MOHAN BABU UNIVERSITY

Sree Sainath Nagar, Tirupati – 517 102

MBU
MOHAN BABU
UNIVERSITY
DREAM. BELIEVE. ACHIEVE

SCHOOL OF PARAMEDICAL, ALLIED AND HEALTH CARE SCIENCES

B.Sc. Medical Lab Technology

CURRICULUM AND SYLLABUS

(From 2022-23 Admitted Batches)

FULLY FLEXIBLE CHOICE BASED CREDIT SYSTEM (FFCBCS)

MBU MOHAN BABU UNIVERSITY

Vision

To be a globally respected institution with an innovative and entrepreneurial culture that offers transformative education to advance sustainability and societal good.

Mission

- Develop industry-focused professionals with a global perspective.
- Offer academic programs that provide transformative learning experience founded on the spirit of curiosity, innovation, and integrity.
- Create confluence of research, innovation, and ideation to bring about sustainable and socially relevant enterprises.
- Uphold high standards of professional ethics leading to harmonious relationship with environment and society.

SCHOOL OF PARAMEDICAL ALLIED AND HEALTH CARE SCIENCES

Vision

To be the global center of excellence for paramedical and allied health science education, research, innovation, incubation, consultancy and public service.

Mission

- Inspire the experts of paramedical and allied health sciences of tomorrow to take on the public health challenges of our society.
- Train the students with fundamental knowledge of paramedical and allied health sciences, skills set and positive attitude for creating innovative solutions to serve industry and community through congenial learning environment with contemporary academic programs, state of the art infrastructure facilities and community health programs.
- Facilitate budding paramedical and allied health science experts with the best research-innovation-incubation-start-up ecosystem to realize their fullest potential for sustainable businesses.
- Encourage faculty and staff to excel in their respective domains of expertize and demonstrate the best of their abilities by way of continuing education, research support and consultancy.

B.Sc. Medical Lab Technology

Program Outcomes

On successful completion of the Programs, the graduates of B.Sc. Medical Lab Technology will be able to:

PO1. **Knowledge:** Study and apply concepts, theories, and practices of health care system to gain fundamental knowledge.

PO2. **Analysis:** To identify, analyze and evaluate various experiences and perspectives using knowledge of paramedical & Allied Health sciences for substantiated conclusions.

PO3. **Development;** Individual or teamwork skills to support shared goals with the interdisciplinary healthcare team to improve societal health

PO4. **Tools & Techniques:** To create, select, and apply appropriate techniques, resources and modern tools with an understanding of the limitations in Health care system.

PO5. **Environment and Sustainability:** Understand the impact of Health care professionals in environmental contexts and demonstrate the knowledge for sustainable development.

PO6. **Ethics and Society:** Apply the ethical principles of health care practices for sustainable development of society

PO7. **Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, to manage projects and finance in multidisciplinary settings.

PO8. **Effective Communication:** Communicate effectively on Paramedical & allied Health care activities with the treating patient, community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO9. **Entrepreneurship:** Entrepreneur and leadership skills to practice independently as well as in collaboration with the interdisciplinary healthcare team.

PO10. **Life-long learning:** Adapt to the changes and advancements in technology and engage in independent and lifelong learning

B.Sc. Medical Lab Technology

Basket Wise - Credit Distribution

S. No.	Basket	Credits (Min. - Max.)
1	SCHOOL CORE	60-80
2	PROGRAM CORE	80-110
3	PROGRAM ELECTIVE	10-36
4	UNIVERSITY ELECTIVE	3-12
	TOTAL CREDITS	**Min. 195**

School Core (60-80 Credits)

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
		L	T	P	S	C	
22DF102001	Medical Terminology and Record Keeping	4	1	2	-	6	-
22DF102002	Introduction to Quality and Patient Safety	4	1	2	-	6	-
22CS102402	Basic Computers and Information Sciences	3	-	2	-	4	
22DF105001	Biomedical Waste Management	-	1	2	-	2	-
22LG101406	Professional English	2	-	-	-	2	-
22MG101006	Principles of Management	3	-	-	-	3	-
22PT102008	Human Anatomy – I	4	1	2	-	6	-
22PT102009	Human Physiology – I	4	1	2	-	6	-
22PT101004	National Health Care Delivery System	2	-	-	-	2	-
22PT102010	Human Anatomy-II	4	1	2	-	6	-
22PT102011	Human Physiology-II	4	-	2	-	5	-
22CC111001	Clinical Posting-I	-	-	-	-	4	-
22CC111002	Clinical Posting-II	-	-	-	-	4	-
22CC101019	National Health Care Delivery System and Medical Records Management	4	-	-	-	4	-
22CC111003	Clinical Posting-III	-	-	-	-	4	-
22CC111004	Clinical Posting-IV	-	-	-	-	4	-

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
22DF102025	Research Methodology and Biostatistics	3	-	2	-	4	-
22DF101001	Research Methodology and Biostatistics for Health Professionals	4	-	-	-	4	-
22DF10104M	Professionalism and Workplace Skills in Allied Health	2	-	-	-	2	-
Mandatory Courses (Min. 4 Credits to be earned, Earned Credits will not be considered for CGPA)							
22CE107601	Environmental Science	2	-	-	-	2	-
22LG101402	Telugu	2	-	-	-	2	-
22LG101404	Sanskrit	2	-	-	-	2	-

Program Core (80-110 Credits)

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
		L	T	P	S	C	
22DF102004	Basic Clinical Biochemistry and Analytics	3	-	2	-	4	-
22DF102005	Medical Microbiology	3	-	2	-	4	-
22DF102007	Haematology-I	3	-	2	-	4	-
22DF102014	Haematology-II	3	-	2	-	4	-
22DF102013	Fundamentals of Histology	3	-	2	-	4	-
22DF102012	Systematic Bacteriology	3	-	2	-	4	-
22DF102011	Metabolism of Biomolecules	3	-	2	-	4	-
22DF102016	Applied Clinical Biochemistry	3	-	2	-	4	-
22DF102017	Immunology and Bacterial Serology	3	-	2	-	4	-
22DF102018	Applied Hematology	3	-	2	-	4	-
22DF102019	Applied Histopathology	3	-	2	-	4	-
22CC101006	Basic Pharmacology and Drug Administration	3	-	-	-	3	-
22DF102029	Medical Parasitology	3	-	2	-	4	
22DF102024	Virology and Mycology	3	-	2	-	4	-
22DF111001	Clinical Internship-I	-	-	-	-	20	-
22DF111002	Clinical Internship-II	-	-	-	-	20	Clinical Internship-I

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
22DF101003	Clinical Laboratory Practices	4	-	-	-	4	-
22DF102003	Medical Biochemistry	3	-	2	-	4	-

Program Elective (10-36 Credits)

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
		L	T	P	S	C	
22CC105001	Basic Life Support and First Aid Management	-	1	2	-	2	-
22CC105002	Enhancing Concentration	-	1	2	-	2	-
22DF102027	Cytogenetics: Procedures and Interpretations	3	-	2	-	4	-
22DF102028	Essentials of Stem Cell Technology	2	-	2	-	3	-
22DF102030	Blood Film Morphology-A Practical Guide	3	-	-		3	-
22DF101002	Design and Interpretation of Clinical Trials	3	-	-	-	3	-
22DF102023	Blood banking and Genetics	3	-	2	-	4	-
22DF102022	Cytopathology	3	-	2	-	4	
22DF102026	Molecular Biology in Laboratory Medicine	3	-	2	-	4	

University Elective (3-12 Credits)

Course Code	Title of the Course	Lecture	Tutorial	Practical	Project based Learning	Credits	Pre-requisite
		L	T	P	S	C	
22EC101701	AI in Healthcare	3	-	-	-	3	-
22DS101701	Bioinformatics	3	-	-	-	3	-
22SS101701	Constitution of India	3	-	-	-	3	-
22CM101702	Cost Accounting and Financial Management	3	-	-	-	3	-
22MG101701	Entrepreneurship for Micro, Small and Medium Enterprises	3	-	-	-	3	-
22CB101703	Forensic Science	3	-	-	-	3	-
22SS101704	Indian History	3	-	-	-	3	-
22SS101705	Indian Tradition and Culture	3	-	-	-	3	-
22ME101704	Managing Innovation and Entrepreneurship	3	-	-	-	3	-
22LG201701	Personality Development	3	-	-	-	3	-
22CS101702	Web Design Fundamentals	3	-	-	-	3	-
22SS101706	Women Empowerment	3	-	-	-	3	-

Note:

1. If any student has chosen a course or equivalent course from the above list in their regular curriculum then, he/she is not eligible to opt the same course/s under University Elective.
2. The student can choose courses from other disciplines offered across the schools of MBU satisfying the pre-requisite other than the above list.

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF102001	**MEDICAL TERMINOLOGY AND RECORD KEEPING**	4	1	2	-	6

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on word roots, prefixes, suffixes basic medical terms, medical abbreviations to human body systems and record-keeping methods in health care and medical ethics and law.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate basic knowledge on roots, prefixes and suffixes to form medical terms in health care system

CO2. Use procedural terms and medical abbreviations to human body for improving communication and reporting between health care providers effectively

CO3. Apply advanced tools and techniques to maintain patient health details in medical system.

CO4. Design a standard protocol by applying medical law and ethics apply to avoid sentinel events.

CO5. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	3	-
CO3	3	1	3	-	-	-	-	-	-	1
CO4	2	1								1
CO5	3	-	-	-	-	3	1	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION OF MEDICAL TERMINOLOGY ***(12 Periods)***

Derivation of medical terms, define word roots, prefixes, and suffixes, Conventions for combined morphemes and the formation of plurals, Basic medical terms, Form medical terms utilizing roots, suffixes, prefixes, and combining roots.

Module 2: INTRODUCTION OF MEDICAL TERMINOLOGY-1 ***(12 Periods)***

Interpret basic medical abbreviations/symbols, utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system and musculoskeletal system

Module 3: INTRODUCTION OF MEDICAL TERMINOLOGY-2 ***(12 Periods)***

Interpret basic medical abbreviations/symbols, utilize diagnostic, surgical, and procedural terms and abbreviations related to the Respiratory system, cardiovascular system, nervous system, and endocrine system.

Module 4: RECORD KEEPING ***(12 Periods)***

Standard procedures in record keeping, interpret medical orders/reports, Data entry and management on electronic health record system, Advanced tools to maintain records in Health care.

Module 5: MEDICAL ETHICS AND LAW ***(12 Periods)***

Medical ethics – Definition, Basic principles of medical ethics – Confidentiality, Malpractice and negligence – Rational and irrational drug therapy, Autonomy and informed consent – Right of patients, Care of the terminally ill- Euthanasia, Development of a standardized protocol to avoid sentinel events

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of role of paramedic in health care system
2. Demonstration of Central Sterile Supply Department (CSSD)
3. Observation and understanding of incinerator complex
4. Demonstration of Immunization section
5. Demonstration of working respective department in health care.

RESOURCES

TEXT BOOKS:

1. Adam Brown, Medical Terminology Easy Guide for Beginners, CreateSpace Independent Publishing Platform, Edition 1, 2016.
2. GD Mogli, Medical records organization and management, Jaypee Brothers Medical Publishers, Edition 2, 2016.

REFERENCE BOOKS:

1. Stedmans, Stedmans pocket Medical Dictionary" Wolters Kluwer India Pvt. Ltd, Edition 1, 2009.
2. Rampi Gupta, CM Francis Medical Ethics, Jaypee Brothers Medical Publishers, Edition 4, 2020.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=_bDatJxhfkQ
2. https://www.youtube.com/watch?v=9iMhc2OU-go
3. https://www.youtube.com/watch?v=sQTrPIwtWaw

WEB RESOURCES:

1. https://blog.ipleaders.in/medical-laws-conflict-ethic
2. https://www.gponline.com/medico-legal-importance-good-records/article/89
3. https://openmd.com/guide/medical-terminology

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF102002	**INTRODUCTION TO QUALITY AND PATIENT SAFETY**	4	1	2	-	6

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course is designed to provide an overview on Quality assurance and management, infection control and prevention, Antibiotic resistance and disaster management.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Apply NABH guidelines to improve the quality of patient care in the health care system.

CO2. Identification of suitable evidence-based infections control principles and techniques to control and prevent to disease in the healthcare environment

CO3. Identify barriers and opportunities in the health care system based on contextual knowledge on microbial antibiotic resistance.

CO4. Demonstrate knowledge on different disaster management techniques to make patient health safety

CO5. Work independently or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	2	-	-	2
CO2	3	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	1
CO4	3	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	1	-	-	-	-
Course Correlation Mapping	**3**	**-**	**-**	**-**	**-**	**3**	**2**	**-**	**-**	**2**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: QUALITY ASSURANCE AND MANAGEMENT ***(15 Periods)***

Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health care and develop skills to implement sustainable quality assurance programs in the health system: Concepts of Quality of Care, Quality Improvement Approaches, Standards and Norm, Quality Improvement Tools, Introduction to NABH guidelines.

