



Karnataka State Open University

Syllabus

Bachelor of Sciences Medical Lab Technology (BSCMLT)

Bachelor of Sciences - Medical Lab Technology (BSCMLT)

Year -I

Code	Subjects	Credits
	Biochemistry: Chemistry and Techniques of Biochemistry	4
	Microbiology: General Microbiology and Techniques	4
	Haematology: Introduction to Haematology and its routine tests	4
	Anatomy and Histotechnology: Different body systems of Human beings	4
	Introductory Biology	4
	Communication skills	4
	Practical	8
Total		32

Year -II

Code	Subjects	Credits
	Biochemistry: Metabolism	6
	Microbiology: Detailed techniques of Clinical Microbiology	4
	Haematology: Haemostatis and Pathology	4
	Histopathology & Techniques	4
	Computer Application	6
	Practical	8
Total		32

Year -III

Code	Subjects	Credits
	Biochemistry: Clinical Aspects	6
	Applied Microbiology	6
	Blood banking and special Hematological Tests	4
	Cytopathology	4
	Lab organization and ethics	4
	Practical	8
Total		32

Detailed Syllabus

Year-I

BMLT 011 Biochemistry: Chemistry and techniques of Biochemistry

Section -1 Introduction

Unit – 1 Bioenergetics, Entropy, Enthalpy & their basic introduction,

Unit – 2 Concept of free energy, Thermodynamics 1st & 2nd Law.

Section -2 Terms

Unit-3 Carbohydrate Structure, properties,, chemical reactions & functions.

Unit-4 Amino Acids Essential & non Essential amino acids with structure & function.

Unit-5 Proteins Primary, Secondary, tertiary & quaternary (Overview).

Unit-6 Lipids Structure, Classification & properties, Enzymes: Classification, enzyme action & their mechanism.

Section-3 Carbohydrates

Unit-7 Carbohydrates intermediate metabolism, glycogenesis, glycogenolysis, gluconeogenesis & glycolysis.

Unit-8 TCA, HMP, and its regulations Disorders of carbohydrates metabolism related to each cycle (inborn error of metabolism).

Section-4 Proteins

Unit-9 Different metabolic pathway of amino acid.

Unit-10 The flow sheet of amino acids oxidation.

Unit-11 Transamination, oxidative deamination and pathways leading to acetyl co-A.

Unit-12 Decarboxylation of Amino acids, formation of nitrogenous excretion products.

Unit-13 Urea cycle and ammonia excretion.

Section-5 Biochemical aspects of Hormone

Unit-14 Hormone receptors and intracellular messengers, Adenylate cyclase, protein kinase and phosphodiesterase.

Unit-15 Role of Insulin, glucagons, epinephrine and their mechanism. Various endocrine and regulatory systems mediated by cyclic AMP.

Section-6 Vitamin

Unit-16 Fat and Water soluble and their deficiency.

Unit-17 Mineral metabolism Minor and Major (Cu, Fe, Ca, Mg & P) Inborn error of Nucleic acids metabolism.

Reference Books :-

1. Clinical biochemistry: techniques and instrumentation by John S. Varcoe
2. Basic Separation Techniques in Biochemistry by R O Okotore
3. Modern physical methods in biochemistry by Albert Neuberger, Laurens L. M. van Deenen

BMLT 012 Microbiology General Microbiology and Techniques

Section-1 Classification of bacteria and Features

Unit-1 On bacilli of differential staining Gram, s Stain .(its modification) ZN .Stain (its modification) On basis of their structure,

Unit-2 Pre –remit of sample collections-general & disease specific their processing & storage

Unit-3 Identification of bacteria on basis of cultural characteristics ,morphological , & serological features Staphylococcus & streptococcus including pneumococci, Family Enterobacteriaceae, Haemophilus bordetella, Corynebacterium, Neisseria .Treponema, Leptospira ,mycoplasma,chlamydia & Treagents.

Section-2 Identification of pathogenic & nonpathogenic fungi

Unit-4 Morphologically ,biochemically,Yeast,Dermatophytes,Cryptococci,Histoplasma,Nocardia,Common lab fungal contaminants

Section-3 Characteristic diagnostic serological tests in diseases

Unit-5 Cholera,Typhoid,Tuberculosis ,VDRL,TPHA, Satellitism.ELISA, PCR

Section-4 Virology Viral genome

Unit-6 General morphology & ultra structure of virus and growth cycles

Unit-7 Their types & symmetry

Unit-8 Cultivation of virus in embryonated eggs, primary culture & secondary culture

Unit-9 Assay methods: Physical & chemical.

