



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

Accredited A++ Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

School of Allied Health Sciences
Department of Medical Laboratory Technology

**1.1.3 Total number of courses having focus on employability/ entrepreneurship/
skill development offered by the University during the year 2023-24**

CONTENTS

S. No.	Course Code	Course Name	Page No.
Employability			
1	SAMA1502	Systemic Bacteriology, Mycology & Virology	2
2	SAMA1504	Coagulation Studies	4
3	SACB1204	Fundamentals of Computing	5
3	SHSB1103	General English Language Learning I	6
5	SHSB1202	General English Language Learning II	7
6	SAMB1102	Basic Biochemistry	8
7	SAMB1104	Sociology & Psychology	9
Entrepreneurship			
8	SAMA1503	Theory of Quality Management & Automation	10
9	SAMB1103	Basic Medical Laboratory Sciences	11
10	SAMB1203	Hospital & Laboratory Management	12
Skill Development			
11	SAMA1501	Histopathology & Cytology Techniques	13
12	SAMB1101	Fundamentals of Anatomy & Physiology	15
13	SAMB1201	Clinical Biochemistry	17
14	SAMB1202	General Microbiology	19

SAMA1502	SYSTEMIC BACTERIOLOGY, MYCOLOGY & VIROLOGY			L	T	P	CREDITS	TOTAL
				4	0	0	5	100

Course Objectives:

To describe about the important medically important bacteria its mode of disease transmission, pathogenesis, diagnosis, prophylaxis and treatment.

To aims at understanding important medically important virus and fungi its mode of disease transmission, pathogenesis, diagnostic method and treatment.

UNIT I Cocci and Acid-fast bacillus

Systematic Bacteriology - Staphylococcus, Streptococci, Neisseria, Corynebacterium and related organisms. Mycobacterium - typical and atypical. Aerobic pathogenic Actinomycetes

UNIT II Enterobacteriaceae

Vibrios, Helicobacter Pseudomonas, Brucella, Haemophilus, Bordetella. Enterobacteriaceae, Salmonella, Shigella, Proteus, Escherichia, Klebsiella

UNIT III Bacilli and Spirochetes

Bacillus, B.anthraxis Clostridia, Mycoplasma, Rickettsia, Spirochetes, Treponema, Leptospira and Borrelia.

UNIT IV Laboratory diagnosis is bacterial pathogens

Recommendation for collection, transport of specimens, isolation of bacteria from clinical specimens. Primary media for isolation and their quality control - Antibiotic sensitivity discs, testing procedures and their quality control.

UNIT V Superficial and opportunistic mycoses

Introduction to Mycology, Dermatophytes and agents of superficial mycoses, Trichophyton, Epidermophyton and Microsporum. Opportunistic mycoses, Candidiasis, Cryptococcosis, Aspergillosis,

UNIT VI Subcutaneous and systemic mycoses

Systemic mycoses Histoplasmosis, Coccidioidomycosis, Blastomycosis. Subcutaneous mycoses, Mycetoma, Morphology, cultural characteristics, pathogenesis/disease caused & lab diagnosis.

UNIT VII Medical importance of DNA Virus

Introduction to Virology General characteristics of virus, Classification of virus, Pox, Herpes, Hepatitis B virus, Adeno virus

UNIT VIII Medical importance of RNA Virus

Orthomyxovirus, paramyxovirus, Adenovirus, Arbovirus, HIV, Rabies, Morphology, cultural characteristics, pathogenesis/disease caused & lab diagnosis.

Course Outcomes:

On completion of the course, students will be able to

CO1 Understand basic bacterial structure and staining.

CO2 Learn an overview of medically important bacterial families like Enterobacteriaceae

CO3 Familiarize with bacilli and spirochetes

CO4 Understand laboratory diagnosis of bacterial pathogens

CO5 Learn about superficial, systemic and opportunistic mycoses.

CO6 Learn and understand diagnosis of medically important viruses

Text / Reference Books

1. David Greenwood, Richard CD., Slack, John Forrest Peutherer. (1992). Medical Microbiology. 16th edition. ELBS with Churchill Livingstone.
2. Ananthanarayan, R. and JeyaramPaniker, C.K. (1994) Text Book of Microbiology, 6th Edn. Orient Longman, Chennai.
3. Alexopoulos CJ and C W. Mims. (1993).Introductory Mycology (3rd edition) Wiley Eastern Ltd, NewDelhi.
4. Jagadish Chander (1996) A Text Book of Medical Mycology. Interprint, New Delhi.
5. Jewetz, E., Melnic, J.L. and Adelberg, E.A. (2000) Review of Medical Microbiology, 19th Edn. LangeMedical Publications, U.S.A
6. Topley & Wilson's. (1990) Principles of Bacteriology, Virology and Immunity, VIII edition, Vol. III Bacterial Diseases, Edward Arnold, London.

SAMA1504	COAGULATIONSTUDIES			L	T	P	CREDITS	TOTAL
				4	0	0	4	100

Course Objectives:

To understand the mechanism and factors involved in coagulation

To apply the concepts of coagulation in analyzing the associated disorders

UNIT I

Hemostasis - Definition, Basic concept and principle, Basic steps involved in Hemostasis.