Module 2: INFECTION CONTROL AND PREVENTION ***(15 Periods)***

The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital-acquired infections and improve health outcomes. Concepts taught should include a. Evidence-based infection control principles and practices [such as Sterilization, Disinfection, Effective hand hygiene and use of Personal Protective Equipment (PPE)], Prevention & control of common healthcare-associated infections, Components of an effective infection control program, and Guidelines (NABH and JCI) for Hospital Infection Control

Module 3: ANTIBIOTIC RESISTANCE ***(15 Periods)***

Antibiotic Resistance: History of antibiotics, way of resistance happens and spreads, Types of resistance- intrinsic, acquired, passive, Trends in drug resistance & Actions to fight resistance, Bacterial persistence, Antibiotic sensitivity, Consequences of antibiotic resistance & Antimicrobial Stewardship – Barriers and opportunities, tools and models in hospitals.

Module 4: DISASTER PREPAREDNESS AND MANAGEMENT ***(15 Periods)***

The principles of on-site disaster management, Fundamentals of emergency management, psychological impact management, Resource management, Preparedness and risk reduction, Key response functions (including public health, logistics, and governance, recovery, rehabilitation and reconstruction), information management, incident command, and institutional mechanisms

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXERCISES:

1. Demonstration of NABH guidelines
2. Demonstration of Vital signs
3. Demonstration of proper use of Personal protective equipment (PPE)
4. Demonstration of evidence-based infection control principles and practices [such as Sterilization, Disinfection, Effective hand hygiene, and use of Personal Protective Equipment (PPE)
5. Discussion on various types of Antibiotics
6. Demonstration of how Resistance Happens and Spreads

RESOURCES

TEXT BOOKS:

1. Y. Anjaneyulu and R Marayya, Quality Assurance and Quality Management, BSP Books Private Limited, Edition 3, 2018.
2. Deepak Tripathi, Quality management, Jaico Publishing House, Edition 1, 2009.
3. Apurba S Sastry, Deepa shree, Essentials of Hospital infection control, Jaypee Brothers Medical Publisher, Edition 1, 2019.
4. Nidhi Gauba Dhawan and Ambrina Sarar Khan, Disaster management and preparedness, CBS Publisher, Edition 1, 2014.
5. Gireesh Kumar KP and Eng, Handbook of antibiotics, Paras Medical Books, Edition 1, 2014.

REFERENCE BOOKS:

1. Alan R. Hauser, Antibiotics for Clinicians, LWW Exclusive NP, Standard Edition, 2019.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=zSyICkGZ6iM
2. https://www.youtube.com/watch?v=LZapz2L6J1Q
3. https://www.youtube.com/watch?v=yHs0GyLNSLg
4. https://www.youtube.com/watch?v=KwAKjtkpdP4

WEB RESOURCES:

1. https://www.sciencedirect.com/science/article/pii/B9780123735935000227
2. https://www.who.int/teams/integrated-health-services/infection-prevention-control
3. https://www.uicc.org/what-we-do/thematic-areas-work/antimicrobial-resistance-amr-and-its-impact-cancer-care
4. https://www.techtarget.com/searchsoftwarequality/definition/quality-assurance

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CS102402	BASIC COMPUTERS AND INFORMATION SCIENCES	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion and hands-on experience on basics of computer science and information science concepts of the I/O devices, CPU (central processing unit) memory, Storage devices and Introduction of windows operating systems and MS office and having the knowledge of computer networks, Internet and its applications.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate knowledge on Basics of computer I/O devices, Processor and memory.

CO2. Prepare the Documents using the word processors.

CO3. Prepare the work sheet and Slide Presentations using the Excel and presentation tool.

CO4. Demonstrate the knowledge on Operating Systems usage and its types.

CO5. Interconnect two or more computers for Information sharing and access the Internet.

CO6. Work independently or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-
CO3	3	2	3	-	-	-	-	-	-	-
CO4	2	2	3	-	-	-	-	-	-	-
CO5	3	2	2	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	3	-
Course Correlation Mapping	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**3**	**3**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT:

Module 1: INTRODUCTION TO COMPUTERS ***(09 Periods)***

Introduction, characteristics of computers, block diagram of computers, generations of computers, computer languages, Input-output devices: Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems),Processor and memory: Central Processing Unit (CPU), main memory.

Module 2: STORAGE DEVICES AND WORD PROCESSOR ***(09 Periods)***

Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices, Introduction to word processor: Introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

Module 3: INTRODUCTION TO SPREADSHEET AND PRESENTATIONS ***(09 Periods)***

Introduction to Excel: Introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs, Introduction to PowerPoint: Introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

Module 4: COMPUTER NETWORKS AND INTERNET APPLICATIONS ***(09 Periods)***

Computer networks: Introduction, types of networks (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network, Internet and its Applications: Definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet, Application of Computers in clinical settings.

Module 5: INTRODUCTION OF OPERATING SYSTEM ***(09 Periods)***

Introduction to Operating System, Characteristics of Operating System, Types of Operating System and its components, Installation of windows OS, History of OS and features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXERCISES

1. Demonstrate of basic hardware of Computers and laptops.
2. Demonstrate about the I/O Devices and CPU.
3. Create and Design Admission/Enquiry Forms.
4. Create Student Id Card using shapes, text and colors.
5. Create Chart and show the product price comparison between years.
6. Insert the Image into various shapes

7. Calculate students marks percentage using spreadsheet.
8. Create slides about yourself using with all the details.
9. What are the steps to connect Internet
10. How to send an Email? Explain the steps in detail.

RESOURCES

TEXT BOOKS:

1. Priti Sinha and Pradeep K, Computer Fundamentals, BPB Publications, Edition 6, 2004.
2. James Bernstein, Office for the Web Made Easy, Independently published, Edition 1, 2021.

REFERENCE BOOKS:

1. Pete Matheson, Microsoft Office 365 for Beginners, Microsoft, Edition 1, 2021.
2. Dr Sabah Sayed, Fundamentals of Computer Science, Imperial College Press, Edition 1, 2009.

SOFTWARE/TOOLS:

1. Software: MS Office/ Window Operating System

VIDEO LECTURES:

1. Computer Fundamentals - Basics for Beginners - Bing video
2. https://youtu.be/-AP1nNK3bRs

WEB RESOURCES:

1. https://www.udemy.com/**computer**-**basics**/online-course
2. *https://www.educba.com/excel/courses/ms-office-course*

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF105001	**BIOMEDICAL WASTE MANAGEMENT**	-	1	2	-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course deals with biomedical waste management and environmental safety. Experimental learning on types of biomedical waste in health care system, waste minimization, General waste control and personal care in health care.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Analyze biomedical waste materials by applying decontamination and disposal techniques to prevent harm to health care professionals.

CO2. Work individually or Teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	1								1
CO2	3	1	2	-	-	-	-	-	-	1
Course Correlation Mapping	**3**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

EXPERIENTIAL LEARNING:

COURSE CONTENT AND LIST OF EXERCISES

Biomedical waste management and environment safety- The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:

1. Definition of Biomedical Waste, Types of waste generated from Health Care Facility
2. Demonstration of various procedures for minimization of Biomedical Waste.
3. Demonstration of Biomedical Waste Segregation, collection, transportation, treatment and disposal (including color coding)
4. Study of Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
5. Study of BMW Management & methods of disinfection
6. Demonstration of Modern Technology for handling BMW
7. Use of Personal protective equipment (PPE)
8. Monitoring & controlling cross-infection (Protective devices)

RESOURCES

TEXT BOOK:

1. Shishir Baskar, Hospital waste management A guide for self-assessment and review, Jaypee brothers Medical Publication, Edition 1, 2009.
2. R. Radhakrishna, Biomedical waste management, Sumit Enterprises, Edition 3, 2007.

REFERENCE BOOKS:

1. Anant Preet Singh and Sukhjit, Biomedical waste disposal, Haypee Brothers Medical Publishers (P) Ltd, Edition 1, 2012
2. Dr. Shalini Sharma and Prof. SVS Chauhan, An Analysis of Bio-Medical Waste Management, LAP Lambert Academic Publishing, Edition 1, 2010.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=qsclvnPvr18
2. https://www.youtube.com/watch?v=gKSPSKiB9PE
3. https://www.youtube.com/watch?v=SxkZdmBSkWo

WEB RESOURCES:

1. https://byjus.com/current-affairs/biomedical-waste/
2. https://www.aiims.edu/en/departments-and-centers/central-facilities/265-biomedical/7346-bio-medical-waste-management.html

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22LG101406	**PROFESSIONAL ENGLISH**	2	-	-	-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course deals with selected literary works of eminent writers, exercises on speaking, reading comprehension skimming and scanning, vocabulary, grammar, pronunciation, and conversation practice.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate knowledge of literary works of various pieces of eminent writers.

CO2. Adapt general and technical vocabulary in communication.

CO3. Apply grammatically correct English in writing.

CO4. Analyze texts using reading techniques.

CO5. Apply different communication styles in various situations.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	2	-	-	-
CO2	2	2	-	-	-	-	2	-	3	-
CO3	2	2	-	-	3	-	2	-	3	-
CO4	2	3	2	-	2	-	2	-	3	-
CO5	2	2	-	-	3	-	2	-	3	-
Course Correlation Mapping	**2**	**2**	**2**	**-**	**3**	**-**	**2**	**-**	3	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: BE THE BEST OF WHATEVER YOU ARE BY DOUGLAS MALLOC ***(06 Periods)***

Be the Best of Whatever You Are– A motivational poem, Reading Comprehension, Grammar, Vocabulary, Pronunciation, Language Games, and Conversation Practice, Letter writing.

Module 2: `ON SAYING PLEASE' SHORT ESSAY BY A. G. GARDINER ***(06 Periods)***

On Saying Please – A Short Essay, Reading Comprehension, Grammar Vocabulary, Pronunciation, Language Games, and Conversation Practice, Email writing.

Module 3: 'IF YOU FORGET ME' POEM BY PABLO NERUDA ***(06 Periods)***

If you Forget Me-A Poem, Reading Comprehension, Grammar, Pronunciation, Language Games and Conversation Practice, essay writing.

Module 4: 'AFTER THE SUNSET' SHORT STORY BY BHOOPAL ***(06 Periods)***

After the Sunset–A Short Story, Reading Comprehension, Grammar, Pronunciation, Language Games, and Conversation Practice, case studies.

Module 5: 'MAN'S PERIL' ESSAY BY BERTRAND RUSSEL ***(06 Periods)***

Man's Peril - An Essay, Reading Comprehension, Vocabulary, Grammar, Pronunciation, Language Games, and Conversation Practice, report writing.

Total Periods: 30

EXPERIENTIAL LEARNING

1. Discuss the role of Health care in nation-building?
2. List out the important vocabulary used most in Health care.
3. Small courtesies play a major role in creating an impression on other people. List out a few examples.
4. Prepare a PowerPoint presentation on the present scenario in higher education and jobs in India.
5. Being a shopkeeper and persuading a customer to buy a product which is introduced newly in the market. Prepare a conversation.
6. The English language has a rich vocabulary. List out the homophones and homonyms and write down the pronunciation and meaning of those words.
7. Describe a situation in your college where teamwork is needed and explain the strategies to manage the team effectively.
8. Write about the importance of IELTS and TOEFL exams.
9. Prepare a report on the medical camp conducted on your campus.
10. Write a letter to the concerned asking permission to attend clinical classes.
11. Prepare a E mail to justify the need of new medical equipment to your hospital.

RESOURCES

TEXT BOOKS:

1. G. Damodar, English Language for Undergraduate Students, Cambridge University, standard edition, 2019.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeetha Sharma, *Technical Communication*, Oxford University Press, Edition 1, 2012.
2. Ashraf Rizvi*, Effective Technical Communication*, McGraw-Hill Education (India) Pvt. Ltd., Edition 1, 2018

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=WnOOKO0CdaM
2. https://www.youtube.com/watch?v=H6Nlz8qmcFc
3. https://www.youtube.com/watch?v=-lTliZO85YM
4. https://www.youtube.com/watch?v=048YjXwgHWE
5. https://www.youtube.com/watch?v=XLLQm7Grmcc

WEB RESOURCES:

1. https://www.researchgate.net/publication/331773456_RK_Narayan's_A_Snake_in_the_Grass_and_Stephen_Leacock's_With_the_Photographer_-_A_Comparative_Study
2. https://smartenglishnotes.com/2020/07/17/on-saying-please-summary-analysis-and-questions-and-answers/
3. http://www.emcp.com/product_catalog/school/litLink/Grade09/U09-04forgetme/
4. https://englishlanguage-lit.blogspot.com/2021/05/after-sunset-short-story-by-bhoopal.html
5. https://www.taylorfrancis.com/chapters/mono/10.4324/9781003090359-31/man-peril-bertrand-russell?context=ubx&refId=1d767e2d-ceb1-4537-9de5-6417eab47d1e

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22MG101006	**PRINCIPLES OF MANAGEMENT**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course enables the students to study the evolution of management; functions and principles of management; application of the principles in an organization; the system and process of effective controlling in the organization.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand managerial functions of business organization.