Section-5 Classification

Unit-10 On basic of structure

Unit-11 On basic of nuclear material

Unit-12 Clinical diagnosis serological techniques for identification of bacteria: TMV Bacteriophages.

Unit-13 HIV .SV 40 ,myxo & paramyxovirus.

Reference Books:-

1. General Microbiology by Hans Günter Schlegel, C. Zaborosch, M. Kogut
2. General Microbiology by Roger Y. Stanier
3. General Microbiology by Robert F. Boyd

BMLT 013 Basics of Haematology

Section-1 Red Blood Cells

Unit-1 Normal morphology count, Isolation from whole blood & count

Unit-2 Effect on count & morphology of physiochemical parameters & the diseased state

Unit-3 Red cell anomalies & their relevance w.r.t normal & diseased state

Unit-4 Blood Transfusion

Unit-5 Pre-requisite & the complication of mis-matched transfusion, Methods of blood matching

Section-2 White blood cells & platelets

Unit-6 Morphology count & methods of isolation

Unit-7 Effect on count & morphology of cell by the physiochemical parameters, diseased

Unit-8 State & the relevance of condition of the diseases

Unit-9 Anaemia's Definition (in general) & courses

Unit-10 Types of anaemia & their classification, Physiochemical

Unit-11 Characteristic features & etiology of a plastic anaemia, haemolytic, megaloblastic

Unit-12 Clinical features & diagnosis

Section-3 Leukaemia

Unit-13 Definition (in general) & their etiology

Unit-14 Classification of leukaemia, FAB classification, Etiologies, physiochemical

Unit-15 Features of different Type of leukaemias, with reference to clinical states

Unit-16 Diagnosis of different types of leukaemias

Section-4 Coagulation studies

Unit-17 General pathways (intrinsic & extrinsic)

Unit-18 Properties (physiochemical) mode of action of coagulation factors

Unit-19 Platelet studies, platelet function tests (for different Coagulation factors)

Unit-20 Effect of promoters & inhibitors at different steps in coagulation, their solution & mode of action

Unit-21 Diseases associated with coagulation disorders, their etiology & characteristics Features

Section-5 Red Cell mass studies

Unit-22 Chemical method & radioactive methods

Unit-23 Red Cell function studies

Reference Books:-

1. Haematology at a Glance by Atul B. Mehta, Victor Hoffbrand
2. A beginner's guide to blood cells by Barbara J. Bain
3. Diagnostic Hematology by Norman Beck

BMLT 014 Anatomy And Histotechnology: Different Body Systems Of Human Being

Section-1 Human Anatomy & Physiology

Unit-1 Cell structure, division & function, Cell organelles

Unit-2 Tissue: Types of tissues and their functions, Skeletal system.

Unit-3 Digestive system

Unit-4 Physiology and anatomy of mouth, stomach, intestine, Absorption of food and its excretion, Role of Bile in digestion and excretion, Liver function and a brief description of liver and biliary tree.

Section-2 Respiratory system

Unit-5 Brief description of larynx, bronchi, lungs

Unit-6 Cardiovascular system: Anatomy and Physiology of heart, arteries and veins.

Unit-7 Circulation: Systematic and pulmonary (in brief), Brief review of chamber.

Unit-9 Urinary system

Unit-10 Structure and Function of the Kidney, uterus, bladder, urethra and nephron

Unit-11 Give special emphasis on formation of Urine, Physiology and Anatomy of male and female reproductive organs

Unit-12 Endocrine: Pituitary, thyroid, parathyroid, thymus, adrenals and pancreas

Section-3 Central nervous system

Unit-13 Brain, spinal cord and meninges explain with its functions

Unit-14 Skins: Structure and Functions, Study and give small project on bones and cartilages, HLA system.

Section-4 Cytology

Unit-15 Cytological Staining, Cytological preparation with special emphasis on MGG, Pap stains, Cytological Fixatives, Cytological Screening.

Unit-16 Histopathology, Theory of Histopathology, Reception of specimens, Histopathology of Tumor cell, Histopathology of Liver, Kidney, Adrenal, Ovary, Testies, Method of preparing stains & Fixatives

Unit-17 Theory of Tissue processing and embedding, Theory of H & E staining, Use of Microtome, Tissue section cutting, Embedding and preparation of blocks, Fixation of Tissue with DPX mount, Theory of frozen section preparation.

