

Learning Objective: The module is designed to provide introduction to Communicative English. It also gives scope to develop proficiency in the language and will help increase the usage of better vocabulary.

Learning outcomes: After successful completion of this module the students would be able to understand and write the language with confidence which would help in their personality development.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Conversational english | 5 | Lecture/ power point | Written |
| 2 | Rephrasing | 5 | Lecture/ power point | Written |
| 3 | Writing skill development | 5 | Lecture/ power point | Written |
| 4 | Paragraph, Letter Writing, Essay writing, Memo, Circular, Notice, Cover Letter, Resume, Thesis, Summary, Précis, Speaking | 10 | Lecture/ power point | Written |

Suggested Reading : Wren & Martin

ITM-BARI- 406 – Analytical Reasoning II

Learning Objective: The module is designed to provide introduction to Communicative English. It also gives scope to develop proficiency in the language and will help increase the usage of better vocabulary.

Learning outcomes: After successful completion of this module the students would be able to understand and write the language with confidence which would help in their personality development.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Theory hours: 25 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|--------------------------------|----------|----------------------|--------------------|
| 1 | Alphabet test • Series Test | 5 | Lecture/ power point | Written |

| | | | | |
|---|---|---|----------------------|---------|
| | • Number , Ranking and time sequence | | | |
| 2 | • Direction sense Test • Decision making test | 5 | Lecture/ power point | Written |
| 3 | • Figure series • Input/output, Assertion and reasoning • Sitting Arrangement | 5 | Lecture/ power point | Written |
| 4 | Non-Verbal Reasoning: • Series test • Odd figure Out | 5 | Lecture/ power point | Written |
| 5 | • Analogy • Miscellaneous Test etc. | 5 | Lecture/ power point | Written |

Practicals

ITM-BMLTP- 407 – Practical Cytology

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|-------------------------|----------|------------------|--------------------|
| 1 | Syllabus same as Theory | 35 | Practical | Written/Practical |

ITM-BMLTP- 408 – Practical Histology

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|-------------------------|----------|------------------|--------------------|
| 1 | Syllabus same as Theory | 35 | Practical | Written/Practical |

Course details:Semester V

| S.No | Paper Code | Paper Name | ESE | CCE | Total Marks |
|------|------------|--|-----|-----|-------------|
| 1 | BMLT 501 | Immunology II | 70 | 30 | 100 |
| 2 | BMLT 502 | Molecular Diagnostics | 70 | 30 | 100 |
| 3 | BMLT 503 | Biomedical Instrumentation & Techniques. | 70 | 30 | 100 |
| 4 | BMLT 504 | Cytogenetics & Tissue culture | 70 | 30 | 100 |
| 7 | BMLTP 505 | Practical Immunology | 35 | 15 | 50 |
| 8 | BMLTP 506 | Practical Molecular Diagnostics | 35 | 15 | 50 |
| | | | 350 | 150 | 500 |

ITM-BMLT- 501- Immunology II

Learning Objectives: Clinically diagnose, investigate and manage a whole spectrum of immune-mediated disorders. Practically perform and interpret the common laboratory techniques used in the Immunology Laboratory. Plan and undertake research in Clinical Immunology in the clinic, laboratory and community.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 37 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|--|----------|----------------------|--------------------|
| 1 | Auto immunity & auto immune disorders | 4 hours | Lecture/ power point | Written |
| 2 | Hypersensitivity : Reactions and types | 3 hours | Lecture/ power point | Written |
| 3 | Immunodiagnostics 3.1 Evaluating immunological functions. 3.2 Detection of specific antibodies 3.3 Flowcytometry 3.4 HLA typing and matching 3.5 Lymphoproliferation assays 3.6 Molecular methods | 12 hours | Lecture/ power point | Written |
| 4 | Immunodeficiency 4.1 Approach to evaluation of the immunodeficient host, Primary immunodeficiency disorders, HIV/AIDS, HIV vaccine development, Ageing and immune system, Secondary immunodeficiency (excluding AIDS). | 10 hours | Lecture/ power point | Written |
| 5 | Treatment of immunological diseases 5.1 Bone-marrow transplantation, IVIG therapy, Cancer vaccines, Therapeutic antibodies, Gene therapy. | 8 hours | Lecture/ power point | Written |