UNIT II

Coagulation - Basic Physiology, coagulation factors, Mechanism of blood coagulation, Extrinsic Pathway, Intrinsic Pathway

UNIT III

Regulators of blood coagulation – Factors, Regulation, Clinical Significance

UNIT IV

Blood coagulation tests I, Bleeding Time, Duke's method, Clotting Time- Capillary tube method & Lee white's method.

UNIT V

Blood coagulation tests II - PT, aPTT, TT, Clot retraction time, Determination of fibrinogen.

UNIT VI

Quality Assurance for routine Hemostasis Laboratory - Introduction, Sample collection technique (Phlebotomy, Sample preparation, Anticoagulant used, Importance of use of Sodium

UNIT VII

Bleeding disorders I: Coagulation factor deficiencies – congenital, acquired Fibrinolytic defects

UNIT VIII

Bleeding disorders II: Vascular disorders, Platelet disorders

Course Outcomes:

On completion of the course, students will be able to

CO1 Understand the physiological and biomechanical aspects of coagulation.

CO2 Identify factors and pathways of blood coagulation.

CO3 Recognize the regulators and clinical significance of coagulation.

CO4 Apply the various coagulation tests in diagnostic and clinical services.

CO5 Appreciate the need of quality practices.

CO6 Understand pathophysiology and management of coagulation disorders.

Text / Reference Books

1. Ramnik Sood, Concise Book of Medical Laboratory Technology (Methods and interpretation), 2nd Ed., N.A.Publishers, 2015
2. Satish Gupta Short text book of Medical Laboratory for technician J.P. Bros, New Delhi, 2014
3. Shirley Mitchell Lewis, Barbara J. Bain, Imelda Bates (2006) Dacie & Lewis Practical Hematology, 10th Ed, Churchill Livingstone/Elsevier.

SACB1204	FUNDAMENTALS OF COMPUTING	L	T	P	EL	CREDITS	TOTAL
		3	0	0	0	3	100

COURSE OBJECTIVES

- ☐ To understand the basics of parts of a computer.
- ☐ To Understand operation of word documents.
- ☐ To understand about files, spread sheets and Networking.

UNIT 1: INTRODUCTION TO COMPUTERS

9 Hrs.

Classifications of computers; Computers inside — Hardware (processing, memory i/o, storage etc), Software (Systems, application); Operating Systems —DOS, LINUX, UNIX, Windows; Programming Overview, need and skills; Networking Basics; Virus; Hacking.

UNIT 2: WORD PROCESSING

9 Hrs.

Operating of word documents like open, close, save, print; Editing Text — tools, formatting, bullets, layout; Navigating word — Keyword, mouse, document formating; paragraph alignment — indentation, headers, footers, numbering; printing — preview, options.

UNIT 3: FILE

9 Hrs.

Importance of file management, backing of files, files and folders- editing, deleting, retrieving, renaming, subfolders; Manipulating windows — minimize, mazimize; power point basics- terminology-templates, viewing.

UNIT 4: SPREADSHEETS

9 Hrs.

MS Excel — opening, entering text and data, formatting, navigating; Formulas- entering, handling and copying; charts- creating, formatting and printing, header and footer, centering of data; printing.

UNIT 5: NETWORKING

9 Hrs.

Internet explorer; www — working, browsing, searching, saving; bookmark — features, favorite, create, delete; printing webpage; email — creating, receiving, reading and sending messages.

Max. 45 Hrs.

COURSE OUTCOMES:

On completion of this course students will be able to

CO1 - Understand the computing skills.

CO2 - Understand the concept of input and output devices of Computers.

CO3 - Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.

CO4 - Understand an operating system and its working, and solve common problems related to operating systems.

CO5 - Able to apply Basic word processing, Spreadsheet and Presentation Graphics Software skills.

CO6 - Develop the basic skills to use the Internet safely, legally, and responsibly.

TEXT / REFERENCE BOOKS:

1. Introduction to Computers — Peter Norton, Tata McGraw-Hill, India.
2. Microsoft 2003 — Jennifer Ackerman Kettel et al., Tata Mc-Graw Hill, India.
3. Working in Microsoft office 2006- Ron Mansfield, Tata Mc-Graw Hill, India.

SHSB1103	GENERAL ENGLISH LANGUAGE LEARNING I	L	T	P	EL	CREDITS	TOTAL
		3	0	0	0	3	100

COURSE OBJECTIVES

- ☐ To improve the comprehension and critical thinking skills.
- ☐ To develop and integrate the use of the four language skills i.e., Listening, Speaking, Reading and Writing.
- ☐ To enhance the vocabulary knowledge by learning various strategies.
- ☐ To train academic and professional skills like interview skills, ICT and Presentation skills.
- ☐ To enable the learner to communicate effectively and appropriately in real life situation.

UNIT 1: LANGUAGE AT THE WORD LEVEL

9 Hrs.

Parts of Speech – Kinds of sentences- Tense- Voice-Impersonal Passive – Reading: Comprehension passages – Writing: Letter writing – Job Application with CV- Speaking: Self Introduction, listening: Introduction to Internet & World Wide Web - Creating and Managing Email Accounts

UNIT 2: LANGUAGE AT THE SENTENCE LEVEL

9 Hrs.

Concord- Phrases and Clauses-Adjectives and adverbs-Modals - Prefix-Suffix–Identifying topic sentence, Connectives and discourse markers - Writing: Paragraph Writing- Compare/ contrast paragraphs, Bar diagrams- Tabular columns– Listening: Using audio and video to learn vocabulary and grammar.