Section-5 Preparation

Unit-18 Preparation of smear for Fine needle aspiration cytology, Pap's smear theory and identification of cells in a normal vaginal smear

Unit-19 Stool examination: normal, abnormal constituent. Normal and abnormal constituent of Urine, Normal and abnormal constituent of amniotic fluid, Normal and abnormal constituent of Semen analysis

Reference Books:-

1. Histotechnology: A Self-Instructional Text by Frieda L Carson and Christa Hladik (Hardcover - May 8, 2009)
2. Histotechnology: A Self-Assessment Workbook by Freida L. Carson (Spiral-bound - Jan 15, 1997)

3. Theory and Practice of Histological Techniques by John D. Bancroft and Marilyn Gamble (Hardcover - Oct 4, 2007)

BMLT 015 Introductory Biology

Section-1 Living World

Unit-1 Biology & Its Branches; relationships with other sciences; scientific methods in Biology; historical breakthroughs; scope of biology and career options

Unit-2 Role of Biology in dispelling myths and misbeliefs; characters of living organisms, (elementary idea of metabolism, transfer of energy at molecular level, open and closed systems, homeostasis, growth and reproduction, adaptation, survival, death).

Unit-3 Origin and evolution of life - theories of evolution; evidence of evolution; sources of variations (mutation, recombination, genetic drift, migration, natural selection)

Unit-4 Concept of species; speciation and isolation (geographical and reproductive); origin of species.

Section-2 Diversity of Life

Unit-5 Variety of living organisms, Systematics; need, history and types of classification (artificial, natural, polygenetic); biosystematics; binomial nomenclature; Two kingdom system, Five kingdom System, their merits and demerits

Unit-6 Status of bacteria and virus; botanical gardens and herbaria; zoological parks and museums

Section-3 Cell and Cell Division

Unit-7 Cell as a basic unit of life - discovery of cell, cell theory, cell as a self-contained unit; prokaryotic and eukaryotic cell; unicellular and multicellular organisms; tools and techniques (compound microscope, electron microscope and cell fractionation)

Unit-8 Ultrastructure of prokaryotic and eukaryotic cell - cell wall, cell membrane - unit membrane concept (fluid mosaic model)

Unit-9 Membrane transport; cellular movement (exocytosis, endocytosis); cell organelles and their functions - nucleus, mitochondria, plastids, endoplasmic reticulum, Golgi complex, lysosomes, lysosomes, microtubules, centriole, vacuole, cytoskeleton, cilia and flagella, ribosomes.

Unit-10 Molecules of cell; inorganic and organic materials - water, salt, mineral ions, carbohydrates, lipids, amino acids, proteins, nucleotides, nucleic acids (DNA and RNA)

Unit-11 Enzymes (Properties, chemical nature and mechanism of action); vitamins, hormones and steroids

Section-4 Genetics

Unit-12 Continuity of life - heredity, variation; Mendel's laws of inheritance, chromosomal basis of inheritance; other patterns of inheritance - incomplete dominance, multiple allelism, quantitative inheritance.

Unit-13 Chromosomes - bacterial cell and eukaryotic cell; parallelism between genes and chromosomes; genome, linkage and crossing over; gene mapping; recombination; sex chromosomes; sex determination; sex linked inheritance; mutation and chromosomal aberrations; Human genetics - methods of study, genetic disorders.

Unit-14 DNA as a genetic material - its structure and replication; structure of RNA and its role in protein synthesis; Gene expression - transcription and translation in prokaryotes and eukaryotes; regulation of gene expression, induction and repression - housekeeping genes; nuclear basis of differentiation and development; oncogenes.

Unit-15 Basics of Recombinant DNA technology; cloning; gene bank; DNA fingerprinting; genomics - principles and applications, transgenic plants, animals and microbes

Section-5 Morphology of Plants and Animals

Unit-16 Morphology - root, stem and leaf, their structure and modification; Inflorescence, flower, fruit, seed and their types; Description of Poaceae, Liliaceae, Fabaceae, Solanaceae, Brassicaceae and Asteraceae.

Unit-17 Morphology of animals - salient features of earthworm, cockroach and rat; tissue systems, structure and function of tissues - epithelial, connective, muscular and nervous.

Reference Books:-

1. Introductory Microbiology (Studies in Biology) by J. Heritage, E. G. V. Evans, and R. A. Killington (Paperback - Jan 26, 1996)
2. Introductory Statistics for Biology (Studies in Biology Series) by R. E. Parker (Paperback - Oct 3, 1991)
3. Introduction to Cell and Tissue Culture: Theory and Technique (Introductory Cell and Molecular Biology Techniques) by Jennie P. Mather and Penelope E. Roberts (Paperback - Sep 30, 1998)
4. Introductory Applied Biostatistics (with CD-ROM) by Sr. Ralph D'Agostino, Lisa Sullivan, and Alexa Beiser (Hardcover - Mar 16, 2005)