CO2. Understand the planning process in the organization.

CO3. Describe the principles of Organisation.

CO4. Understand the concept and process of staffing.

CO5. Demonstrate the ability to direct, leadership and communicate effectively.

CO6. Work independently or in team to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	1	-	-
CO2	3	1	-	1	-	-	-	1	1	-
CO3	3	1	-	1	-	-	-	1	1	-
CO4	3	1	-	-	-	-	-	1	1	-
CO5	3	1	-	-	-	1	-	-	1	-
CO6	3	-	-	-	-	-	-	1		-
Course Correlation Mapping	**3**	**1**	**-**	**1**	**-**	**1**	**-**	**1**	**1**	**-**

Correlation Levels: ***3: High;*** ***2: Medium; 1: Low***

COURSE CONTENT

Module 1: INTRODUCTION TO MANAGEMENT ***(09 Periods)***

Meaning, Definition, Concept, Scope And Principles of Management; Evolution of Management Thought- Management Theories – Classical, Behaviour, System, Contingency and Contemporary Perspectives on Management. Management Art or Science And Management as Profession. Process And Levels of Management. Introduction to Functions [POSDCORB] of Management.

Module 2: PLANNING – IMPORTANCE ***(11 Periods)***

Planning- Importance, Objectives, Process, Policies, Types of Planning, Decision Making- Process of Decision Making, Types of Decision, Problems involved in Decision Making.

Module 3: ORGANISING ***(09 Periods)***

Meaning Importance, Principles of Organizing, Spam of Management, Patterns of Organisation- Formal And Informal Organizations, Common Organizational Structures; Departmentalization, Authority- Delegation, Centralization Decentralization, Responsibility- Line and Staff Relationship.

Module 4: STAFFING ***(07 Periods)***

Sources of Recruitment, Selection Process, Training, Directing, Controlling- Meaning and Importance, Function, Span of Control, Process And Types of Control, Motivation, Coordination- Need and Types And Techniques Of Coordination- Distinction between Coordination And Cooperation- Requisites for Excellent Coordination-Systems Approaches and Coordination.

Module 5: EMERGING ISSUES IN MANAGEMENT ***(09 Periods)***

Total Quality Management, Technology Management, Talent and Knowledge Management, Leadership, Organizational Change And Development, Corporate Social Responsibility.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXERCISES:

1. Students will be given case studies on management theory and its relevance to contemporary business practices.
2. Case study of Amazon India on planning and staffing personnel for its timely delivery in rural area.
3. Group discussion on technology, organization and management.

   The above all will be detailed in CHO

RESOURCES

TEXT BOOKS:

1 Charles W.L. Hill And Steven L. McShane, Principles Of Management, Tata Mc-Craw-Hill Company, Edition 1, 2006.

2 Griffin, Ricky W., Management. AITBS Publishers and Distributors, Edition 1, 2010.

REFERENCE BOOKS:

1. Neeru Vasishth, Principles of Management text and cases, Taxmann Publishers, Edition 5, 2019.
2. Robbins, Fundamentals of Management, Pearson Education India, Edition 9, 2016.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=tUrjAn24ZiA
2. https://www.youtube.com/watch?v=vtVJOg_tW4o

WEB RESOURCES:

1. https://byjus.com/commerce/henri-fayol-14-principles-of-management/
2. https://education.stateuniversity.com/pages/cw1ev9e9ib/An-Introduction-to-the-Principles-of-Management.html
3. https://open.lib.umn.edu/principlesmanagement/chapter/1-1-introduction-to-principles-of-management/

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22PT102008	**HUMAN ANATOMY - I**	4	1	2	-	6

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on the Macroscopic & Microscopic structure and functions of human body and its Development which is essential for clinical studies.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate the anatomical knowledge of terms, positions, movements and tissues of human body.

CO2. Apply the anatomical knowledge of bones, muscles, and joints in clinical practice.

CO3. Demonstrate the structure and functions of organs in circulatory, digestive, and respiratory system.

CO4. Analyze the concepts of normal microscopic anatomy of tissues in human body.

CO5. Work independently or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	1	1	-	-	1	1	-	-	1
CO2	3	2	1	-	-	1	1	-	-	1
CO3	3	2	1	-	-	1	1	-	-	1
CO4	3	1	1	-	-	1	1	-	-	1
CO5	3	-	-	-	-	-	-	-	-	1
Course Correlation Mapping	**3**	**2**	**1**	**-**	**-**	**1**	**1**	**-**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION TO HUMAN ANATOMY ***(10 Periods)***

Subdivisions of Anatomy, History of Anatomy, Anatomical terms, Positions, Planes& Axis, Movements, Epithelium – Classification, Tissue – Classification, and Applied anatomy.

Module 2: SKELETAL, ARTICULATORY, & MUSCULAR SYSTEM ***(10 Periods)***

Skeletal system: Skeleton, Bone - Classification, Young bone, adult bone, Blood supply, Nerve supply, Ossification, Bones of – Head & Neck, Upper limb, Thorax, Vertebral column, Bony Pelvis, and Lower limb; Cartilage & its Types,

Articulatory system: Joint – Classification, Synovial joint, Joints of – Head & Neck, Upper limb, Thorax, Vertebral column, Pelvis, and Lower limb;

Muscular system: Muscle – Parts, Types, Structure, Architecture, Nomenclature, Nerve supply, Muscle action, Muscles of – Head & Neck, Upper limb, Thorax, Vertebral column, Pelvis, and Lower limb and Applied anatomy.

Module 3: CIRCULATORY SYSTEM ***(10 Periods)***

Circulation – Components, Types, Anastomoses, End – Arteries, Heart & Pericardium, Major blood vessels; Lymphatic system - Components, Major Lymphatic vessels; Lymphoid organs - Lymph node, Spleen, Thymus, and Palatine tonsil; Reticulo-Endothelial system, and Applied anatomy.

Module 4: DIGESTIVE SYSTEM ***(10 Periods)***

Organs - Oral cavity, Teeth, Tongue, Salivary glands, Pharynx, Oesophagus, Stomach, Small intestine – Duodenum, Jejunum, Ileum, Liver & Gall bladder, Extra-Hepatic Biliary Apparatus Pancreas, Large Intestine – Caecum, Appendix, Colon, Rectum & Anal canal and Applied anatomy.

Module 5: RESPIRATORY SYSTEM **(10 Periods)**

Organs –External Nose, Nasal cavity, Paranasal air sinuses, Nasopharynx, Oropharynx, Larynx, Trachea, Pleura, Lungs, Diaphragm, and Applied anatomy.

Module 6: GENERAL HISTOLOGY **(10 Periods)**

Microscope, Cell, common objects, study of the basic tissues of the body; Epithelium, Connective Tissue, Cartilage; Bone; Muscular tissue; Nervous Tissue; Blood vessels, lymphoid tissue, Glands, Teeth, Skin and its appendages.

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of anatomical terms, positions, planes, axis, movements, and tissues.
2. Demonstration of bones, joints, and muscles in human body.
3. Demonstration of heart, blood vessels, and lymphoid organs in human body.
4. Demonstration of organs of digestive system in human body.
5. Demonstration of organs of respiratory system in human body.
6. Demonstration of microscope, microscopic structures of cell, objects, and general tissues in human body.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES BOOKS:

1. B.D Chaurasia's Human Anatomy-Regional and applied; CBS publishers, Vol 1,2,3,4 Edition 9, 2022.
2. Snell [Richard S], Clinical Anatomy for medical students, Edition 6, 2021
3. Inderbir Singh's, book of Anatomy, Vol 1,2 and 3, Edition 3, 2020
4. Inderbir Singh's Text book of Human Histology, Jaypee Publishers, Edition 10, 2022
5. Inderbir Singh's Text book of Human Embryology, Jaypee Publishers, Edition 12, 2022

REFERENCE BOOKS

1. A. k. Datta, Essentials of human anatomy; Current books international publishers; Volume: 1,2,3,4; Edition 10, 2019.
2. Richard Tunstall and Susan Standring, Gray's Anatomy - The anatomical basis of clinical practice, Elsevier publishers, Edition 42, 2020.
3. Rachel koshi, Cunningham's manual of practical Anatomy, Oxford University Press publishers, Volume - 1,2 and 3, Edition 16, 2017.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=UzPafAvoYH0.
2. https://www.youtube.com/watch?v=Nr6a7kqh4ZM
3. https://www.youtube.com/watch?v=bL_fg1St7Cg
4. https://www.youtube.com/watch?v=aV1cNPJAByo
5. https://www.youtube.com/watch?v=_l-NS4Q3bv0
6. https://www.youtube.com/watch?v=upqjWIElahs
7. https://www.youtube.com/watch?v=849IL6HSMd4
8. https://www.youtube.com/watch?v=mcmUWYzhdzA
9. https://www.youtube.com/watch?v=IvK-UGOI5ZQ
10. https://www.youtube.com/watch?v=-sDoYJOQMFw

WEB RESOURCES:

1. https://medicostimes.com/mbbs-first-year-books-pdf/
2. https://worldofmedicalsaviours.com/anatomy-books-pdf/
3. https://enarm.com.mx/catalogo/31.pdf
4. https://www.freebookcentre.net/medical_books_download/Clinical-Anatomy.html
5. https://www.academia.edu/42079859/ESSENTIAL_CLINICAL_ANATOMY
6. https://emedicodiary.com/book/view/47/kulkarni-clinical-anatomy-a-problem-solving-approach
7. https://textbookequity.org/Textbooks/anatomy+phys+vol2a.pdf
8. https://openstax.org/details/books/anatomy-and-physiology
9. https://www.pdfdrive.com/clinical-anatomy-books.html
10. https://www.goodreads.com/en/book/show/51790563

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22PT102009	**HUMAN PHYSIOLOGY - I**	4	1	2	-	6

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Basic structure and detailed physiology of cell, body fluids, muscles, digestive system, respiratory system and renal system.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the basic concepts of cell and body fluids

CO2. Analyse the blood and its components.

CO3. Analyse the relationship between the mechanisms of nerve and muscle physiology.

CO4. Understand the process of digestion and absorption of food.

CO5. Understand the mechanisms of respiration on human body.

CO6 Understand the concepts of blood filtration by kidneys

CO7 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	2	-	-	-	-	-	-	-	-	-
CO2	3	2	-	2	-	-	-	-	-	2
CO3	3	2	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	-	-	-	-	-	-	-	-	-
CO7	-	-	-	-	-	-	3	3	-	3
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**-**	**3**	**3**	**-**	**2**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSECONTENT

MODULE 1: GENERAL PHYSIOLOGY AND BLOOD ***(12 Periods)***

Cell: Morphology. Organelles: their structure and functions, Transport Mechanisms across the cell membrane, Body fluids: Distribution, composition. Blood: Introduction, Composition and functions. Plasma: Composition, formation, functions and Plasma proteins. RBC: count and its variations. Erythropoiesis- stages, factors regulating. Reticuloendothelial system, Haemoglobin: structure, function and derivatives Anemia, types of Jaundice. Blood indices, PCV, ESR.WBC: Classification, Morphology, functions, count, its variation of each and Immunity. Platelets: Morphology, functions, count, its variations Haemostatic mechanisms. Blood coagulation–factors: mechanisms, Clinical disorders and Anticoagulants. Blood Groups: Landsteiner's law. Types, significance, determination, Erythroblastosis Fetalis. Blood Transfusion: Cross matching, Indications and complications. Lymph: Composition, formation, circulation and functions.

MODULE2: NERVE MUSCULE PHYSIOLOGY ***(12Periods)***

Introduction: Resting membrane potential. Action potential – ionic basis and properties. Nerve: Structure and functions of neurons. Classification, Properties and impulse transmission of nerve fibers. Nerve injury – degeneration and regeneration. Muscle: Classification, Skeletal muscle: Structure. Neuromuscular junction: Structure. Neuromuscular transmission, myasthenia gravis. Excitation- Contraction coupling, Rigor mortis.