UNIT 3: WRITING FOR THE SCREEN

9 Hrs.

Reported Speech, Compound nouns, Abbreviations/ Acronyms- Types of Sentences- Simple, Compound, Complex-Transformation of sentences- Flow Chart-Writing process descriptive paragraphs/drawing diagram from the paragraph –Creating and writing online quiz tests using Kahoot application- E-mail writing- letters inviting dignitaries-Accepting and Declining.

UNIT 4: LANGUAGE AT DISCOURSE LEVEL

9 Hrs.

Cloze reading exercises- Developing dialogues- Question tags- Instructions- Recommendations-Group Presentations - Preparing Checklist-Posting Online feedback for any article- Writing classified Advertisements- Argumentative Essay writing- Creating Blogs using wordpress.com.

UNIT 5: CREATIVE THINKING

9 Hrs.

Identifying the topic sentences by reading the content - Group discussions on a given topic – Mock interview – Story cluster – Rearrange the story – News report – Ad making - Writing Letters – Job application – Accepting/Declining job offers.

Max. 45 Hrs.

COURSE OUTCOMES On completion of the course, students will be able to know

- CO1 - Analyze any piece of work critically employing reading and vocabulary strategies.
- CO2 - Understand the importance of vocabulary words used in verbal and written conversation.
- CO3 - Enhance critical thinking skills by composing questions in reasoning format.
- CO4 - Equip themselves with professional soft skills to meet the industry demands.
- CO5 - Construct and evaluate written discourse with advanced skill set.
- CO6 - Equip the students with the required Professional Skills.

TEXT / REFERENCE BOOKS

1. Bhattacharya, Indrajit. An Approach to Communication Skills, Dhanpat Rai Co. Pvt Ltd; New Delhi.
2. Jones, Leo. Cambridge Advanced English: Student's Book New Delhi: Cambridge Univ Press,1998.
3. English for Science and Technology (2013) by Department of English, Sathyabama.

SBSH1203	GENERAL ENGLISH LANGUAGE LEARNING II	L	T	P	EL	CREDITS	TOTAL
		3	0	0	0	3	100

COURSE OBJECTIVES

- ☐ To equip students to use the language effectively in daily life.
- ☐ To improve the knowledge of Computing and Information and Communication Technology.
- ☐ To find the relevance of grammar in conversational skills.
- ☐ To build the professional and industrial skills like Personality development and critical thinking, etc.
- ☐ To enhance creative writing for interactive media.

UNIT 1: LANGUAGE FOR EVERY DAY USAGE

9 Hrs.

Parts of speech- Tenses-Types of sentences - Degree of comparison – Dialogue writing- Building conversation with imaginary situation – Listening and Reading skills through teacher led practice – writing agenda for a meeting – note taking – Summary writing.

UNIT 2: SOCIAL MEDIA STRATEGIES

9 Hrs.

Editing the passage with respect to spelling, grammar and punctuation-Rearranging Jumbled sentences - Writing effective headlines – Giving feedback online-Letter to the editor- Problems and Solutions- Campaign Leaflet and Writing Film Review.

UNIT 3: LANGUAGE FOCUS

9 Hrs.

WH questions-Framing open-ended questions -Auxiliaries - Finites - Non – finites: Modal auxiliaries: Verbs: use of Transitive, Intransitive verbs - Phrasal verbs – Quantifiers- Identifying the odd word out- Collocations- Writing informal mails to friends and relatives

UNIT 4: PROFESSIONAL WRITING

9 Hrs.

Simile, Metaphor- Connotations- denotations- Idioms and Phrases-Letter to the editor with solutions to current problems –Essay writing- Paragraph writing – Line Graph- Creating Accounts - On line Groups - Twitter- Face book - Skype- Linked in - Research Gate-You Tube - Flickr.

UNIT 5: CREATIVE WRITING FOR INTERACTIVE MEDIA

9 Hrs.

Report Writing- Letter writing- Request for practical training-Projects – Creating PowerPoint Presentation and uploading – Creating Blogs and uploading data – Creative writing - stories and poems article writing and presentation.

Max. 45 Hrs.

COURSE OUTCOMES On completion of the course, students will be able to know

- CO1- Improve communication skills effectively in everyday conversation.
- CO2 - Use ICT tools efficiently to improve communication skills.
- CO3 - Enhance conversation skills, impromptu speech inculcating basic grammar.
- CO4 - Equip themselves with professional soft skills to meet the industry demands.
- CO5 - Construct creative article demanded for interactive media.
- CO6 - Equip the students with the required Professional Skills.