BMLT 016 COMMUNICATION SKILLS

Section 1: Concord & Forms of Verbs

Unit-1 Rule of Concord or Agreement, Present Tense, Past Tense, Future Tense,

Unit-2 Tenses with Since, The Future Tense in Adverbial Clauses, Tense in Sentences of Condition

Section-2 : Idiomatic use of Prepositions and Conjunctions

Unit-3 What is an Idiom

Unit-4 Idiomatic Use of Prepositions, Words Followed by prepositions, Structural Use of Infinitive, Gerund and Participles, The Participle, The Infinitive, Gerunds

Section 3: Common Errors in English

Unit-5 Adjectives and Adverbs (Confused)

Unit-6 Errors in the Use of Adjectives and Adverbs

Section 4: Punctuation, Capitalization & Comprehension

Unit-7 Punctuation,Capitalization,Good Manners,The Conjurer's Revenge,The Home Coming,My Last Will and Testament

Section 5: Vocabulary Building in English Language

Unit-8 Useful Words for Expressing Ideas, Opinions and Emotions,Single Words for Phrases or Sentences, Derivations: Root Words, Prefixes and Suffixes,Antonyms and Synonyms,Nationality Words: Names of Countries and People

Section 6: Essay and Business Letter Writing

Unit-9 Writing an Essay

Unit-10 Business Letters

Reference Books:-

1. Messages: The Communication Skills Book by Matthew McKay (Paperback - Mar 3, 2009)
2. People Skills: How to Assert Yourself, Listen to Others, and Resolve Conflicts by Robert Bolton (Paperback - Jun 1986)
3. The Hard Truth About Soft Skills: Workplace Lessons Smart People Wish They'd Learned Sooner by Peggy Klaus (Paperback - Jan 22, 2008)

Year-II

BMLT 011 Biochemistry: Metabolism

Section-1 Introduction to Metabolism and Bioenergetics

Unit-1 Introduction

Unit-2 Universal carrier molecules

Unit-3 Bioenergetics of phosphate compounds

Unit-4 Regulation of metabolic processes

Unit-5 Glycolysis ,Release of energy from glucose

Unit-6 Phases of glycolysis

Unit-7 Energy yield from the pathway

Unit-8 Anaerobic glycolysis

Unit-9 Sources of glucose for glycolysis

Section-2 The Citric Acid Cycle

Unit-10 Cellular respiration, Stages of cellular respiration

Unit-11 The Citric acid cycle, Phases of reactions of citric acid cycle

Unit-12 Additional Pathways in Carbohydrate Metabolism

Unit-13 Pentose phosphate pathway, Glyoxylate cycle, Gluconeogenesis, Glycogen synthesis, Starch synthesis

Section-3 Electron Transport and Oxidative Phosphorylation

Unit-14 Introduction

Unit-15 Components of electron transport chain

Unit-16 Electron Transport – Carriers and arrangement of carriers into complexes, pathway of Electron Transfer through the Carriers

Unit-17 Proton Motive force

Section-4 Photosynthesis

Unit-18 Basic process of photosynthesis, physics of light

Unit-19 Chloroplast structure

Unit-20 Light reaction and photophosphorylation

Unit-21 Dark reaction – Calvin cycle

Unit-22 Photorespiration

Section-5 Lipid Metabolism

Unit-23 Lipid digestion and absorption

Unit-24 Fatty acid oxidation

Unit-25 Ketone body metabolism

Unit-26 Fatty acid biosynthesis

Unit-27 Cholesterol biosynthesis

Unit-28 Eicosanoids

Unit-29 Synthesis of phospholipids and sphingolipids

Reference Books:-

1. Medical Biochemistry: Human Metabolism in Health and Disease by Miriam D. Rosenthal and Robert H. Glew (Paperback - Mar 30, 2009)
2. Nutritional Biochemistry, Second Edition by Tom Brody (Hardcover - Nov 30, 1998)
3. Annual Plant Reviews, Biochemistry of Plant Secondary Metabolism (Volume 40, 2) by Michael Wink (Hardcover - Jun 1, 2010)

BMLT 022 Microbiology: detailed techniques of clinical microbiology

Section-1 Classification of bacteria

Unit-1 On bacilli of differential staining Gram, s Stain .(its modification) ZN .Stain (its modification)

Unit-2 On basis of their structure, Pre –remit of sample collections-general & disease specific their processing & storage,

Unit-3 Identification of bacteria on basis of cultural characteristics ,morphological , & serological features.

Unit-4 Features Staphylococcus & streptococcus including pneumococci, Family Enterobacteriaceae, Haemophilus, Bordetella, Corynebacterium, Neisseria, Treponema, Leptospira, mycoplasma, chlamydia & Tricagents.