MODULE3: DIGESTIVE SYSTEM ***(12Periods)***

Introduction: Physiological anatomy and nerve supply of alimentary canal, Enteric nervous system. Salivary Secretion: Saliva: Composition. Functions. Swallowing: Definition. Different stages. Function. Stomach: Functions. Gastric juice: Gland, composition, function, regulation. Gastrin: Production, function and regulation. Peptic ulcer. Pancreatic Secretion: Composition, production, function. Liver: Functions of liver. Bile secretion: Composition, functions and regulation. Gall bladder: Functions. Intestine: Succus entericus: Composition, function and regulation of secretion. Intestinal motility and its function and regulation. Mechanism of Defecation.

fMODULE4: RESPIRATORY SYSTEM ***(12Periods)***

Introduction: Physiological anatomy –. Functions of respiratory system. Respiratory muscles. Mechanics of breathing: Intrapleural and Intrapulmonary pressure changes during respiration. Lung compliance: Normal value, Surfactant – Composition, production, functions. RDS Spirometry: Lung volumes and capacities, Timed vital capacity and its clinical significance, Maximum ventilation volume, Respiratory minute volume, Dead Space: Types and their definition, Pulmonary Circulation, Ventilation-perfusion ratio and its importance. Transport of respiratory gases: Oxygen transport – Different forms, oxygen-haemoglobin dissociation curve. Carbon dioxide transport: Different forms, chloride shift. Regulation of Respiration: Neural Regulation. Hering - breuer's reflex. Voluntary control. Chemical Regulation. Hypoxia: Effects of hypoxia, Type. Disorders of Respiration: Dyspnoea, Orthopnoea, Hyperpnoea and hyperventilation.

MODULE5: RENAL SYSTEM ***(12Periods)***

Introduction: Physiological anatomy. Nephrons – cortical and juxtamedullary. Juxtaglomerular apparatus. Glomerular membrane. Renal blood flow and its regulation. Functions of kidneys. Mechanism of Urine Formation: Glomerular Filtration: Mechanism of glomerular filtration. GFR – normal value and factors affecting. Renal clearance. Inulin clearance. Criatinine clearance. Tubular Reabsorption: Reabsorption of Na+, glucose, HCO3-, urea and water. Filtered load. Renal tubular transport maximum. Glucose clearance: TmG. Renal threshold for glucose. Tubular Secretion: Secretion of H+ and K+. PAH clearance, Micturition: Mechanism of micturition. Atonic bladder, automatic bladder, Artificial Kidney: Principle of haemodialysis, Structure of skin and functions.

TotalPeriods:60

EXPERIENTIAL LEARNING

LISTOFEXPERIMENTS:

1. Study of Microscope and its uses
2. Collection of blood sample
3. Determination of RBC count
4. Determination of WBC count
5. Differential leukocyte count
6. Estimation of haemoglobin
7. Determination of blood groups
8. Determination of bleeding time clotting time
9. Determination of ESR
10. Determination of PCV

RESOURCES BOOKS

1. Guyton & Hall, Text book of Medical Physiology, Saunders publisher, Edition 13, 2015.
2. K Sembulingam, Essentials of Medical Physiology, Jaypee Medical Publishers, Edition 9, 2022.
3. G.K. Pal and G.K Pravati, Textbook of Practical Physiology, Orient Longman, Edition 1, 2003

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=xyhbIPSLBsA
2. https://www.youtube.com/watch?v=0f9p9JX4qJk
3. youtube.com/watch?v=JZhJI6rfFzg

WEB RESOURCES:

1. https://books.google.co.in/books?id=CcJvIiesqp8C&lpg=PP1&pg=PP1#v=twopage&q&f=false
2. https://books.google.co.in/books?id=KNpN_jvbmAIC&lpg=PP1&pg=PP1#v=onepage&q&f=false
3. https://www.visiblebody.com/

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22PT101004	**NATIONAL HEALTH CARE DELIVERY SYSTEM**	2	-	-	-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Health care system, AYUSH, vital events of life and epidemiology in India.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the basic concepts in health care delivery system.

CO2. Acquire knowledge on various AYUSH systems.

CO3. Analyse the Vital events of life and its impact on demography.

CO4. Understand the principles and methods of epidemiology.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	1	-		-	-	_
CO2	3	1	-	-	2	-	1	-	-	_
CO3	3	2	-	-	1	-	1	-	-	_
CO4	3	-	-	-	1	-		-	-	_
Course Correlation Mapping	**3**	**2**	**-**	**-**	**1**	**-**	**1**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE1: NATIONAL HEALTHCARE DELIVERY SYSTEM ***(07 Periods)***

Healthcare delivery system in India at primary, secondary and tertiary care Community participation in healthcare delivery system, Health system in developed countries, Private Sector

MODULE2: AYUSH SYSTEM OF MEDICINE ***(08 Periods)***

Introduction to Ayurveda, Naturopathy, Unani, Siddha, Homeopathy, Need COURSE for integration of various system of medicine.

MODULE3: DEMOGRAPHY AND VITAL STATISTICS ***(07 Periods)***

Demography & its concept, Vital events of life & its impact on demography, Significance and recording of vital statistics, Census & its impact on health policy.

MODULE4: NATIONAL HEALTH POLICIES ***(08 Periods)***

National Health Mission, National Health Policy Issues in Health Care Delivery System in India achievements and constraints in various National Heath Programme. National Health Programme-Background objectives, action plan, targets, operations,

TotalPeriods:30

EXPERIENTIAL LEARNING

1. Demonstration of various levels of health care system.
2. Presentation of health care programs.
3. Illustration on ayush system of medicine and it's practice.
4. A clinical overview on demography and vital statistics.
5. A clinical based epidemiological study and survey of communicable and non-communicable diseases.

Note : It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

BOOKS:

1. Francis, Hospital Care Management, Jones & Bartleft Learning, Edition 4, 2019.
2. Sharon B .Buchbinder, Introduction to Health Care Management, Jones & Bartleft Learning, Edition 2, 2011.
3. Fandis S, Health Service Management, Analysis& Management, Wasworth publishing, Edition 2, 2019.

VIDEO LECTURES:

1. https://youtu.be/It_cV56Dxtk
2. https://youtu.be/VIrdH_3RKKk

WEB RESOURCES:

1. https://library.medschl.cam.ac.uk/e-books/
2. https://www.ncbi.nlm.nih.gov/

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22PT102010	**HUMAN ANATOMY-II**	4	1	2	-	6

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on the Macroscopic & Microscopic structure and functions of human body and its Development which is essential for clinical studies.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate the anatomical knowledge of human excretory organs.

CO2. Apply the anatomical knowledge of reproductive organs and its application in clinical practice.

CO3. Demonstrate the structure and functions of exocrine and endocrine glands.

CO4. Understand the structure and functions of nervous system and its importance in health care practice.

CO5. Analyze the concepts of normal microscopic anatomy of various systemic organs in human body.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	1	1	-	1	1	1	-	1
CO2	3	2	1	1	-	1	1	1	-	1
CO3	3	2	1	1	-	1	1	1	-	1
CO4	3	2	1	1	-	1	1	1	-	1
CO5	3	1	1	1	-	1	1	1	-	1
CO6	3	-	-	-	-	-	1	-	-	-
Course Correlation Mapping	**3**	**2**	**1**	**1**	**-**	**1**	**1**	**1**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: EXCRETORY SYSTEM ***(11 Periods)***

Organs - Kidney, Ureter, Urinary bladder, and Urethra; Skin & Its Appendages - Thick skin, and Thin skin, Hair, and Nail.

Module 2: REPRODUCTIVE SYSTEM ***(11 Periods)***

Male reproductive system: Organs – Scrotal sac &Testis, Epididymis, Vas deferens, Seminal vesicle, Prostate, and Urethra.

Female reproductive system: Organs - Ovary, Uterus, Fallopian tube, Cervix, Vagina, and Mammary gland.

Module 3: ENDOCRINE SYSTEM ***(11 Periods)***

Exocrine glands: Salivary glands, Lacrimal gland, Pancreas, Liver, Mammary gland, Sweat and Sebaceous gland.

Endocrine glands: Hypothalamus, Pineal gland, Pituitary gland, Thyroid gland, Parathyroid gland, Pancreas, Adrenal gland, and Gonads.

Module 4: NERVOUS SYSTEM, AND SENSE ORGANS ***(12 Periods)***

Nervous system: Neuron, Neuroglia, Classification, Autonomic Nervous system; Brain - Cerebrum, Cerebellum, Basal Ganglia, Limbic system, Thalamus, Hypothalamus, Ventricles, Cerebro-Spinal fluid, and Spinal cord.

Sense organs: Tongue – Taste pathway, Nose – Olfactory pathway, Eye – Visual pathway, Ear – Auditory pathway.

Module 5: SYSTEMIC HISTOLOGY **(15 Periods)**

Respiratory system: Nasal cavity, Larynx, Trachea, and Lungs.

Digestive system: Oral cavity, Teeth, Tongue, Salivary glands – Parotid, Sub-mandibular, Sub-lingual, Pharynx, Oesophagus, Stomach, Small intestine – Duodenum, Jejunum, Ileum, Large Intestine – Ceacum, appendix, Colon, Liver, Gall bladder, and Pancreas.

Nervous system: Cerebrum, Cerebellum, and Spinal cord.

Urinary system: Kidney, Ureter, Urinary bladder, and Urethra.

Male reproductive system: Testis, Vas deferens, Prostate, and Male urethra.

Female reproductive system: Mammary gland, Ovary, Uterus, Cervix, and Vagina.

Endocrine system: Pituitary, Thyroid, and Adrenal gland.

Skin: Thick skin, and Thin skin.

Eye: Cornea, and Retina.

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of organs in human excretory system.
2. Demonstration of human reproductive organs.
3. Demonstration of exocrine and endocrine glands in human body.
4. Demonstration of organs of nervous system and sense organs in human body.
5. Demonstration of microscopic structures of various systemic organs in human body.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES BOOKS:

1. B.D Chaurasia's Human Anatomy-Regional and applied; CBS publishers, Vol 1,2,3,4 Edition 9, 2022.
2. Snell [Richard S], Clinical Anatomy for medical students, Edition 6, 2021
3. Inderbir Singh's book of Anatomy, Vol 1,2,3, Edition 3, 2020
4. Inderbir Singh's Text book of Human Histology, Jaypee Publishers, Edition 10, 2022
5. Inderbir Singh's Text book of Human Embryology, Jaypee Publishers, Edition 12, 2022
6. A. k. Datta, Essentials of human anatomy; Current books international publishers; Volume: 1,2,3,4; Edition 10, 2019.
7. Richard Tunstall and Susan Standring, Gray's Anatomy - The anatomical basis of clinical practice, Elsevier publishers, Edition 42, 2020.
8. Rachel koshi, Cunningham's manual of practical Anatomy, Oxford University Press publishers, Volume - 1,2,3; Edition 16, 2017.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=UzPafAvoYH0.
2. https://www.youtube.com/watch?v=Nr6a7kqh4ZM
3. https://www.youtube.com/watch?v=bL_fg1St7Cg
4. https://www.youtube.com/watch?v=aV1cNPJAByo
5. https://www.youtube.com/watch?v=_l-NS4Q3bv0
6. https://www.youtube.com/watch?v=upqjWIElahs
7. https://www.youtube.com/watch?v=849IL6HSMd4
8. https://www.youtube.com/watch?v=mcmUWYzhdzA
9. https://www.youtube.com/watch?v=IvK-UGOI5ZQ
10. https://www.youtube.com/watch?v=-sDoYJOQMFw

WEB RESOURCES:

1. https://medicostimes.com/mbbs-first-year-books-pdf/
2. https://worldofmedicalsaviours.com/anatomy-books-pdf/
3. https://enarm.com.mx/catalogo/31.pdf
4. https://www.freebookcentre.net/medical_books_download/Clinical-Anatomy.html
5. https://www.academia.edu/42079859/ESSENTIAL_CLINICAL_ANATOMY
6. https://emedicodiary.com/book/view/47/kulkarni-clinical-anatomy-a-problem-solving-approach
7. https://textbookequity.org/Textbooks/anatomy+phys+vol2a.pdf
8. https://openstax.org/details/books/anatomy-and-physiology
9. https://www.pdfdrive.com/clinical-anatomy-books.html
10. https://www.goodreads.com/en/book/show/51790563

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22PT102011	**HUMAN PHYSIOLOGY-II**	4	-	2	-	5

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on functional aspects cardio-vascular physiology, Endocrine physiology, reproductive physiology, nervous physiology and special senses in human system and its pathophysiology.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the basic concepts of cardiovascular physiology.

CO2. Understand the mechanisms and pathophysiology of endocrine glands.

CO3. Understand the basic concepts of male and female reproductive physiology and various methods of contraception.

CO4. Analyse the process of sensory and motor impulse transmission from body to brain and vice versa.