TEXT / REFERENCE BOOKS

1. Bhattacharya, Indrajit. An Approach to Communication Skills, Dhanpat Rai Co. Pvt Ltd; New Delhi.
2. Rajendra, Pal and Korlhalli. Essentials of Business Communication, J.S.Sultan Chand & Sons, 2007
3. Seely, John. The Oxford Guide to Writing and Speaking Oxford: Oxford University Press, 1998

- Employability

SAMB1102	BASICS OF BIOCHEMISTRY	L	T	P	EL	CREDITS	TOTAL
		4	0	0	0	4	100

COURSE OBJECTIVES

- Aim is to provide a basic understanding of the core principles and topics of Biochemistry and their experimental basis.
- To enable to perform routine as well as special investigative procedures in different specialties of Medical Laboratory Technology.

UNIT 1: Chemistry, metabolism & Clinical pathology of Carbohydrate

12 Hrs.

Chemistry of carbohydrates & their related metabolism - Introduction, definition, classification, biomedical importance Brief outline of metabolism: Glycogenesis & glycogenolysis (in brief), Glycolysis, citric acid cycle & its significance, HMP shunt & Gluconeogenesis, Diabetes mellitus, gestation diabetes mellitus, Hyperglycemia & hypoglycemia and its causes.

UNIT 2: Chemistry of Amino acids and Protein Metabolism and its clinical pathology

12 Hrs.

Amino acids -Definition, classification, essential & non-essential amino acids. Chemistry of Proteins - Introduction, definition, classification, structure, and its biomedical importance, Transformation, Decarboxylation, Ammonia formation & transport, Urea cycle, metabolic disorders in urea cycle, catabolism of amino acids especially Phenylalanine, Tyrosine & Tryptophan, Creatinine, Proteinuria.

UNIT 3: Chemistry of Lipids, Lipids metabolism & clinical Pathology

12 Hrs.

Introduction, definition, classification, biomedical importance, essential fatty acids. Non-essential fatty acids, Brief out line of metabolism: Beta oxidation of fatty acids, fatty liver, Ketosis, Cholesterol & its clinical significance, Lipoproteins in the blood composition & their functions in brief, Atherosclerosis

UNIT 4: Enzymes and its clinical significance

12 Hrs.

Introduction, definition, classification, coenzymes, isoenzymes, properties, factors affecting enzyme action, enzyme inhibition, diagnostic value of serum enzymes - Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT, Amylase, Lipase, Carbonic anhydrase etc.,

UNIT 5: Acid base balance concepts & disorders

12 Hrs.

Water metabolism, Distribution of fluids in the body, ECF, ICF, dehydration. - pH, Buffers, Acidosis, Alkalosis.

COURSE OUTCOMES On completion of the course, students will be able to know

- CO1- Attain knowledge about the basics of biochemistry and their importance.
- CO2 – Attain knowledge on carbohydrates, proteins, fats and their functions in the body.
- CO3 – Attain knowledge on the basic principles of metabolism and its regulation
- CO4 – Understand the role of enzymes and its importance in diagnosis of various diseases.
- CO5 – Understand the role of pH, buffer system and water balance in the body.
- CO6 – Access various biochemical parameters and its relation to disease and dysfunction of organs.

TEXT / REFERENCE BOOKS

1. Textbook of Medical Biochemistry by MN Chatterji & Rana Shinde, 7th Edition, Jaypee Publishers.
2. Handbook of Biochemistry & Nutrition by Shivanand Nayak B, by Jaypee publishers, 4th edition, 2020.
3. Harper's illustrated Biochemistry 31st edition, by Lange Publishers, 2018.
4. Principles of Biochemistry by Voet & Voet fourth edition, Wiley publishers, 2010.

SAMB1104	SOCIOLOGY & PSYCHOLOGY	L	T	P	EL	CREDITS	TOTAL
		3	0	0	0	3	100

COURSE OBJECTIVES

- ☐ To help the students to know about social process and characteristic of socialization.
- ☐ Train them to acquire Family and Communal health knowledge and be aware of with Professional Socialization during hospitalization.

UNIT 1

9 Hrs.

Interdependence between man and society, Family organization.

UNIT 2

9 Hrs.

Social processes, associative and disassociate, social groups characteristics functions in a health setting, Socialization during hospitalization.

UNIT 3

9 Hrs.

Culture - health & illness, System of social stratification, social control, social change, social dis organization, social planning and social reconstruction

UNIT 4

9 Hrs.

Introduction, definition, Branches, Methodology involved, Psychology in health care, Sensation, attention and perception

UNIT 5

9 Hrs.

Personality, Motivation, Learning, Mental health, Creative thinking

Max. 45 Hrs.

COURSE OUTCOMES On completion of the course, student will be able to

CO1 Understand the basic of society.

CO2 get familiar with social processes and hospitalization

CO3 Recognize the Professional Socialization and culture - health & illness.

CO4 Apply the practical knowledge and understanding to usage of instruments.

CO5 Bridge the gap between society and hospitalization.

CO6 Familiar with Psychology in health care.

TEXT / REFERENCE BOOKS

1. Sica, A. (2001). Encyclopedias, Handbooks, and Dictionaries. In N.J. Smelser & P.B. Baltes (Eds.), International Encyclopedia of the Social & Behavioral Sciences.
2. Handbook of Psychology, 2nd edition by Irving B. Weiner (Editor)
3. Oishi S, Kesebir S, Snyder BH. Sociology: A lost connection in social psychology. Personality and Social Psychology Review. 2009 Nov.13(4):334-53.