Section-2 Characteristic diagnostic serological tests in diseases

Unit-5 Cholera, Typhoid, Tuberculosis, VDRL, TPHA, Satellitism, ELISA, PCR.

Unit-6 Virology General morphology & ultra structure of virus and growth cycles

Section-3 Introduction to clinical microbiology

Unit-7 Public health, diagnostic testing, pharmaceutical sales, and basic research and development

Section-4 Mechanisms of Microbial Pathogenicity

Unit-8 Microbial pathogenicity including both overt microbial factors and complex interactions with the host that produce symptoms of disease

Unit-9 The cellular, biochemical, molecular, and genetic bases for modern understanding of microbial disease will be included

Section-5 Epidemiology of Infectious Disease

Unit-10 The causes, distribution, control, and prevention of infectious disease in human populations.

Unit-11 Basic epidemiological concepts, including study design, analysis, and modeling of infectious disease data, establishing causal relationships, detecting confounding factors

Reference Books:-

1. Basic Clinical Laboratory Techniques - Paperback (July 10, 2007) by Barbara H. Estridge, Anna P. Reynolds, and Norma J. Walters
2. Clinical Laboratory Microbiology: A Practical Approach (MyHealthProfessionsKit Series) - Hardcover (Apr. 2, 2010) by Karen Kiser, William Payne, and Theresa Taff
3. Cumulative Techniques and Procedures in Clinical Microbiology (CUMITECH Series, #1-#15) - Ring-bound (1974) by John C. Sherris

BMLT 023 Haematology: Haemostasis and Pathology

Section-1 Introduction

Unit-1 Definition and scope of pathology

Unit-2 Causes of diseases, hereditary and acquired, Diseases, Subdivisions of pathology , Techniques in pathology , Diagnostic pathology (biopsies, cytology, autopsy)

Unit-3 Inflammation

Unit-4 Definition

Unit-5 Causes and types

Unit-6 General Effects of inflammation

Unit-7 Dynamics of Inflammation - Function of fluid exudates; function of cellular exudates, Chemical mediators

Section-2 Environmental and nutritional pathology

Unit-8 Smoking, Radiation injury, Nutritional: malnutrition, obesity, Vitamin deficiencies

Unit-9 Haemodynamics and circulatory disorders

Unit-10 Haemorrhage, thrombosis and embolism, Ischaemia, infarction and oedema, Haemorrhage, haemostasis, Shock

Section-3 Neoplasia

Unit-11 Definition

Unit-12 Nomenclature

Unit-13 Examples of benign and malignant tumours

Unit-14 Features of benign and malignant tumours, Spread of tumours

Unit-15 Growth disorders, Atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia and neoplasia, Precancerous lesions, and carcinoma in situ.

Section-4 Introduction to Haematology & Haemostasis

Unit-16 Hematopoiesis, Anemia introduction & Classification

Unit-17 Megaloblastic anemia

Unit-18 Iron deficiency anemia & other hypochromic microcytic anemias

Unit-19 Hemolytic Anemias I- Introductions & Classification

Unit-20 Hemolytic Anemias II- Structural hemoglobinopathies, Aplastic Anemia, Anemia of chronic disorders
Malaria

Section-5 Leukemias-

Unit-21 Introductions & classification

Unit-22 Acute leukemia, Chronic myeloid leukemias, Chronic Lymphocytic leukemias, Myelodysplastic syndromes & other preleukemic conditions, Physiology of coagulation & Haemostasis

Unit-23 Bleeding disorders - Introduction & Classification, Congenital bleeding disorders, Acquired bleeding disorders

Reference Books:-

- 1.MCQ's for the MRCP Part 1: Infectious Disease, Haematology and Chemical Pathology (MRCP Study Guides) - Paperback (Nov. 3, 1999) by D. W. Galvani, Nicholas J. Beeching MD, Fred J. Nye MD, and W. D. Neithercut
- 2.Cells, Tissues, and Disease: Principles of General Pathology (Majno, Cells, Tissues, and Disease) - Hardcover (Aug. 26, 2004) by Guido Majno and Isabelle Joris

BMLT 024 Histopathology and Techniques

Section-1 Histopathology and Techniques

Unit-1 Management and planning, receiving and recording of specimens, indexing, maintaining records,

Unit-2 Knowledge of maintenance and use of the following : Microscope, Automatic tissue processor, vacuum embedding bath, microtomes (various types with working of each), hot plates, refrigerators, cryostat, Tissue processing —details of paraffin embedding, vacuum embedding, Decalcification

Section-2 Microtomes

Unit-3 Section cutting and different types of microtomes

Unit-4 Frozen section — uses and techniques

Unit-5 Theory and principles of different staining procedures in Histopathology, Histochemistry

Section-3 Functions of organs

Unit-6 Structure and function of vital organs like liver, spleen, kidney, heart, brain etc. in short, Museum methods — mounting of specimens, preparation of mounting medium, sealing the Jars

Unit-7 Various medicolegal procedures maintaining records.