CO5. Understand the mechanisms of Special senses and their role in human body.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	2	-	2	-	-	-	-	-	2
CO3	3	2	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	-	-	-	-	-	3	3	-	-
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**-**	**3**	**3**	**-**	**2**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: CARDIOVASCULAR SYSTEM ***(14 Periods)***

Introduction: Physiological anatomy and nerve supply of the heart and blood vessels. Organisation of CVS. Cardiac muscles: Structure, Conducting system: Components. Impulse conduction, Cardiac Cycle: Definition. Phases of cardiac cycle. Pressure and volume curves. Heart sounds – causes, character., ECG: Definition. Different types of leads. Waves and their causes. P-R interval., Cardiac Output: Definition. Normal value. Determinants. Stroke volume and its regulation. Heart rate and its regulation. variations, Arterial Blood Pressure: Definition. Normal values and its variations. Regulation of BP., Arterial pulse., Shock – Definition. Classification–causes and features, Special circulations

Module 2: ENDOCRINE SYSTEM ***(14 Periods)***

Introduction: Major endocrine glands. Hormone: classification, mechanism of action., Functions of hormones, Pituitary Gland: Anterior Pituitary and Posterior Pituitary hormones: Secretory cells, action on target cells, Growth hormone functions Disorders: Gigantism, Acromegaly, Dwarfism, Diabetes insipidus., Pituitary-Hypothalamic Relationship., Thyroid Gland: Thyroid hormone and calcitonin: secretory cells, synthesis, storage, action and regulation of secretion. Disorders: Myxedema, Cretinism, Grave's disease., Parathyroid hormones: secretory cell, action, regulation of secretion. Disorders: Hyperparathyroidism. Hyperthyroidism. Calcium functions, Adrenal Gland: Adrenal Cortex: Secretory cells, synthesis, action, Cortisol, and Androgens. Disorders: Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome., Adrenal Medulla: Secretory cells, action, and noradrenaline. Disorders: Pheochromocytoma., Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin and glucagon. Glucose metabolism and its regulation. Disorder: Diabetes mellitus., Local Hormones. (Briefly)

Module 3: REPRODUCTIVE SYSTEM ***(08 Periods)***

Introduction: Physiological anatomy reproductive organs. Sex determination. Sex differentiation. Disorder, Male Reproductive System: Functions of testes. Pubertal changes in males. Spermatogenesis. Testosterone: action. Semen., Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females. Hormones: estrogen and progesterone-action., Menstrual Cycle: Phases., Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy. Functions of placenta. Contraception methods male and female

Module 4: NERVOUS SYSTEM ***(18 Periods)***

Introduction: Organisation of CNS – central and peripheral nervous system. Functions of nervous system. Synapse: Functional anatomy, classification, Synaptic transmission., Sensory Mechanism: Sensory receptors: function, classification and Sensory pathway:, The ascending tracts –lateral spinothalamic tract and the anterior spinothalamic tract – their origin, course, termination and functions., Sensory cortex. Somatic sensations: crude touch, fine touch, tactile localization, tactile discrimination, stereognosis, vibration sense, kinesthetic sensations. Pain sensation:. Cutaneous pain –slow and fast pain, hyperalgesia. Deep pain. Visceral pain – referred pain. Motor Mechanism: Motor Cortex. Motor pathway: The descending tracts – pyramidal tracts, extrapyramidal tracts – origin, course, termination and functions. Upper motor neuron and lower motor neuron. Paralysis, monoplegia, paraplegia, hemiplegia and quadriplegia., Reflex Action: components, Bell-Magendie law, classification and Monosynaptic and, superficial reflexes, deep reflexes, Spinal cord Lesions: Complete transection and Hemi-section of the spinal cord., Cerebellum: Functions., Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome, Basal Ganglia: Structures included and functions. Parkinson's disease., Higher functions of cerebral cortex – learning, memory and speech., CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance. Blood brain barrier. Hydrocephalus., ANS: Features and actions of parasympathetic and sympathetic nervous system.

Module 5: SPECIAL SENSES ***(06 Periods)***

Vision: Introduction: Functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Photopic vision. Scotopic

vision.,Visual Pathway and the effects of lesions. Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism., Audition: Physiological anatomy of the ear. Functions of external ear, middle ear auditory pathway. Types of Deafness. Tests for hearing., Taste: Taste buds. Primary tastes. Gustatory pathway. Smell: Olfactory pathway.

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Examination of Radial pulse
2. Recording of blood pressure
3. Examination of CVS
4. Examination of sensory nervous system
5. Examination of motor nervous system

RESOURCES

TEXT BOOKS:

1. K Sembulingam, Essentials of Medical Physiology, Jaypee Medical Publishers, Edition 9, 2022.
2. D Venkatesh, Basics Of Medical Physiology, Wolters Kluwer, Edition 4, 2023
3. G.K. Pal and G.K Pravati pal, Textbook of Practical Physiology, Orient Longman, Edition 1, 2003

REFERENCE BOOKS:

1. Ganong, Review of medical physiology, The McGraw hill, Edition 23, 2023.
2. Guyton & Hall, Text book of Medical Physiology, Saunders publisher, Edition 13,2015

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=xyhbIPSLBsA
2. https://www.youtube.com/watch?v=0f9p9JX4qJk
3. youtube.com/watch?v=JZhJI6rfFzg

WEB RESOURCES:

1. https://books.google.co.in/books?id=CcJvIiesqp8C&lpg=PP1&pg=PP1#v=twopage&q&f=false
2. https://books.google.co.in/books?id=KNpN_jvbmAIC&lpg=PP1&pg=PP1#v=onepage&q&f=false
3. https://www.visiblebody.com/

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CC111001	**CLINICAL POSTING-I**	-	-	-	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Develop communication skills to deal with patients and health care professionals.

CO2. Apply appropriate medical devices and techniques to diagnose the patient illness.

CO3. Develop skills in formulating various medical documentation procedures.

CO4. Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

1. Students will attend to clinical posting weekly two days in 3rd semester.
2. The Evaluation process is day to day, based on logbook and viva.

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CC111002	**CLINICAL POSTING-II**	-	-	-	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Develop communication skills to deal with patients and health care professionals.

CO2. Apply appropriate medical devices and techniques to diagnose the patient illness.

CO3. Develop skills in formulating various medical documentation procedures.

CO4. Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

1. Students will attend to clinical posting weekly two days in 4th semester.
2. The Evaluation process is day to day, based on logbook and viva.

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CC101019	**NATIONAL HEALTH CARE DELIVERY SYSTEM AND MEDICAL RECORDS MANAGEMENT**	4	-	-	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on word roots, prefixes, suffixes basic medical terms, medical abbreviations to human body systems and record-keeping methods in health care and medical ethics and law. Health care system, AYUSH, vital events of life and epidemiology in India.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate basic knowledge on roots, prefixes and suffixes to form medical terms in health care system

CO2. Apply advanced tools and techniques to maintain patient health details in medical system and Design a standard protocol by applying medical law and ethics.

CO3. Understand the basic concepts in health care delivery system and health policies

CO4. Acquire knowledge on various AYUSH systems and Analyze the Vital events of life and its impact on demography.

CO5. Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	-	-	-	-	-	-	-
CO2	3	2	-	1	-	1	-	-	1	-
CO3	3	2	-	-	-	1	-	-	1	-
CO4	3	2	-	1	-	1	-	-	1	1
CO5	3	2	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**1**	**-**	**1**	**-**	**-**	**1**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module1: INTRODUCTION TO MEDICAL TERMINOLOGY (15 Periods)

Derivation of medical terms, define word roots, prefixes, and suffixes, Conventions for combined morphemes and the formation of plurals, Basic medical terms, Form medical terms utilizing roots, suffixes, prefixes, and combining roots. Interpret basic medical abbreviations/ symbols , utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, Respiratory system, cardiovascular system, nervous system, and endocrine system.

Module2: MEDICAL ETHICS & RECORD KEEPING (15 Periods)

Medical ethics – Definition, Basic principles of medical ethics – Confidentiality, Malpractice and negligence – Rational and irrational drug therapy, Autonomy and informed consent – Right of patients, Care of the terminally ill- Euthanasia, Development of a standardized protocol to avoid sentinel events, Standard procedures in record keeping, interpret medical orders/reports, Data entry and management on electronic health record system, Advanced tools to maintain records in Health care.

Module3: NATIONAL HEALTHCARE DELIVERY SYSTEM & NATIONAL HEALTH POLICIES (15 Periods)

Healthcare delivery system in India at primary, secondary and tertiary care Community participation in healthcare delivery system, Health system in developed countries, Private Sector, National Health Mission, National Health Policy Issues in Health Care Delivery System in India achievements and constraints in various National Heath programme. National Health Programme, Background objectives, action plan, targets, operations.

Module4: AYUSH SYSTEM OF MEDICINE, DEMOGRAPHY & VITAL STATISTICS (15 Periods)

Ancient scientists of bharat, introduction to Ayurveda, Naturopathy, Unani, Siddha, Homeopathy, Need Course for integration of various system of medicine. Demography & its concept, Vital events of life & its impact on demography, Significance and recording of vital statistics, Census & its impact on health policy.

Total Periods:60

EXPERIENTIAL LEARNING

1. Demonstration of various levels of health care system
2. Presentation of health care programs.
3. Illustration on 46ikip system of medicine and it's practice.
4. A clinical overview on demography and vital statistics.
5. Discussion on medical terminology of different body systems.
6. Write about basic principles of medical ethics.
7. Write about electronic health record system.

RESOURCES

TEXTBOOKS:

1. Adam Brown, Medical Terminology Easy Guide for Beginners, Create Space Independent Publishing Platform, Edition 1, 2016.
2. GD Mogli, Medical records organization and management, Jaypee Brothers Medical Publishers, Edition2, 2016.

REFERENCE BOOKS:

1. Francis, Hospital Care Management, Edition 4, 2019
2. Sharon B. Buchbinder, Introduction to Health Care Management, Edition 2, 2011

VIDEOLECTURES:

1. https://www.youtube.com/watch?v=_bDatJxhfkQ
2. https://www.youtube.com/watch?v=9iMhc2OU-go
3. https://youtu.be/It_cV56Dxtk
4. https://youtu.be/VirdH_3RKKk

WEB RESOURCES:

1. https://library.medschl.cam.ac.uk/e-books/
2. https://www.ncbi.nlm.nih.gov/
3. https://blog.ipleaders.in/medical-laws-conflict-ethic
4. https://www.gponline.com/medico-legal-importance-good-records/article/89

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CC111003	CLINICAL POSTING-III	-	-	-	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Develop communication skills to deal with patients and health care professionals.

CO2. Apply appropriate medical devices and techniques to diagnose the patient illness.

CO3. Develop skills in formulating various medical documentation procedures.

CO4. Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

1. Students will attend to clinical posting weekly two days in 5th semester.
2. The Evaluation process is day to day, based on logbook and viva.

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CC111004	**CLINICAL POSTING-IV**	-	-	-	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Develop communication skills to deal with patients and health care professionals.

CO2. Apply appropriate medical devices and techniques to diagnose the patient illness.

CO3. Develop skills in formulating various medical documentation procedures.

CO4. Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

Note:

1. Students will attend to clinical posting weekly two days in 6th semester.
2. The Evaluation process is day to day, based on logbook and viva.

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF102025	**RESEARCH METHODOLOGY AND BIOSTATISTICS**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed Knowledge on the basic principles of research and methods applied to draw inferences from the research findings. The students will also be made aware of the need of biostatistics and understanding of data, sampling methods, in addition to being given information about the relation between data and variables.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand concepts of research methodology.

CO2 Collect data for research in various methods.

CO3 Analyse research data by using biostatistics

CO4 Write their research or review papers to publish in journal

CO5 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	3	1	-	-	-
CO2	1	1	2	-	2	-	-	-	3	-
CO3	1	1	2	-	1	-	-	1	-	1
CO4	2	1	2		2					1
CO5	1	2	2	-	3	2	1	-	-	-
Course Correlation Mapping	**1**	**1**	**2**	**1**	**2**	**3**	**1**	**1**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: FOUNDATIONS OF RESEARCH ***(10 Periods)***

Definition Research, Introduction to research methods, Objectives of Research, Identifying research problem, Types of Research & Research Approaches, Research Methods vs Methodology Ethical issues in research, Research design.

Module 2: RESEARCH PROBLEM AND DATA COLLECTION ***(09 Periods)***

Research Problem, Measurement & Scaling Techniques, Types of Data, Research tools and Data Research Problem, Measurement & Scaling Techniques, Types of Data, Research tools and Data collection methods, Sampling methods, randomization, crossover design, placebo, blinding techniques, Developing a research proposal.

Module 3: INTRODUCTION TO BIOSTATICS ***(09 Periods)***

Meaning, Definition, and Characteristics of Statistics, Importance of the Study of Statistics, Understanding of data in biostatistics, Statistics in Health Science, How & where to get relevant data, Relation between data & variables, Type of variables: defining data sets.

Module 4: DATA ANALYSIS AND DISSEMINATION ***(09 Periods)***

Basic Principles of Data Graphical Representation, Analysis of variance & covariance. Measures of central tendency include mean, median, and mode. Probability and standard distributions include binomial and normal distributions. Sample size calculation, Sampling techniques address sampling need, criteria, procedures, design errors, variation, and tests of significance. Statistical significance involves parametric and non-parametric tests.

Module 5: SCIENTIFIC WRITING ***(08 Periods)***

Introduction, reviewing literature, formulating research problems and proposals, integrating theory and data and understanding citation and referencing. types of reports, formal report layout, and journal standards (impact factor, citation index). importance of communicating science, challenges in scientific writing, plagiarism and its detection and writing scientific papers.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To practice problems on various biostatistics tools
2. Demonstrate types of data collection from hospital.
3. To determine research statistics tools.
4. Analyze data by using SPSS.