- Employability

SAMA1503	THEORY OF QUALITYMANAGEMENT & AUTOMATION			L	T	P	CREDITS	TOTAL
				4	0	0	5	100

Course Objectives:

To introduce the concept of quality management

To apply the significances of analyzers in automation

UNIT I

Automation - Introduction, meaning, advantages, history

UNIT II

Continuous flow analyzers, Single channel continuous flow analyzers-advantages, disadvantages

UNIT III

Multi-channel flow analyzers, discrete auto analyzers - basic features, types, semi-automated, fully automated Batch analyzers

UNIT IV

Random access analyzers (RAA), Component steps in fully automated analyzers, Auto analyzers based on immunoassay techniques

UNIT V

Micro particle enzyme immunoassay (MEIA), various random-access analyzers - Hitachi- 704, BM/Hitachi -717

UNIT VI

Centrifugal analyzers, ASCA, Dry chemistry analyzers, Dimension RxL clinical chemistry system, The Heterogeneous Immunoassay module components, Beckman Array 360system, Mini Vidas analyzers

UNIT VII

Immulite automated immunoassay analyzers, Latest trends in Automation

UNIT VIII

Biochips, Lab on a chip (LoC), Nano sensors - advantages and disadvantages, PCR & its applications.

Course Outcomes

On completion of the course, students will be able to

CO1 Understand the principles of automation.

CO2 Identify role of automation in flow analyzers.

CO3 Recognize the types of analyzers and their significance.

CO4 Apply the theoretical understanding to practical usage.

CO5 Recognize the latest trends and quality practices.

CO6 Bridge the gap between clinical and industry in theory and practice of automation.

Reference Books

1. Laboratory management – Quality in Laboratory diagnosis – Candis A Kinkus, Demos medical publishers, 2011

2. Quality control in Laboratory – Gaffar Sarwar Zamman, Intech open publishers, 2011

3. Clinical Diagnosis and Management by Laboratory Methods, Henry 23rd edition, 2016

SAMB1103	BASIC MEDICAL LABORATORY SCIENCES	L	T	P	EL	CREDITS	TOTAL
		3	0	0	0	3	100

COURSE OBJECTIVE

- ☐ To know basic of laboratory management and laboratory management.
- ☐ To have basic understanding of reagents preparation, sample collection.

UNIT 1: INTRODUCTION TO SAMPLE COLLECTION 9 Hrs.
Methods of collection, Transport, packing and storing of specimens, importance of labeling and identification.

UNIT 2: PREPARATION OF SOLUTIONS 9 Hrs.
Units of weight and volume, Calculation of concentration and methods of expressing concentration of solutions, types of water and their properties and uses. Preparation of standard solutions and reagents, Calculation of concentration and dilution factor, Interconversion of concentration - Normal, Molar, Molal and Percentage solution. Preparation of reagents for various biochemical analysis, chemical indicators and theory of indicators.

UNIT 3: LABORATORY CHEMICAL & GLASSWARE AND ITS USES 9 Hrs.
Cleaning of glassware's, Types and use of pipettes and calibration of pipettes. Stores and supplies: Indenting, ordering, storage, shelf-life of various reagents and grades of chemicals. Grades of chemicals, storage and handling of chemicals and reagents.

UNIT 4: CALIBRATION AND VALIDATION OF CLINICAL LAB INSTRUMENT 9 Hrs.
Principle and QC procedure for lab instruments - parts, principle, maintenance, and care of microscopes, incubator, Hot air oven, Autoclave, Centrifuge, Colorimeter, Spectrophotometer, Flame photometer, Refrigerator, pH meter.

UNIT 5: LABORATORY SAFETY 9 Hrs.
First aid in the laboratory, Precautions for infective material, common lab accidents and their prevention, first aid. Handling of infective materials: General principles, laboratory hazards and safety measures, universal safety precautions.

Max. 45 Hrs.

COURSE OUTCOMES On completion of the course, students will be able to know

- CO1- Understand the General knowledge of laboratory organization
- CO2 - Understand the sample collection procedure
- CO3 - To know about basic laboratory procedure and reagents preparation.
- CO4 - To learn about laboratory chemical and glassware uses
- CO5 - To know about Laboratory safety, and rules regarding safe disposal.
- CO6 - To know about laboratory reporting, recoding procedures and management.

TEXT / REFERENCE BOOKS

1. MLT Text book of Anatomy and Physiology, Mahendra Kumar Gupta, 2003.
2. Anatomy for MLT & other Allied Courses, Dr. Renu Chauhan, APC Books, 2016.
3. Human Anatomy and Physiology for Courses in Nursing and Allied Health Sciences 4th Ed, Yalayya swamy N.N., CBS Publishers, 2017.
4. Ross & Wilson Anatomy and Physiology in Health and Illness, Anne Waugh & Allison Grant, Elsevier, 13th edition, 2013.

- Entrepreneurship

SAMB1203	HOSPITAL AND LABORATORY MANAGEMENT	L	T	P	EL	CREDITS	TOTAL
		3	0	0	2	3	100

COURSE OBJECTIVES

- ☐ To help the students to know about Health care Management.
- ☐ Train them to acquire Family and Communal health knowledge.
- ☐ To be aware of with specimen collection procedures.