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| 5.2 Anti-inflammatory medications: steroids, NSAIDs and antihistamines. | | | |
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ITM-BMLT- 502- Molecular Diagnostics

Learning Objectives:

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 44 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|--|----------|----------------------|--------------------|
| 1 | Isolation and Purification of Nucleic acids: 1.1 Principles and Methods. Molecular cloning, labeling of nucleic acid, hybridization. | 6 hours | Lecture/ power point | Written |
| 2 | Nucleic acid amplification methods and types of PCR: 2.1 Reverse Transcriptase-PCR, Real-Time PCR, Multiplex PCR, Nested PCR, PCR-ELISA, Ligase Chain Reaction.. | 8 hours | Lecture/ power point | Written |
| 3 | Applications of PCR 3.1 PCR based microbial typing: Eubacterial identification based on 16S rRNA sequences- 3.2 Amplified Ribosomal DNA Restriction analysis (ARDRA)- Culture independent analysis of bacteria- DGGE and TRFLP. 3.3 Molecular diagnosis of fungal pathogens based on 18S rRNA sequences-Detection of viral pathogens through PCR. 3.4 RAPD for animal and plants- | 12 hours | Lecture/ power point | Written |

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| | PCR in forensic science-AmpFLP, STR, Multiplex PCR- Determination of Paternity- Human identification and sex determination. | | | |
| 4 | Automated DNA sequencing 4.1 Principles, Methods and Instrumentation-Advances in DNA sequencing-Pyrosequencing-Microarrays- Personalised Medicine-Pharmacogenomics. | 10 hours | Lecture/ power point | Written |
| 5 | Proteomics- Clinical Proteomics 5.1 Good Laboratory Practices. Different Levels of Biosafety, Containment Levels for rDNA experiments. Biosafety aspects of transgenic plants and germplasm. | 8 hours | Lecture/ power point | Written |

References

1. Genes VIII (2004) by B. Lewin, Oxford University Press.
2. An Introduction to Genetic Analysis (2000) by A.J.F. Griffiths, J.H. Miller, D.T. Suzuki, R.C. Lewontin and W.M. Gelbart, W.H. Freeman, New York.
3. Molecular Biology of the Gene (2004) by J.D. Watson, Tania A baker, Stephen P. Bell, Alexander Gann, Michael Levine, Richard Losick, Pearson Education Pte. Ltd. (Singapore).
4. Essentials of Molecular Biology (1998) by G. M. Malacinski and D. Friefelder, Jones & Bartlett Publishers.
5. rDNA safety guidelines- Government of India, Ministry of Science and Technology, Dept. of Biotechnology, New Delhi.
6. rDNA safety guidelines & regulations-Government of India, Ministry of Science and Technology, Dept. of Biotechnology, New Delhi.
7. An Introduction to Forensic DNA Analysis (2002) Rudin, N and Inman, K. CRC Press.
8. Forensic DNA Typing. Biology, Technology and Genetics of STR markers (2005) John M. Butler, Elsevier Academic Press, Amsterdam.
9. Molecular Diagnostics: Fundamentals, Methods & Clinical applications (2007). Lele Buckingham and Maribeth L. Flaws.
10. Fundamentals of Molecular Diagnostics (2007). David E. Bruns, Edward R. Ashwood, Carl A. Burtis. Saunders Group.

ITM-BMLT- 503- Biomedical Instrumentation & Techniques.