RESOURCES

TEXT BOOKS:

1. S.P. Gupta, Statistical Methods, Sultan Chand & Sons, Edition 46,2023.
2. C.R. Kothari, Research Methodology, New age International Publisher, Edition 4, 2019.

REFERENCE BOOKS:

1. Himanshu Tyagi, Biostatistics Buster, Jaypee Brothers Medical Publishers, Edition 1,2011.
2. Bratati Banerjee, Mahajans Methods in Bistatistical for medical students and research workers, Jaypee Brothers Medical Publishers, Edition 9, 2018.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=d77eQz0_Sfk
2. https://www.youtube.com/watch?v=yOU_s0xzc-Y
3. https://www.youtube.com/watch?v=txIS0N0l9xU&list=PLEIbY8S8u_DK7i4Fj6Hgq8sn_l42k9H1L
4. https://www.youtube.com/watch?v=1Q6_LRZwZrc

WEB RESOURCES:

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8764821/
2. https://www.scribbr.com/category/methodology/
3. https://www.easybiologyclass.com/biostatistics-introduction-significance-applications-and-limitations-of-statistics/

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF101001	RESEARCH METHODOLOGY AND BIOSTATISTICS FOR HEALTH PROFESSIONALS	4	-	-	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed Knowledge on the basic principles of research and methods applied to draw inferences from the research findings. The students will also be made aware of the need of biostatistics and understanding of data, sampling methods, in addition to being given information about the relation between data and variables.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand concepts of research methodology.

CO2 Collect data for research in various methods.

CO3 Analyze research data by using biostatistics

CO4 Write their research or review papers to publish in journal

CO5 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	-	1	-	3	1	-	-	-
CO2	1	1	2	-	2	-	-	-	3	-
CO3	1	1	2	-	1	-	-	1	-	1
CO4	2	1	2		2					1
CO5	1	2	2	-	3	2	1	-	-	-
Course Correlation Mapping	**1**	**1**	**2**	**1**	**2**	**3**	**1**	**1**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: FOUNDATIONS OF RESEARCH ***(10 Periods)***

Definition Research, Introduction to research methods, Objectives of Research, Identifying research problem, Types of Research & Research Approaches, Research Methods vs Methodology Ethical issues in research, Research design.

Module 2: RESEARCH PROBLEM AND DATA COLLECTION ***(09 Periods)***

Research Problem, Measurement & Scaling Techniques, Types of Data, Research tools and Data Research Problem, Measurement & Scaling Techniques, Types of Data, Research tools and Data collection methods, Sampling methods, randomization, crossover design, placebo, blinding techniques, Developing a research proposal.

Module 3: INTRODUCTION TO BIOSTATICS ***(09 Periods)***

Meaning, Definition, and Characteristics of Statistics, Importance of the Study of Statistics, Understanding of data in biostatistics, Statistics in Health Science, How & where to get relevant data, Relation between data & variables, Type of variables: defining data sets.

Module 4: DATA ANALYSIS AND DISSEMINATION ***(09 Periods)***

Basic Principles of Data Graphical Representation, Analysis of variance & covariance. Measures of central tendency include mean, median, and mode. Probability and standard distributions include binomial and normal distributions. Sample size calculation, Sampling techniques address sampling need, criteria, procedures, design errors, variation, and tests of significance. Statistical significance involves parametric and non-parametric tests.

Module 5: SCIENTIFIC WRITING ***(08 Periods)***

Introduction, reviewing literature, formulating research problems and proposals, integrating theory and data and understanding citation and referencing. types of reports, formal report layout, and journal standards (impact factor, citation index). importance of communicating science, challenges in scientific writing, plagiarism and its detection and writing scientific papers.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To practice problems on various biostatistics tools
2. Demonstrate types of data collection from hospital.
3. To determine research statistics tools.
4. Analyze data by using SPSS.

RESOURCES

TEXT BOOKS:

1. S.P. Gupta, Statistical Methods, Sultan Chand & Sons, Edition 46,2023.
2. C.R. Kothari, Research Methodology, New age International Publisher, Edition 4, 2019.

REFERENCE BOOKS:

1. Himanshu Tyagi, Biostatistics Buster, Jaypee Brothers Medical Publishers, Edition 1,2011.
2. Bratati Banerjee, Mahajans Methods in Bistatistical for medical students and research workers, Jaypee Brothers Medical Publishers, Edition 9, 2018.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=d77eQz0_Sfk
2. https://www.youtube.com/watch?v=yOU_s0xzc-Y
3. https://www.youtube.com/watch?v=txIS0N0l9xU&list=PLEIbY8S8u_DK7i4Fj6Hgq8sn_l42k9H1L
4. https://www.youtube.com/watch?v=1Q6_LRZwZrc

WEB RESOURCES:

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8764821/
2. https://www.scribbr.com/category/methodology/
3. https://www.easybiologyclass.com/biostatistics-introduction-significance-applications-and-limitations-of-statistics/

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22DF10104M	**PROFESSIONALISM AND WORKPLACE SKILLS IN ALLIED HEALTH**	2	-		-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides essential soft skills and professionalism for allied health settings, focusing on communication, emotional intelligence, problem-solving, ethics, cultural diversity, and patient-centered behavior to support effective workplace performance. It prepares students to adapt confidently to evolving healthcare environments.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the foundations of emotional and social intelligence and their importance in allied health professionalism.

CO2. Explain structured problem-solving approaches and the role of critical thinking in effective workplace decision-making.

CO3. Illustrate key components of communication, ethics, cultural sensitivity, and patient-centered interaction in healthcare settings.

CO4 Understand the significance of adaptability and resilience in managing challenges within dynamic healthcare environments.

CO5. Evaluate on personal strengths and expectations to align professional behavior with organizational and patient needs.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	1	-	-	2	-	2	-	2
CO2	3	3	2	2	-	1	-	2	-	3
CO3	2	2	2	-	-	3	1	3	-	2
CO4	2	2	1	1	2	1	1	2		3
CO5	2	2	2	-	3	3	1	1	-	3
Course Correlation Mapping	3	3	2	2	3	3	1	3	-	3

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: EMOTIONAL AND SOCIAL INTELLIGENCE ***(06 Periods)***

Introduction to emotional and social intelligence (ESI), Competencies for recognizing and managing behaviors, moods, and impulses, Foundational 4 Quadrants of ESI, Assessing current ESI skills, Managing stress to enhance ESI application, Building workplace connections and professional relationships, Applying ESI for improved professional effectiveness.

Module 2: CRITICAL THINKING SKILLS FOR THE PROFESSIONAL ***(06 Periods)***

Critical thinking concepts and principles, Structured problem-solving models, Questioning techniques for deeper understanding.

Module 3: THE GROWTH MINDSET ***(06 Periods)***

Beliefs and actions that promote a growth mind set, Opportunities for developing a growth mindset, Practices to foster a growth mindset in the workplace

Module 4: ADAPTABILITY AND RESILIENCY ***(06 Periods)***

Concepts of adaptability and resilience, Adjusting actions and approaches to changing conditions, Strategies for recovering from challenges and bouncing forward, Assessing situations from multiple perspectives to choose effective responses.

Module 5: PROFESSIONALISM IN ALLIED HEALTH ***(06 Periods)***

Workplace expectations of allied healthcare professionals, Emotional intelligence, self-management, and interpersonal skills, Internal and external communication skills, Enhancing patient interactions and satisfaction.

Total Periods: 30

EXPERIENTIAL LEARNING

1. Assess and explain your emotional and social intelligence profile.
2. Describe workplace situations where critical thinking leads to better outcomes.
3. Illustrate growth mindset behaviors through workplace examples.
4. Interpret adaptability and resilience through personal or observed experiences.
5. Demonstrate professional communication through role-play scenarios.

(Note: It's an indicative one. Course instructor may change the activities and the same shall be reflected in course handout)

RESOURCES

TEXT BOOKS:

1. Daniel Goleman - Emotional Intelligence: Why It Can Matter More Than IQ, 10th Edition, Bantam Books (2005).
2. Judith Dwyer - Communication for Health Professionals, 3rd Edition, Cambridge University Press (2020).

REFERENCE BOOKS:

1. Carol S. Dweck - Mindset: The New Psychology of Success, Updated Edition, Ballantine Books/Random House (2016).
2. Jeff Boss - Navigating Chaos: How to Find Certainty in Uncertain Situations, 1st Edition, Greenleaf Book Group Press (2015).

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=D6_J7FfgWVc
2. https://www.youtube.com/watch?v=X1deApOKfZE
3. https://www.youtube.com/watch?v=xhUNYVzSEM4

WEB RESOURCES:

1. https://www.coursera.org/learn/growth-mindset
2. https://www.coursera.org/specializations/adaptability-and-resiliency
3. https://www.danielgoleman.info

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22CE107601	**ENVIRONMENTAL SCIENCE**	2	-	-	-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Thiscourse provides a detailed discussion onnatural resources, ecosystems, biodiversity, environment pollution and control, social issues and environment, human population and environment.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Analyze natural resources to solve complex environmental problems and natural resource management considering society, environment and sustainability.

CO2. Analyze ecosystems and biodiversity to solve complex environmental problems by following environmental ethics considering society, environment and sustainability besides communicating effectively in graphical form.

CO3. Analyze various types of pollution and their control measures to solve environmental problems through appropriate tools and techniques following latest developments considering society, ethics, environment and sustainability.

CO4. Analyze social issues and its impact on environment, environmental acts to solve complex environmental problems considering society, environment and sustainability besides communicating effectively in graphical form.

CO5. Analyze human population and its impact on environment to solve complex environmental problems through team work and using appropriate tools and techniques considering ethics, society, environment and sustainability.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	-	2	-	-	1	-	1
CO2	3	2	-	-	2	2	1	1	-	1
CO3	3	2	2	1	2	2	2	-	-	-
CO4	3	2	2	2	2	-	-	2	-	1
CO5	3	2	2	2	2	2	2	-	-	1
Course Correlation Mapping	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**1**		**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: NATURAL RESOURCES *(07 Periods)*

Multidisciplinary nature of environment; Natural Resources: Renewable and non-renewable resources; Forest, Water, Mineral, Food and Energy resources -Causes, Effects, Remedies, Case studies; Role of an individual in conservation of natural resource and equitable use of resources for sustainable lifestyles.

Module 2: ECOSYSTEMS AND BIODIVERSITY *(07 Periods)*

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem - Producers, Consumers, Decomposers; Food chains, Food webs, Ecological pyramids – Types; Characteristic features, Structure and functions of forest ecosystem, Desert ecosystem, Aquatic ecosystem.

Biodiversity: Concept and value of biodiversity, Role of biodiversity in addressing new millennium challenges, Hot spots of biodiversity, Threats to biodiversity, Man-wild life conflicts, Endemic, Endangered and extinct species of India, Conservation of biodiversity – In-situ and ex-situ.

Module 3: ENVIRONMENTAL POLLUTION AND CONTROL *(06 Periods)*

Causes, Adverse effects and control measures of pollution - Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Nuclear pollution, Solid waste management – Urban waste, industrial waste; Latest developments in pollution control, Hazards and disaster management – Floods, Earthquakes, Tsunamis, Case studies.

Module 4: SOCIAL ISSUES AND THE ENVIRONMENT *(06 Periods)*

Sustainable development, Urban problems related to energy, Environmental ethics –Issues, Solutions; Global warming, Acid rain, Ozone layer depletion, Nuclear accidents and case studies, Wasteland reclamation, Consumerism and waste products, Concept of green technologies, Environment justice: National Green Tribunal and its importance; Environment protection act, Air act, Water act, Wildlife protection act, Forest conservation act, Issues involved in enforcement of environmental legislation, Public environmental awareness.

Module 5: HUMAN POPULATION AND THE ENVIRONMENT *(04 Periods)*

Population growth, Population characteristics and variation among nations, Population explosion, Family welfare program, Environment and human health, Human rights, Value education, HIV/AIDS, Women and child welfare, Role of information technology in environment and human health; Case studies - Field Work/Assignment/Seminar on Environmental assets – Water bodies/Forest/Grassland/Hill/Mountain.

Total Periods: 30

EXPERIENTIAL LEARNING

1. Visit a nearby villages and know the status of availability of local resources that can be improved through proper education.
2. Make an awareness program in the villages for the development of natural resources, ecosystems and biodiversity.
3. Prepare a document by visiting a local urban waste dumping yard near to the Tirupati city.
4. Visit a local village and find a barren land and make the land into a useful land by planting plants or providing the soil and fertilizers required to improve the soil.
5. Visit a local zoological park and identify the species variety and variability.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. Anubha Kaushik and Kaushik, C.P., *Perspectives in Environmental Studies*, New Age International (P) Ltd. Publications, Edition 6, 2018.
2. Erach Barucha, *Environmental Studies,* Orient Blackswan, Edition 3, 2021.