UNIT 1: PRINCIPLES OF HOSPITAL MANAGEMENT

9 Hrs.

Hospital planning - Organization of OP & IP., Ancillary services, Hospital statistics, Evaluation of patient care, Resource mobilization, Public Relations in Hospital. Human Resource Management
Manpower planning - Recruitment procedures - Training and Development, Educational institutions and consultants - Principles and methods of executive development programme - Performance appraisals, Job satisfaction.

UNIT 2: INVENTORY MANAGEMENT

9 Hrs.

Need for adopting materials management concept, Norms for inventory, Inventory carrying cost, Understocking, Overstocking - ABC analysis - Inventory reports - Materials handling, Store keeping and warehousing management.

UNIT 3: BOOK AND RECORD KEEPING

9 Hrs.

Meaning and Objectives – Double entry system, Trial balance, Profit and loss account, Preparation of balance sheet, Medical records Maintenance

UNIT 4: MANAGEMENT OF BIO-MEDICAL WASTE

9 Hrs.

Technologies for Treatment for BMW, Criteria for selecting appropriate Medical Waste Technologies

UNIT 5: GENERAL KNOWLEDGE OF LABORATORY ORGANIZATION

9 Hrs.

Reporting and recoding procedures, Ethics of laboratory practice including confidentiality of reports, medicolegal aspects of record keeping, Audit in a Medical Laboratory, Introduction and Importance, NABL & CAP, Responsibility, Planning, Horizontal, Vertical and Test audit, Frequency of audit, Documentation.

Max. 45 Hrs.

COURSE OUTCOMES On completion of the course, students will be able to know

CO1- Understand the organization routine functioning and operational standards of laboratories.

CO2 - To be aware of with specimen collection procedures.

CO3 - Recognize the aware of pre analytical, analytical, analytical, and post analytical stages of processing.

CO4 - Apply the theoretical understanding to practical usage and recognize the latest trends and quality practices.

CO5 - To have a general understanding of the organization routine functioning.

CO6 - To know operational standards of laboratories.

TEXT / REFERENCE BOOKS

1. Gupta, Hospital & Health care Administration, 2000, Jaypee Brothers Medical Publishers, New Delhi.
2. Jha, S.M., Hospital Management, 2003, Himalaya publishing house, New Delhi.
3. Mohd.Faisal Khan, Hospital Waste Management, 2004, Kanishka publishers, New Delhi.

SAMA1501	HISTOPATHOLOGY & CYTOLOGY TECHNIQUES	L	T	P	CREDITS	TOTAL
		4	0	0	5	100

Course Objectives:

- To be able to fix, process, embed tissues and make sections for micro section studies
- To be competent to make routine cytological preparation

UNIT I

Introduction to Histopathology and Cytopathology Techniques – Basic concepts and principles. Applications

UNIT II

Reception of specimens– Criteria, Requisites, Container, Identity, Labeling, Rejection

UNIT III Tissue processing- Micro techniques I

Basic steps, fixing – Types of fixatives, Factors, Dehydration, Embedding

UNIT IV Micro techniques II

Microtomy, Staining, Mounting, Methods of decalcifications

UNIT V Equipment

Microscope, Microtome -Types, Uses, Parts, different types of microtome knives, care and maintenance, Automated tissue processor- components, working and precautions during use, Tissue floating bath

UNIT VI Staining

Hematoxylin and Eosin staining, preparation of hematoxylin and eosin stains, Reticulin stain, PAP staining- components and methods.

UNIT VII Cytology

Introduction to FNAC and Exfoliative cytology, Processing of fluids- Sputum, bronchial aspirates, bronchial washings, gastric washings, Urine and other watery fluids, Cerebrospinal fluid

UNIT VIII Museum techniques

The mounting of pathological specimens - Introduction., Preparation of specimen, Fixation of specimen- Kaiserling solution-1 and Kaiserlingsolution-2, Precaution taken for the Fixation of Specimens, Storage of Specimens, Mounting of Museum Specimens, Filling and Scaling

Course Outcomes:

On completion of the course, student will be able to

CO1 Identify the basic structure of cells, tissues and organs and describe their contribution to normal function.

CO2 Interpret light- and electron-microscopic histologic images and identify the tissue source and structures.

CO3 Demonstrate common histology procedures such as embedding tissue in paraffin, tissue sectioning and mounting, or routine staining of tissue sections

CO4 Describe common histology laboratory procedures used to prepare stained slides from tissuesamples.

CO5 Outline the principles of histochemistry and types of microscopies utilized in histology

CO6 Understand professional procedures in museum display, collections, care and preservation

Reference books

1. Bancroft's Theory and Practice of Histological Techniques by John D Bancraft /Edition 8 (2018)
2. Handbook of Histopathological and Histochemical Techniques: Including Museum Techniques / edition3 (1974) by C. F. A. Culling
3. Hand book of Medical laboratory technology, 2nd edition by Robert H Carman, Christian Medical Association of India (publishers)
4. Textbook of Medical Laboratory Technology/ edition 3 (2020) by Godkar P.B

SAMB1101	FUNDAMENTALS OF ANATOMY AND PHYSIOLOGY	L	T	P	EL	CREDITS	TOTAL
		4	0	0	2	4	100

COURSE OBJECTIVES

- To understand how organs and structures present and how they function and how both structure and function are modified by deficiency to disorder or pathology to disease will be understood.
- To achieve through demonstrations using prosected cadavers, student dissection, anatomical models, plastinated specimens, online learning modules, labeled gross specimens and models.