Learning Objectives: Understand the medical devices applied in measurement of parameters related to cardiology, neurology and the methods of continuous monitoring and transmitting them. Learn some of the cardiac assist devices. Learn to measure the signals generated by muscles. Understand the need and use of some of the extracorporeal devices.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 45 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|--|----------|----------------------|--------------------|
| 1 | <p>Cardiac Equipment:</p> <p>1.1 Electrocardiograph, Normal and Abnormal Waves, Heart rate monitor, Holter Monitor, Phonocardiography, Plethysmography.</p> <p>1.2 Cardiac Pacemaker- Internal and External Pacemaker- Batteries, AC and DC Defibrillator- Internal and External.</p> | 10 hours | Lecture/ power point | Written |
| 2 | <p>Neurological Equipment</p> <p>2.1 Clinical significance of EEG, Multi channel EEG recording system, Epilepsy, Evoked Potential-Visual, Auditory and Somatosensory, MEG (Magneto Encephalo Graph). EEG Bio Feedback Instrumentation.</p> | 10 hours | Lecture/ power point | Written |
| 3 | <p>Skeletal Muscular Equipment</p> <p>3.1 Generation of EMG, recording and analysis of EMG waveforms, fatigue characteristics,</p> <p>3.2 Muscle stimulators, nerve stimulators, Nerve conduction velocity measurement, EMG Bio Feedback Instrumentation.</p> | 10 hours | Lecture/ power point | Written |
| 4 | <p>Extra Corporeal Devices and Special Diagnostic Techniques</p> <p>4.1 Hemo Dialyser unit, Lithotripsy, Principles of Cryogenic technique and application, Endoscopy, Laproscopy. Thermography – Recording and clinical application, ophthalmic instruments.</p> | 7 hours | Lecture/ power point | Written |

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| 5 | Bio-chemical Measurement 5.1 Blood glucose sensors - Blood gas analyzers, colorimeter, flame photometer, spectrophotometer, blood cell counter, auto analyzer (simplified schematic description). | 8 hours | Lecture/ power point | Written |
|---|---|---------|----------------------|---------|

SUGGESTED BOOKS

1. Khandpur R.S, “Handbook of Biomedical Instrumentation”, Tata McGraw-Hill, New Delhi, 2003.(Units II & IV)
2. Sujata V. Bhatt, “Biomaterials”, Second Edition, Narosa Publishing House, 2005.

References

1. John Enderle, Joseph D. Bronzino, Susan M. Blanchard, “Introduction to Biomedical Engineering”, Elsevier, 2005.
2. John G. Webster, “Medical Instrumentation Application and Design”, John Wiley and sons, New York, 2004. (Units I, II & V)
3. A.C Anand, J F Kennedy, M.Miraftab, S.Rajendran, “Woodhead Medical Textiles and Biomaterials for Healthcare”, Publishing Limited 2006.

ITM-BMLT- 504- Cytogenetics & Tissue culture.

Learning Objectives:

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 45 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|--|----------|----------------------|--------------------|
| 1 | Introduction to cytogenetic s and tissue culture. | 1 hours | Lecture/ power point | Written |
| 2 | Terminolgy, classification and nomenclature of human chromosomes. | 1 hours | Lecture/ power point | Written |
| 3 | Barr body -origin, sampling, staining and its demonstration | 3 hours | Lecture/ power point | Written |
| 4 | Karyotyping - methods of chromosome analysis. a.Culture and direct preparation b.Banding techniques. c.Major chromosomal abnormalities. | 8 hours | Lecture/ power point | Written |

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| 5 | Tissue culture : principle and brief outline, indications. Equipments: (I) Laminar flow equipment., (II) Carbon dioxide incubator. (III) Inverted microscope. | 7 hours | Lecture/ power point | Written |
| A | Procedure of preparation of glassware, media etc. (I) Dry heat sterilization. (II) Autoclaving (III) Chemical sterilization. | 5 | Lecture/ power point | Written |
| B | Derivation of culture from the tissue. (I) Enzymatic digestion of the tissue using collagenase, protease etc. (II) Plating of cells in tissue using collagenase, protease etc. (III) Observation of cells in Invertoscope (I V) Subculturing and derivation of cell lines | 5 | Lecture/ power point | Written |
| C | Characterization of cell lines. (I) Determination of biochemical markers in cells. (II) Chromosomal and DNA contents of cells. (III) Immunological properties of cells. | 3 | Lecture/ power point | Written |
| D | Preservation of immortalized cell lines. Storage in glycerol & in liquid nitrogen | 2 | Lecture/ power point | Written |

Practicals

ITM-BMLTP- 505 – Practical Immunology

Standard of passing:

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|------------------|----------|------------------|--------------------|
|------|------------------|----------|------------------|--------------------|

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|---|-------------------------|----|-----------|-------------------|
| 1 | Syllabus same as Theory | 35 | Practical | Written/Practical |
|---|-------------------------|----|-----------|-------------------|