REFERENCE BOOKS:

1. Cunningham, W. P. and Cunningham, M. A., *Principles of Environmental Science*, Tata McGraw-Hill Publishing Company, New Delhi, Edition 8, 2016.
2. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2nd Edition, 2009.
3. Anji Reddy, M., *Text Book of Environmental Science and Technology*, BS Publications, Revised Edition, 2014.
4. Rajagopalan, R., *Environmental Studies*, Oxford University Press, Edition 3, 2015.

VIDEO LECTURES:

1. http:// nptel.ac.in/courses/109/104/109104047
2. https://www.youtube.com/watch?v=mIPBPG-5dUw

WEB RESOURCES:

1. https://nptel.ac.in/courses/122102006
2. https://www.flame.edu.in/academics/ug/program-structure/major-minor courses/environmental-studies
3. https://www.tutorialspoint.com/environmental_studies/environmental_studies_environment.htm

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22LG101402	**తెలుగు**	2	-	-	-	2

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION: తుమ్మల సీతారామమూర్తి-**ఎక్కట్లు,** తిక్కన-**నాడీజంఘోపాఖ్యానం,** పోతన-**ధ్రువోపాఖ్యానం,** దువ్వూరి రామిరెడ్డి - **కృషీ వలుడు, మరియు తెలుగు వ్యాకరణం మీద అవగాహన.**

COURSE OUTCOMES: కోర్సు విజయవంతంగా పూర్తిచేసిన తర్వాత ,విద్యార్థులు వీటిని చేయగలరు:

CO1. విద్యార్థులలో మానవీయ విలువలు పెరిగి నైతిక వలువలతో జీవించడం

CO2. సమాజంలో మనకు చేతనైన సాయం చెయ్యడం ప్రతి మనిషి బాధ్యత అనే సందేశం

CO3. త్రికరణ శుద్ధితో కృషి చేస్తే ఏదైనా సాధించ వచ్చు అనే సందేశం

CO4. వ్యవసాయ రంగం గూర్చి విద్యార్థులలో అవగాహన కలగడం

CO5. తెలుగు వ్యాకరణం

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

పాఠ్య ప్రణాళిక

Module 1: **ఎక్కట్లు** – తుమ్మల సీతారామమూర్తి ***(06 Periods)***

సత్ప్రవర్తన, సచ్ఛీలత, సన్మార్గం, సమసమానత్వం గూర్చి వివరించడం.

Module 2: **నాడీజంఘోపాఖ్యానం** – తిక్కన ***(06 Periods)***

సహాయం చేసినివారిని మరచి పోరాదు. చేసిన మేలు మరచిన వారి జీవితం ఎంత హీనంగా ఉంటుందో తెలియజేయడం.

Module 3: **ధ్రువోపాఖ్యానం** – పోతన ***(06 Periods)***

ఎటువంటి కష్టాలకు సమస్యలకు కుంగి పోకుండా దీక్షతో పట్టుదలతో కృషితో అనుకున్నది సాధించాలని తెలియజేయడం.

Module 4: **కృషీ వలుడు** – దువ్వూరి రామిరెడ్డి ***(06 Periods)***

సమాజానికి వెన్నెముక అయిన రైతు యొక్క కష్టాలను త్యాగాలను వివరించడం.

Module 5: **సంధులు, సమాసాలు, అలంకారాలు.** ***(06 Periods)***

తెలుగు భాష యొక్క మూలాలను తెలుసుకోవడం.

Total Periods: 30

RESOURCES

TEXT BOOKS:

1. **ఎక్కట్లు – కవి తుమ్మల సీతారామమూర్తి చౌదరి.**
2. **నాడీజంఘోపాఖ్యానం – కవి తిక్కన. (మహాభారతం – శాంతి పర్వం – తృతీయా శ్వాసం – 472 నుండి 511 పద్యాల** వరకు).
3. **ధ్రువోపాఖ్యానం** – కవి పోతన (ఆంధ్ర మాహాభాగవతం – చతుర్థ స్కంధం – 216 నుండి 277 పద్యాల వరకు)
4. కృషీ వలుడు – కవి దువ్వూరి రామిరెడ్డి

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=5jX20h6HWzg
2. https://www.youtube.com/watch?v=FFtPSPByBmk
3. https://www.youtube.com/watch?v=nQHF_pgTfL8
4. https://www.youtube.com/watch?v=IEERKL3Q2Cs

Web Resources:

1. http://teluguvignanamvinodam1.blogspot.com/2021/06/maha-bharatam-in-telugu-pdf-free-download_25.html
2. https://www.freegurukul.org/blog/ramayanam-pdf/

EXPERIENTIAL LEARNING

The experiential learning components will be detailed in CHO.

SCHOOL CORE

Course Code	Course Title	L	T	P	S	C
22LG101404	**SANSKRIT**	2	-	-	-	2

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: अस्मिन् पाठ्यक्रमे संस्कृत गद्य, पद्य, व्याकरमेन सह महाभारतम् अपि च रामायणस्य कान्श्चन खण्डानां मेलनं भवति। अयं पाठ्यक्रमः छात्राणां कृते विभिन्न संस्कृत ग्रन्थानां अपि च साहित्यस्य समालोचनात्मक विश्लेषण करणमपि शिक्षयति। संपूर्ण पाठ्यक्रमे अस्मिन्, छात्राः देवनागरी लिपेः लिखनं अधिगच्छति, संस्कृतस्य शब्दानां उच्चारणं तथा हृदिस्थं करिष्यति, अपि च प्राथमिक व्याकरण पठिष्यति तेन ते संस्कृते सरल वाक्यानां निर्माणं कर्तुं प्रभवन्ति।

COURSE OUTCOMES: पाठ्यक्रमस्य सफलसमाप्तेः अनन्तरं छात्राः

CO1 कर्तव्यपरक शैक्षणिक वृत्तिपरक तथा शोधकर्तृणां निर्माणार्थं छात्राणां संज्ञानात्मक, प्रभावशाली तथा व्यवहारिक क्षमतानां आकार प्रदानार्थं सहायतां करोति।

CO2 सामाजिक परिवर्तने भागग्रहणार्थं सक्षमाः भवितुं छात्रेषु सेवायाः धारणा संचारः करोति।

CO3 समकालीन समस्या-समाधान स्थितिषु प्राचीन भारतीय ज्ञानस्य अनुप्रयोगस्य ज्ञानप्राप्तिः। सामान्य रूपेण तथा विशेष रूपेण अभ्यसने तथा तस्य मूल्यांकनस्य संदर्भे च नैतिक उपयुक्ततायाः एकः दृढतर भावनायाः विकासनार्थम्।

CO4 प्राचीन साहित्यतः प्राथमिक जीवनं तथा अवधारणानां ज्ञानप्रदानं यत् कालातीतः जातः तथापि इदानीमपि समाजाय अनुवर्तते।

आवेदनस्य प्रमुख क्षेत्रेषु प्राथमिक कौशलस्य अधिग्रहणे सुगमकरणम् उदा- नेतृत्वे, संचारे, अनुसंधान योग्यतायां, व्यवहार संशोधने इत्यादि।

CO5 सामाजिक विविधतायाः कृते सम्मान-विकसितं करनं तथा सामाजिक अपि च सांस्कृतिक प्रासंगिकतायाः अध्ययने अभिवृद्धि करनम्।

CO-PO Mapping Table:

Course Outcomes	Program Outcomes								
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
CO1	3	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module-1: प्राचीन पद्यसाहित्यम् **(06 Periods)**

1.आर्य पादुका पट्टाभिषेकः - वल्मीकिः – श्रीमद्रामायणम्

2. यक्षप्रश्नाः - वेदव्यासः – महाभारतम्

Module-2: चम्पूकाव्यम् & आधुनिक पद्यकाव्यम् **(06 Periods)**

3.गङ्गावतरणम् - भोजराजः - चम्पूरामायणम्

4. मोहापनोदः - श्री पमिडिपाटि पट्टाभिरामारावः – मूलकथा-'धर्मसौहृदम्' इति संस्कृत पद्यकाव्यम्

Module-3: गद्यसाहित्यम् **(06 Periods)**

5. अत्युत्कटैः पापपुण्यैः इहैव फलमश्नुते - नारायणपण्डितः - हितोपदेशः

6. शूद्रकवीरवरकथा - हितोपदेशः

Module-4: शब्दाः **(6 Periods)**

देव, कवि, भानु, पितृ, धातृ, गो, रमा, मति

Module 5: महाकवि, शास्त्रकाराः **(6 Periods)**

1.पाणिनिः 2.कौटिल्यः 3.भरतमुनिः 4.भारविः 5.माघः 6.भवभूतिः 7.शङ्कराचार्यः 8.दण्डी

Total Periods: 30

EXPERIENTIAL LEARNING:

The experie

RESOURCES

TEXT BOOKS:

1.विश्वभारती 2,संस्कृत भारती 3.अमृतवाणी

REFERENCE BOOKS:

1.रामायणम् 2.महाभारतम् 3.अष्टाध्यायी 4.अमरकोशः

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=bh-14xfMeYk
2. https://www.youtube.com/watch?v=6xFkoOpzsvs

Web Resources:

1. https://www.forum.universityupdates.in/threads/ou-sanskrit-2nd-semester-study-material.33659/
2. https://cbpbu.ac.in/study_mat_sanskrit.php

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102004	**BASIC CLINICAL BIOCHEMISTRY AND ANALYTICS**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Medical Laboratory Technician rolls, responsibilities, biochemistry lab chemicals preparation, and various instruments principle, methods and calibration.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand laboratory ethics and responsibilities

CO2. Prepare the solutions by using various techniques in the laboratory

CO3. Acquire knowledge on various instruments clinical biochemistry.

CO4. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	1	-	-	3		-	-	-
CO2	3	3	1	3	-	-	3	-	-	-
CO3	3	3		3	-	-	3	-	-	-
CO4	3	2	1	1	-	-	2	-	-	-
Course Correlation Mapping	**3**	**3**	**1**	**3**	**-**	**3**	**3**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1: INTRODUCTION OF MEDICAL LAB TECHNOLOGY *(08 Periods)*

Role of Medical Lab Technology, Ethics and responsibility, safety measures, first aid. Cleaning and care of laboratory glass ware: Steps involved in cleaning soda lime glass, borosil glass, preparation of chromic acid solution and storage. Distilled water: Methods of preparation, types of water distillation plants, storage of distilled water.

MODULE 2: UNITS OF MEASUREMENT AND CALIBRATION OF VOLUMETRC APPARATUS *(08 Periods)*

Unit of Measurement: S.I unit and CGS units, Conversion, Strength, molecular weight, equivalent weight, Normality, Molarity, Molality and Numerical. Calibration of volumetric apparatus: Flask, Pipettes, Burettes and Cylinders. Analytical balance: Principle, working, Maintenance.

MODULE 3: CONCEPT OF pH, VOLUMETRIC ANALYSIS AND OSMOSIS *(10 Periods)*

Concept of pH: Definition, Henderson Hassel batch equation, Pka value, pH indicator, methods: pH paper and pH meter: principle, working, maintenance and calibration of pH meter.

Volumetric analysis: Normal and molar solutions, Standard solutions, preparation of reagents, Storage of chemicals. Osmosis: Definition, types of osmosis, factors affecting osmotic pressure, Vant Hoff's equation, Application of osmosis.

MODULE 4: ANALYTICAL BIOCHEMISTRY *(09 Periods)*

Spectrophotometry and Colorimetry: Introduction, Instrumentation, Lamberts law and Beers law, Applications. Photometry: Introduction principles, Instrumentation, Applications. Electrophoresis: Introduction, principle, instrumentation, types and applications.

MODULE 5: CHROMATOGRAPHY *(10 Periods)*

Chromatography: Introduction, Types. Paper Chromatography: Introduction, principles, types, details for qualitative and quantitative analysis, applications. Thin layer chromatography: Introduction, experimental techniques, applications, limitations and High performance thin layer chromatograph. Gas chromatography: Introduction, principle and applications. Ion exchange chromatography: Introduction, definition, principle, cation and anion exchangers and applications. Gel Chromatography: Introduction, principle, methods and applications.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To prepare 0.1 N NaOH solution
2. To prepare 0.2 N HCL solution
3. To prepare 0.1 Molar H2SO4
4. To demonstrate the principle, working & maintenance of spectrophotometer.
5. To demonstrate the principle, working & maintenance of colorimeter.
6. To demonstrate the principle, working & maintenance of flame photometer.
7. To demonstrate the principle, working & maintenance of paper chromatography
8. To demonstrate the principle, working & maintenance of column chromatography.
9. To demonstrate the principle, working & maintenance of Electrophoresis

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. Praful B. Godkar, Text book of Medical Laboratory Technology, Balani Publications, Vol 1 and 2, Edition 3, 2021.
2. Mukherjee, Medical Laboratory Technology, McGraw Hill India, Val 1 and 2, Edition 3, 2017.
3. Varley, Practical clinical biochemistry, CBS Publications, Edition 4, 2005.