UNIT 1: THE SKELETAL SYSTEM&MUSCULAR SYSTEM

12 Hrs.

Bones – Types, structure, Axial & Appendicular Skeleton, Bone formation and growth, Description of bones. Joints –classification and structure. Alterations in disease, Classification, Structure and properties of muscles, Neuromuscular junction, Electromyogram and disorders of muscles.

UNIT 2: CARDIOVASCULAR AND LYMPHATIC SYSTEM

12 Hrs.

Blood, Blood groups, Hemoglobin and iron metabolism, Coagulation of Blood, Structure of heart, Cardiac cycle, Electrocardiogram, Blood Pressure, Circulation: systemic, pulmonary, coronary, Lymphatic system, Lymphatic vessels and Lymphatic tissues, Lymph nodes.

UNIT 3: RESPIRATORY SYSTEM & DIGESTIVE SYSTEM

12 Hrs.

Structure of the organs of respiration, Muscles of respiration: intercostal and Diaphragm Alterations in disease, Structure of Alimentary tract and accessory organs of digestions – Mouth, Stomach, Liver and Gall bladder.

UNIT 4: EXCRETORY SYSTEM, NERVOUS SYSTEM & SPECIAL SENSES

12 Hrs.

Kidney, Ureter, Urinary bladder, Urethra (male and female), Urine Formation, Structure of neuralgia & neurons, Somatic Nervous system, Structure of brain, spinal cord, cranial nerves, peripheral nerves, Autonomous Nervous system – sympathetic, parasympathetic Structure, location. Alterations in disease. Structure of, eye and ear, Physiology of vision, Auditory & Olfactory apparatus.

UNIT 5: REPRODUCTIVE SYSTEM

12Hrs.

Male Gonad: Testes, Epididymis, Female Gonad: Ovary, Fallopian Tube, Uterus, Vagina and Mammary gland. Introduction of male Genital Organs, Introduction of female Genital Organs.

Max. 60 Hrs.

COURSE OUTCOMES On completion of the course, students will be able to know

- CO1 – Use anatomical terminology to identify and describe locations and functions of major organs of each system covered.
- CO2 – Understand the interrelationships among molecular, cellular, tissue, and organ functions in each system Correlate the inter-dependency and interactions of the systems.
- CO3 - Acquire knowledge about homeostatic imbalances
- CO4 – Acquire knowledge about the causes.
- CO5 - Understand the contributions of each organ and tissue system

TEXT / REFERENCE BOOKS

1. Human Anatomy and Physiology for Courses in Nursing and Allied Health Sciences 4th Ed, Yalayya swamy N.N., CBS Publishers,2017.
2. Ross & Wilson Anatomy and Physiology in health and Illness, Anne Waugh & Allison Grant, Elsevier,13thedition,2013.
3. Fundamentals of Anatomy & Physiology, Judi L Nath, Edwin F. Bartholomew, FredericH. Martini,



SAMB1201	CLINICAL BIOCHEMISTRY	L	T	P	EL	CREDITS	TOTAL
		4	0	0	0	4	100

COURSE OBJECTIVES

- To impart experiential learning to the students in order to develop a desired workforce to combat ever increasing demand of medical lab technicians in the healthcare sector.
- To enable the students to function efficiently, confidently and safely in clinical laboratory settings including hospital environments.

UNIT 1: PHOTOMETRY

12 Hrs.

Definition, laws of photometry, absorbance, transmittance, absorption maxima, instruments, parts of photometer, types of photometry–colorimetry, spectrophotometry, flame photometry, fluorometry, choice of appropriate filter, measurements of solution, calculation of formula, applications.

UNIT 2: WATER, VITAMINS & ENZYMES OF CLINICAL IMPORTANCE

12 Hrs.

Distribution of fluids in the body, ECF & ICF, water metabolism, dehydration, mineral metabolism, macronutrients (principal mineral elements) & trace elements. Fat - & water-soluble vitamins, sources, requirement, deficiency disorders & biochemical functions. Introduction to enzymes of clinical importance, Study on the distribution, clinical significance, and determination of AST, ALT, LDH and serum levels of LDH in pathological conditions. Study on the clinical significance and biological role of creatine kinase, alkaline phosphatase and gamma glutamyl-transferase.

UNIT 3: LIVER & RENAL FUNCTIONS & THEIR ASSESSMENT

12 Hrs.

Based on: 1-Carbohydrate metabolism 2-Protein metabolism 3- Lipid metabolism 4-Measurements of serum enzyme levels 4-Bile pigment metabolism, Jaundice, its types and their biochemical findings. Detailed study on renal clearance and glomerular filtration rate and study on non-protein nitrogen containing compound. Study on biochemistry and physiology of urea and clinical significance of urea measurement. Detailed study on biochemistry and physiology of creatinine and creatine, clinical significance of creatinine clearance and plasma creatinine.