Section-4 Histopathology

Unit-8 Theory of Histopathology

Unit-9 Reception of specimens, Histopathology of Tumor cell, Histopathology of Liver, Kidney, Adrenal, Ovary, Testes

Unit-10 Method of preparing stains & Fixatives.

Unit-11 Theory of Tissue processing and embedding

Unit-12 Theory of H & E staining

Unit-13 Use of Microtome, Tissue section cutting. Embedding and preparation of blocks

Unit-14 Fixation of Tissue with DPX mount, Theory of frozen section preparation.

Section-5 Preparation

Unit-15 Preparation of smear for Fine needle aspiration cytology, Pap's smear theory and identification of cells in a normal vaginal smear

Unit-16 Stool examination: normal, abnormal constituent.

Unit-17 Normal and abnormal constituent of Urine, Normal and abnormal constituent of amniotic fluid, Normal and abnormal constituent of Semen analysis

Reference Books:-

1. Basic Techniques in Diagnostic Histopathology by Alexander Kennedy (Hardcover - Oct 10, 1977)
2. Carleton's Histological Technique (Oxford Medical Publications) by H. M. Carleton, R. A. B. Drury, and E. A. Wallington (Hardcover - Nov 6, 1980)
3. Diagnostic Criteria Handbook in Histopathology: A Surgical Pathology Vade Mecum by Paul Joseph Tadrous (Hardcover - Apr 25, 2008)
4. Cellular Pathology Technique by C. F. A. Culling, R. T. Allison, and W. T. Barr (Hardcover - Mar 1985)

BMLT 025 Computer Application

Section-1 Computer terminology

Unit-1 Identify computer monitor, keyboard, printer

Unit-2 Explain RAM, ROM, and CD ROM, Identify hard disk and floppy disk, Laser Printer, Discuss micro processors

Unit-3 Explain DOS and OS2/Windows operating systems

Unit-4 Identify differences in hardware needs for software applications

Section-2 TYPE DOCUMENTS

Unit-5 Learn to access MS Word, Learn to center titles

Unit-6 Type and spell check documents, Save documents, Retrieve documents, Revise documents

Unit-7 Use MS Word to alphabetize lists

Unit-8 Use MS Word to type in large and small print, Print documents

Section-3 PREPARE SPREADSHEETS

Unit-9 Access MS Excel, Copy Excel spreadsheets to MS Word, Widen columns, Label columns, Alphabetize lists, Sort data, Insert decimals and dollar signs, Insert formulas to add, subtract, multiply and divide

Unit-10 Use formulas to calculate minimums, maximums, and averages

Unit-11 Combine spreadsheets, Save spreadsheets, Retrieve spreadsheets, Add “fluff” to appearances of spreadsheets, Create assigned spreadsheets for specific application use

Section-4 DATA BASE

Unit-12 Access Data Base, Enter data into D-Base, Save data in D-Base, Access files in D-Base, Save files in D-Base, Manipulate data, Extract information

Section-5 POWERPOINT

Unit-13 Access Powerpoint, Develop picture/word combination, Develop a presentation in powerpoint, Print from powerpoint

Reference Books:

1. Biomedical Informatics: Computer Applications in Health Care and Biomedicine (Health Informatics) by Edward H. Shortliffe and James J. Cimino (Hardcover - May 25, 2006)
2. Century 21? Computer Applications and Keyboarding: Comprehensive, Lessons 1-150 by Jack Hoggatt and Jon A. Shank (Hardcover - Jan 28, 2005)
3. Century 21 Computer Applications & Keyboarding by Jack Hoggatt, Jon A. Shank, and Jerry W. Robinson (Hardcover - Mar 2, 2001)

Year-III

BMLT 031 Biochemistry: Clinical Aspects

Section-1 Management and planning:

Unit-1 Reception and recording of specimens

Unit-2 Maintenance of laboratory records, reporting.

Section-2 Specimen collection

Unit-3 Whole blood, plasma, serum, urine, C.S.F & other body fluids, preservation of specimens, anticoagulants.

Section-3 Quality Control:

Unit-4 Role of quality control and its importance

Unit-5 Accuracy, Reliability, Precision

Unit-6 Internal and external quality control measure, preparation of reagents, standardization of methods, safety measures and precautions.

Section-4 Glasswares

Unit-7 Types, use, care and maintenance of flasks, pipettes, cylinders, funnels, tubes, thermometers.