ITM-BMLTP- 506 – Practical Molecular Diagnostics**Standard of passing:**

Total Marks (35+ 15)= 50marks

35 marks : Theory Paper

Passing Marks: 14

15 marks : CCE

Passing Marks: 6

Practical hours: 35 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|-------------------------|----------|------------------|--------------------|
| 1 | Syllabus same as Theory | 35 | Practical | Written/Practical |

Course details Semester VI

| S.No | Paper Code | Paper Name | ESE | CCE | Total Marks |
|------|------------|---|-----|-----|-------------|
| 1 | BMIC 601 | Scientific methodology, Biostatistics & Technical writing | 70 | 28 | 30 |
| 2 | BMIC 602 | Medical Techniques: Social, Legal & ethical issues & community Health | 70 | 28 | 30 |
| 8 | BMIC 603 | Dissertation | 100 | 40 | |
| | | Total | 240 | | 60 |

ITM-BMLT- 601- Scientific methodology, Biostatistics & Technical writing**Learning Objectives:** The student will learn to collect, tabulate, & analyze data as a researcher.**Teaching Methodology :** Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 30 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Research Methodology 1.1 Introduction & types,y. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical. | 8 hours | Lecture/ power point | Written |
| 2 | Literature survey 2.1 Importance & Primary and secondary sources | 4 hours | Lecture/ power point | Written |
| 3 | Research Design 3.1 Basic principles, Characteristics of a good design. | 4 hours | Lecture/ power point | Written |
| 4 | Formulation of hypothesis 4.1 Meaning, Techniques and Precautions of Interpretation. | 4 hours | Lecture/ power point | Written |
| 5 | Research Report Writing 5.1 Structure and components of scientific reports, Types of report, Different steps in the preparation – Layout, structure and Language of typical reports – Illustrations and tables , Bibliography, referencing and footnotes. | 10 hours | Lecture/ power point | Written |

ITM-BMLT- 602- Medical Techniques:Social, Legal & ethical issues & community Health

Learning Objectives: The student will learn to collect, tabulate, & analyze data as a researcher.

Teaching Methodology : Lectures and demonstration by audio visual aids, seminars & group discussions.

Standard of passing:

Total Marks (70+ 30)= 100marks

70 marks : Theory Paper

Passing Marks: 28

30 marks : CCE

Passing Marks: 12

Theory hours: 30 (minimum)

| S.No | Topic/ Sub Topic | Duration | Mode of teaching | Mode of Evaluation |
|------|---|----------|----------------------|--------------------|
| 1 | Medical Ethics Intro/History – Moral theories & guiding principles | 8 hours | Lecture/ power point | Written |
| 2 | Research ethics & informed consent | 4 hours | Lecture/ power point | Written |
| 3 | Physician Patient Relationship Source and Justification of Medical Ethics | 4 hours | Lecture/ power point | Written |
| 4 | Modern Genetics and Reproductive Technologies & control | 4 hours | Lecture/ power point | Written |
| 5 | Ethical Issues in Organ Transplantation, abortion & euthanasia | 4 hours | Lecture/ power point | Written |
| 6 | Scarc medical resources & payong for health care | 4 | Lecture/ power point | Written |
| 7 | COMMUNITY HEALTH General concepts of health and diseases with reference to natural history of disease with pre-pathogenic and pathogenic phase. The role of socio-economic and cultural environment in health and diseases-Epidemiology and scope. Public health administration-An overall view of the health Administration set up at centre and state level. The National Health Programmes- National Health programmes including tuberculosis, malaria,MCH and HIV/AIDS. Health problems in vulnerable groups-Pregnant and lactating women and infants and school going children-occupational groups, geriatrics. | 5 hours | Lecture/ power point | Written |
| | Occupational Health- Definition, scope-Occupational diseases, prevention of occupational diseases and hazards. Social security and other measures for the protection of occupational hazards, accidents and disease. Details of compensation acts. Family planning objectives of National fa | 5 hours | Lecture/ power point | Written |

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| <p>family planning methods. A general idea of advantages and disadvantages of the method. Mental Health- community aspects of mental health; role of physiotherapists, therapists in mental health problems such as mental retardation etc. Communicable disease-An overall view of the communicable disease. Classification according to the principal mode of transmission. Role of insects and their vectors. International health agencies</p> | | | |
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Suggested reading

Basic issues in bioethics – Munson

Bioethics 2002, Paul