UNIT 4: LIPIDS AND CARDIAC PROFILE

12 Hrs.

Introduction to lipid profile tests and study on the diagnostic tests done for lipoprotein disorders, Study on the clinical significance of lipid profile test and the changes in values in different lipoprotein disorders like Atherosclerosis, Fatty streak, Fibrous Plaque. In brief Hypertension, Angina, Myocardial Infarction, Pattern of Cardiac Enzymes in heart diseases.

UNIT 5: ACID BASE BALANCE

12 Hrs.

Introduction, detailed study on the electrolyte composition of body fluids. Study on distribution of ions by passive and active transport and detailed study on Henderson –Hasselbach equation, study on bicarbonate carbonic acid buffer system, phosphate buffer system, plasma protein buffer system and hemoglobin buffer system. Study on isohydric and chloride shift, respiratory compensatory mechanism and renal compensatory mechanism in the regulation of acid- base. Detailed study on metabolic acidosis, metabolic alkalosis –classification, compensatory mechanism and laboratory findings. Detailed study on respiratory acidosis and respiratory alkalosis- classification, compensatory mechanism and laboratory findings.

Max. 60 Hrs.

COURSE OUTCOMES On completion of the course, students will be able to know

CO1- Understand the different analytical techniques for analyzing samples.

CO2 - Acquire knowledge about various diseases and their causes.

CO3 - Learn different types of immune techniques and its analysis of various microorganism.

CO4 - Demonstrate on various types of glucose estimation and its interpretation.

CO5 - Implement various methods to diagnose the lipid profile.

CO6 - Understand various deficiency diseases of vitamins and biochemicals.

TEXT / REFERENCE BOOKS

1. Textbook of Medical Biochemistry by MN Chatterjea & Rana Shinde, 7th Edition, Jaypee Publishers.
2. Analytical Biochemistry by Dr. P. Asokan, Chinnaa publications edition 3, 2010.
3. Principles of Biochemistry by Voet & Voet fourth edition, 2018, Wiley publishers

SAMB1202	GENERAL MICROBIOLOGY	L	T	P	EL	CREDITS	TOTAL
		4	0	0	0	4	100

COURSE OBJECTIVES

- To develop an understanding of the basic concepts and terminology in general pathology and microbiology.
- To understand the methods of microbial staining, media, transport and control of microbial pathogens.

UNIT 1: GENERAL MICROBIOLOGY

12 Hrs.

General characters and classification of Bacteria - Characteristics of Bacteria - Morphology - Shape, Capsule, Flagella, Inclusion, Granule, Spore - Growth and Maintenance of Microbes - Bacterial division, Batch Culture, Continuous culture, bacterial growth- total count, viable count, bacterial nutrition, oxygen requirement, CO₂ - requirement, temperature, pH, light.

UNIT 2: STERILIZATION AND DISINFECTION IN MICROBIOLOGY

12 Hrs.

Definition of sterilization and disinfection, Brief description of various agents used in sterilization by physical method like sunlight, drying, dry heat, moist heat, filtration, radiation and ultrasonic vibrations., Sterilization by chemical methods – Alcohols, Aldehyde, Dyes, Halogens, Phenols, Surface-active agents, Metallic salts and gases., Sterilization by Gases & vapors by Ethylene Dioxide, Formaldehyde vapors., Testing of disinfectants to determine the efficiency of disinfectant.

UNIT 3: MEDIA & STAINING

12 Hrs.

Culture Media - Definition, uses, basic requirements, classification, Agar, Peptone, Transport Media, Sugar Media, Anaerobic Media, Containers of Media, Forms of Media – Staining Methods - Simple, Gram's staining, Ziehl - Neelsen staining or AFB staining, Negative Impregnation.

UNIT 4: COMMONLY USED INSTRUMENTS, EQUIPMENTS IN MICROBIOLOGY

12 Hrs.

Optical or light microscope, phase contrast microscope, dark field microscope, Fluorescence Microscopy, Electronic Microscopy, Safety hood chamber

UNIT 5: LABORATORY DIAGNOSIS IS BACTERIAL PATHOGENS

12 Hrs.

Collection and Transportation of Specimen - General Principles, Containers, Rejection, Samples- Urine, Faeces, Pus, Sputum Body fluids, Swab, Blood. Isolation of bacteria from clinical specimens. Primary media for isolation and their quality control - Antibiotic sensitivity discs, testing procedures and their quality control.

Max. 60 Hrs.

COURSE OUTCOMES On completion of the course, students will be able to know

CO1- Understand the basic samples collection and transport in microbiology lab.

CO2 - Demonstrate media and staining used in microbiology lab.

CO3 - Describe the role of various instruments in laboratory.

CO4 - To explore the scope of microbiology, microbial structure and their growth.

CO5 - Carry out the process of sterilization, media preparation, staining methods to control microbes.

CO6 - Acquire the knowledge to process various clinical samples and interpret the results.

TEXT / REFERENCE BOOKS

1. Microbiology with Diseases by Taxonomy Paperback by Bauman Robert W. (Author) 2017.
2. Textbook of Pathology - Harsh Mohan - 8th Edition (English) Paperback – 2019.
3. Robbins & Cotran Pathologic Basis of Disease: South Asia Edition Paperback – 2014.