Unit-8 Analytical instruments and techniques

Unit-9 Principles photoelectric colorimeters, spectrophotometers, flamephotometers, electrophoresis, Chromatography, Elisa and RIA, isotopes.

Unit-10 Types of photoelectric colorimeters, spectrophotometers, flamephotometers, electrophoresis, Chromatography, Elisa and RIA, isotopes.

Unit-11 Use, care and maintenance photoelectric colorimeters

Unit-12 Use, care and maintenance Spectrophotometers

Unit-13 Use, care and maintenance Flame photometers

Unit-14 Use, care and maintenance Electrophoresis

Unit-15 Use, care and maintenance Chromatography

Unit-16 Use, care and maintenance Elisa and RIA

Unit-17 Use, care and maintenance isotopes

Section-5 Biochemical test profiles

Unit-18 Principle and use of Glucose tolerance test

Unit-19 Principle and use of liver function tests

Unit-20 Principle and use of kidney function tests

Unit-21 Principle and use of Thyroid Function Test

Reference Books:-

- 1.Clinical Biochemistry: Metabolic and Clinical Aspects by William J. Marshall MA MSc PhD MBBS FRCP FRCPATH FRCPedin FIBiol and Stephen K. Bangert MA MB BChir MSc MBA FRCPATH (Paperback - Jun 20, 2008)
- 2.Molecular Genetics, Biochemistry and Clinical Aspects of Inherited Disorders of Purine and Pyrimidine Metabolism by Ursula Gresser, R.A. De Abreu, J. Aimi, and F.X. Arredondo-Vega (Hardcover - Sep 10, 1993)
- 3.Handbook of Cell-Penetrating Peptides, Second Edition (Pharmacology and Toxicology: Basic and Clinical Aspects) by Ulo Langel (Hardcover - Aug 15, 2006)
- 4.Electrolytes, Acid-Base Balance and Blood Gases: Clinical Aspects and Laboratory by Wolf Rüdiger Külpmann, H.-K. Stummvoll, and Paul Lehmann (Paperback - Apr 13, 2007)

BMLT 032 Applied Microbiology

Section-1 Management and Planning.

Unit-1 The reception and recording of specimen, cataloguing and indexing maintenance of laboratory records

Unit-2 A knowledge of working and maintenance of the Incubators

Unit-3 A knowledge of working and maintenance of the Refrigerators

Unit-4 A knowledge of working and maintenance of the Water baths

Unit-5 A knowledge of working and maintenance of the Ovens

Unit-6 A knowledge of working and maintenance of the Steamers

Unit-7 A knowledge of working and maintenance of the Autoclaves

Unit-8 A knowledge of working and maintenance of the Inspissator

Unit-9 A knowledge of working and maintenance of the Centrifuges

Unit-10 A knowledge of working and maintenance of the Vacuum Pumps

Unit-11 A knowledge of working and maintenance of the Water Steel.

Unit-12 cleaning and sterilization of syringes and needles, Simple glass wares

Section-2 Sterilization

Unit-13 Methods of sterilization and their uses.

Unit-14 Chemical, dry heat, steam sterilization, Tyndalisation, filtration, sterilization by ultra-violet light, Care and use of microscope.

Unit-15 Dark ground illumination, fluorescence and microscopy, Common bacteriological staining techniques, Cultural Methods

Section-3 Systemic Bacteriology

Unit-16 The general principles of the methods employed in identifying an unknown organism.

Unit-17 Elementary knowledge of common pathogens

Unit-18 Technique oriented examination of specimens such as pus, urine, stool, sputum, throat swab, Parasitological techniques and elementary knowledge of life cycle and lab.

Unit-19 Diagnosis of common parasites

Unit-20 Introduction to virology techniques.

Section-4 Serological Methods

Unit-21 Methods of performing agglutination, complement fixation, precipitation tests.

Unit-22 General knowledge of antigen antibody reactions

Unit-23 Mycology as related to Candida and Dermatophytes.

Section-5 Preservation and Maintenance

Unit-24 Methods of preservation of cultures, maintenance of stock cultures

Unit-25 Disposal of infected material and culture media.

Reference Books:-

1. Microbial Biotechnology: Fundamentals of Applied Microbiology by Alexander N. Glazer and Hiroshi Nikaido (Hardcover - Oct 1, 2007)
2. Statistical Analysis in Microbiology: StatNotes by Richard A. Armstrong and Anthony C. Hilton (Paperback - Nov 22, 2010)
3. Wastewater Microbiology (Wiley Series in Ecological and Applied Microbiology) by Gabriel Bitton (Hardcover - May 18, 2005)

BMLT 033 Blood Banking and special Hematological Tests

Section-1 Red Blood Cells

Unit-1 Normal morphology count

Unit-2 Isolation from whole blood & count

Unit-3 Effect on count & morphology of physiochemical parameters & the diseased state

Unit-4 Red cell anomalies & their relevance w.r.t normal & diseased state

Unit-5 Blood Transfusion

Unit-6 Pre-requisite & the complication of mis-matched transfusion

Unit-7 Methods of blood matching

Section-2 White blood cells & platelets

Unit-8 Morphology count & methods of isolation

Unit-9 Effect on count & morphology of cell by the physiochemical parameters, diseased.

Unit-10 State & the relevance of condition of the diseases Anaemia's

Unit-11 Definition (in general) & causes, types of anaemia & their classification, Physiochemical

Unit-12 Characteristic features & etiology of a plastic anaemia, haemolytic, megaloblastic,

Unit-13 Clinical features & diagnosis

Section-3 Leukaemia

Unit-14 Definition (in general) & their etiology

Unit-15 Classification of leukaemia

Unit-16 FAB classification, Etiologies, physiochemical features of different Type of leukaemias, with reference to clinical states

Unit-17 Diagnosis of different types of leukaemias

Section-4 Coagulation studies

Unit-18 General pathways (intrinsic & extrinsic)

Unit-19 Properties (physiochemical) mode of action of coagulation factors

Unit-20 Platelet studies

Unit-21 Platelet function tests (for different Coagulation factors)

Unit-22 Effect of promoters & inhibitors at diff steps in coagulation, their solution & mode of action

Unit-23 Diseases associated with coagulation disorders, their etiology & characteristics Features.

Section-5 Red Cell mass studies

Unit-24 Chemical method & radioactive methods

Unit-25 Red Cell function studies

Unit-26 Steps in Blood Management

Unit-27 Reception, labeling and recording of laboratory investigations

Unit-28 Cleaning of glassware, pipettes, E.S.R tubes and counting chambers

Unit-29 Preparation of capillary pipette, distilled water, reagents, buffers collection of blood

Unit-30 Preparation of blood smear

Unit-31 Staining of blood and bone marrow smears.

Unit-32 Measurement of hemoglobin, counting of leucocytes, erythrocytes, platelets and reticulocytes.

Unit-33 Recognition of blood cells in peripheral blood smear, Determination of haematocrite and E.S.R, preparation of haemolysate and determination of alkali resistant hemoglobin, paper electrophoresis of haemoglobin

Reference Books:

1. Special Tests for Orthopedic Examination - Paperback (Jan. 15, 1997) by Jeff G. Konin MEd MPT ATC, Denise L. Wiksten PhD ATC, and Jerome A. Isear Jr. MS PT ATC

2. The Special Educator's Comprehensive Guide to 301 Diagnostic Tests - Paperback (Aug. 25, 2006) by Roger Pierangelo Ph.D. and George Giuliani J.D. Psy.D.

BMLT 034 Cytopathology

Section-1 Cytology

Unit-1 General properties of living organisms

Unit-2 General properties of chemistry of the cells

Unit-3 General properties of cellular membranes

Unit-4 General properties of cytoskeleton

Unit-5 General properties of endoplasmic reticulum

Unit-6 General properties of Golgi body

Unit-7 General properties of Lysosomes

Unit-8 General properties of nuclear envelope

Unit-9 General properties of chromatin and chromosomes

Unit-10 General properties of mitosis

Unit-11 General properties of meiosis

Section-2 Outline of Embryology

Unit-12 Gametogenesis

Unit-13 reproductive cycle

Unit-14 fertilization

Unit-15 cleavage

Unit-16 A model of gastrulation.

Section-3 Histology

Unit-17 Epithelial tissue

Unit-18 connective tissues (blood connective, cartilage, bone)

Unit-19 muscular tissue

Unit-20 nervous tissue.

Reference Books:

- 1.Diagnostic Cytopathology: Expert Consult: Online and Print by Winifred Gray MB BS FRCPATH and Gabrijela Kocjan MB BS FRCPATH (Hardcover - Jun 21, 2010)
- 2.Practical Principles of Cytopathology Revised by Richard M. DeMay (Hardcover - Oct 9, 2007)
- 3.Differential Diagnosis in Cytopathology with CD-ROM by Paolo Gattuso, Vijaya B. Reddy, and Shahla Masood (Hardcover - Oct 30, 2009)
- 4.The Bethesda System for Reporting Thyroid Cytopathology: Definitions, Criteria and Explanatory Notes by Syed Z. Ali and Edmund S. Cibas (Paperback - Dec 11, 2009)