REFERENCE BOOKS:

1. M.A. Siddiqi, Handbook of Biochemistry, Scientific Book Company, Edition 15, 2024.
2. Chatterjee, Shinde, Text book of Medical Biochemistry, Jaypee Medical Publications, Edition 8, 2012.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=XUbOJgmf9B4
2. https://www.youtube.com/watch?v=oNl4vKCdp3Y
3. https://www.youtube.com/watch?v=lo1QVzZOG-Y
4. https://www.youtube.com/watch?v=qIW_VjVf3ZY
5. https://www.youtube.com/watch?v=Cje2HED2No0

WEB RESOURCES:

1. https://www.genome.gov/
2. https://collegedunia.com/
3. https://chem.libretexts.org/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102005	**MEDICAL MICROBIOLOGY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Historical accepts of microbiology, sterilization techniques, bacterial normal growth, culture media and fundamentals immunity.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate history of medical microbiology, and Handlining, care of Glassware and microscope.

CO2. Perform sterilization and disinfections techniques in the laboratory.

CO3. Understand microbial classification and cultural activities.

CO4. Explain types of immunity and laboratory animal care

CO5. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	2	-	-	-	-	-	-
CO2	3	-	-	3	-	-	-	-	-	-
CO3	3	1	-	2	-	-	-	-	-	-
CO4	3	2	-	2	-	3	-	-	-	2
CO5	3	1	-	2	-	-	-	-	-	-
Course Correlation Mapping	**3**	**1**	**-**	**2**	**-**	**3**	**-**	**-**	**-**	**2**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1: INTRODUCTION TO MEDICAL MICROBIOLOGY *(08 Periods)*

Introduction- Historical aspects of Microbiology. Microbe Vs Humans, Safety measures in Clinical Microbiology, Glassware used in Clinical Microbiology Laboratory. Introduction-Care and handling of glassware, Cleaning of glassware, Equipment used in clinical Microbiology Laboratory: Introduction-Care and maintenance including calibration. Microscopy-Introduction and history-Types, principle and operation mechanism of following microscopes. Light microscope, DGI, Fluorescent, Phase contrast, Electron microscope: Transmission/ Scanning

MODULE 2: STERILIZATION TECHNIQUES *(10 Periods)*

Sterilization: Definition, Types and principles of sterilization methods, Heat (dry heat, moist heat with special Reference to autoclave), Radiation, Filtration Efficiency testing to various sterilizers

Antiseptics and disinfectants: Definition, Types and properties, Mode of action - Uses of various disinfectants, Precautions while using the disinfectants - Qualities of a good disinfectant, and Testing efficiency of various disinfectants.

MODULE 3: MICROORGANISM CLASSIFICATION *(10 Periods)*

General characteristics & classification of Microbes: (Bacteria &fungi), Classification of microbes with special reference to prokaryotes & eukaryotes Morphological classification of bacteria, Bacterial anatomy (Bacterial cell structures)., Growth and Nutrition of Microbes: General nutritional & other requirements of the bacteria, Classification of bacteria on the basis of their nutritional requirements, Physical conditions required for growth.

MODULE 4: BACTERIAL GROWTH AND CULTURE MEDIA *(09 Periods)*

Normal growth cycle of bacteria (growth curve), Types of microbial cultures: Synchronous, Static, continuous culture. Culture media: Introduction, Classification of culture media (Example & Uses) solid media, liquid media, semisolid, Media, routine/synthetic/defined media, basal media, enriched, enrichment, Selective differential media, sugar fermentation media, transport media, preservation media and anaerobic culture media, Quality control in culture media. Aerobic & anaerobic culture methods: Concepts-Methods Used for aerobic cultures, Methods used for anaerobic cultures and automation in culture media preparation.

MODULE 5: IMMUNITY *(08 Periods)*

Introductions to Immunology, Immunity Antigens and Antibodies, Care & handling of laboratory animals: Introduction General care & handling, Ethics & legality in use of laboratory animal

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To demonstrate safe code of practice for a Microbiology laboratory
2. To prepare cleaning agents & to study the technique for cleaning & sterilization of glassware
3. To demonstrate the working & handling of Compound microscope
4. To demonstrate the method of sterilization by autoclave including its efficacy testing
5. To demonstrate the method of sterilization by hot air oven including its efficacy testing
6. To demonstrate the method of sterilization of media/solution by filtration.
7. Demonstration of Antiseptics, Spirit, Cetrimide& Povidone-Iodine.
8. To demonstrate the use of disinfectants
9. To prepare working dilution of commonly used disinfectants
10. In-use test
11. Rideal-walker phenol co-efficient test.
12. Kelsey-Sykes test
13. To demonstrate the different morphological types of bacteria
14. Preparation of one culture media from each type
15. To demonstrate aerobic culture
16. To demonstrate anaerobic culture
17. Visit to animal house & demonstrate about care of laboratory animals
18. To prepare working dilution of commonly used disinfectants.

RESOURCES

TEXT BOOKS:

1. Mackie and McCartney, Practical Medical Microbiology, Elsevier, Edition 14, 1996.
2. Anantha narayana and Panikers, Text book of Microbiology, Universities Press Pvt. Ltd, Edition 12, 2022.
3. Satish Gupte, The short Textbook of Medical Microbiology, Japee Brothers Medical Publishers, Edition 1, 2020.

REFERENCE BOOKS:

1. Mukherjee, Medical laboratory Technology, CPS Publishers, Vol. I, II and III, Edition 2, 2022.
2. Prescott, Harley., Microbiology, McGraw Hill Publishers, Edition 4, 2008.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=6-oTnYOvhIA
2. https://www.youtube.com/watch?v=fND5I_A7wNM
3. https://www.youtube.com/watch?v=umv5KWodPjQ

WEB RESOURCES:

1. https://www.britannica.com/
2. https://sitn.hms.harvard.edu/flash/2020/how-microbes-grow/
3. https://thepharmapedia.com/rideal-walker-test-chick-martin-test-phenol-coefficient-test-gpat-drug-inspector/pharmacy-notes/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102007	**HAEMATOLOGY-I**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on basic hematology, blood components, anticoagulants, hemoglobin production, urine analysis and quality assurance hematology.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate handling of various instruments with safety measures in haematology.

CO2. Understand blood collection and preservation, and blood cells morphology and functions.

CO3. Demonstrate haemoglobin synthesis, haemostasis and radioactivity.

CO4. Understanding of Anticoagulants

CO5. Analysis of urine in the laboratory and quality assurance in hematology lab

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-
CO5	3	1	-	-	-	-	-	-	-	-
CO6	3	3	3	-	-	-	3	-	-	-
Course Correlation Mapping	**3**	**3**	**3**	**2**	**-**	**-**	**3**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

MODULE 1: BASIC HAEMATOLOGY ***(08 Periods)***

Introduction to hematology-Definition, Importance, Equipment's, Laboratory safety measures in Hematology laboratory.

MODULE 2: BLOOD AND ANTICOAGULANTS ***(08 Periods)***

Blood: Introduction, composition, function, and normal cellular components. Anticoagulants: types, mode of action, and preference of anticoagulants for different hematological studies.

MODULE 3: COLLECTION OF BLOOD ***(07 Periods)***

Collection and preservation blood sample for various hematological investigations. Formation of cellular components of blood: Erythropoiesis, Leucopoiesis and Thrombopoiesis.

MODULE 4: HEMOGLOBIN AND RADIOACTIVITY ***(07 Periods)***

Definition, types, structure, synthesis and degradation. Morphology of normal blood cells. Normal haemostasis and physiological properties of coagulation factors. Radioactivity: definition, half-life, physical decay and units.

MODULE 5: URINE ANALYSIS & QUALITY ASSURAFNCE IN HEMATOLOGY ***(15 Periods)***

Routine biochemistry: pH, Specific Gravity, Glucose, Ketones, Bilirubin, Albumin and Microscopic Examination. Internal assurance in haematology: Internal and External quality control including reference preparation, Routine quality assurance protocol. Statistics analysis: Standard deviation, Co-efficient of variation, accuracy and precision.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To preparation of EDTA, Sodium Citrate, Oxlate with fluoride.
2. To perform collection of blood sample for haematology lab investigation.
3. Microscope
4. Hemocytometer
5. Glass pipette and auto pipette.
6. Glassware
7. Sahli's apparatus
8. Identification of normal blood cells
9. To Perform Routine Biochemistry of Urine for :
    a. pH
    b. Specific Gravity
    c. Glucose
    d. Ketones
    e. Bilirubin
    f. Albumin
    g. Microscopic Examination

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. Godkar, Darshan P. Godkar, Textbook of Medical Laboratory Technology, Balani Book Bundle publishers, Vol 1 and 2, Edition 3, 2021
2. Ramnik Sood, Modern Medical Laboratory Technology: Methods and Interpretation, Jaypee Brothers Medical Publishers, Edition 7, 2023.

REFERENCE BOOKS:

1. Kanai L. Mukherjee, Medical Laboratory Technology, McGraw-Hill Companies, Volume 1,2 & 3, 2013.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=-vJrsK6I23k
2. youtube.com/watch?v=q5WfVZSYL5A
3. https://www.youtube.com/watch?v=JZhJI6rfFzg

WEB RESOURCES:

1. https://gyansanchay.csjmu.ac.in
2. https://bitesizebio.com
3. https://med.libretexts.org/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102014	**HAEMATOLOGY-II**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on various diseases like anemia, quantitative disorders of Leucocytes, morphological alterations in blood cells, bleeding disorders and methods of estimating different components of blood. And the basic concepts of staining and coagulation in haematology laboratory

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Identify Various abnormality related to Red Blood cells and White Blood Cells

CO2. Estimate ESR, PCV, total WBC and RBC by using various techniques

CO3. Prepare blood smear, various staining techniques and examination by microscope

CO4. Identify the various abnormalities related to neutrophils

CO5. Gain Knowledge on bleeding disorders and its diagnostic techniques.

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	-	2	-	-	1	-	1	-
CO2	3	2	-	2	-	-	1	-	1	-
CO3	3	3	-	2	-	-	1	-	-	-
CO4	2	1	-	1	-	-	1	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	3	-	2	-	-	-	1	-	-
Course Correlation Mapping	**3**	**3**	**-**	**2**	**-**	**-**	**1**	**1**	**1**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: RBC AND WBC QUANTITATIVE DISORDER ***(09 Periods)***

Anemia- Introduction, Classification, Microcytic hypochromic anemia, Macrocytic anemia, Normocytic and normochromic anemia., Quantitative disorders of Leukocytes Cause and significance- Granulocytic and Monocytic Disorders, Lymphocytic Disorders

Module 2: HAEMOCYTOMETER ***(09 Periods)***

Haemocytometer: Introduction, Principle, Reagent preparation, procedure, errors involved and means to minimize errors. RBC Count, Total leucocytes count (TLC), Platelet Count, Absolute Eosinophil count., Principle mechanism and different methods with merit and demerits for the measuring Erythrocyte Sedimentation Rate (ESR) and its significance. Different methods with merit and demerits for packed cell volume/Hematocrit value

Module 3: SMEAR PREPARATION AND PHYSIOLOGICAL VARIATIONS ***(09 Periods)***

Preparation of blood films-Types, Methods of preparation (Thick and thin smear/film) and utility Staining techniques in Haematology (Romanowsky's stains): Principle, composition, preparation of staining reagents and procedure of the following- Giemsa's stain , Leishman's stain, Wright's stain Field's stain, JSB stain., Differential leucocytes count (DLC): Normal and absolute values in Haematology, Physiological variations in Hb, PCV, TLC and Platelets, Macroscopic and microscopic examination of semen, Examination of CSF and other body fluids for cytology i.e. pleural, peritoneal and synovial fluid etc. Haemoglobinometry: Different methods to measure Haemoglobin with merits and demerits

Module 4: MORPHOLOGICAL ALTERATIONS IN NEUTROPHILS ***(09 Periods)***

Morphologic Alterations in Neutrophils-Toxic granulation, Cytoplasmic vacuoles, Döhle bodies, May–Hegglin anomaly, Alder–Reilly anomaly, Pelger–Huët anomaly and Chédiak–Higashi syndrome.

Module 5: BLEEDING DISORDERS AND DIAGNOSIS ***(09 Periods)***

Bleeding disorders-Introduction Causes of bleeding disorders, Vascular defect, Platelet defect , Factor deficiency, Inhibitors , Hyper fibrinolysis, Types of bleeding disorders, Inherited bleeding disorders and Acquired bleeding disorders., Thrombosis- Introduction, Causes of thrombosis, Monitoring of Anticoagulants, Oral anticoagulants by INR and Heparin. Preparation of Reagents for coagulation studies: M/40 Calcium chloride, Brain Thromboplastin, Cephalin Adsorbed Plasma, Screening Tests for coagulation Studies and their significance

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of centrifuge
2. Preparation Peripheral blood film and staining
3. Perform Differential leukocyte count and interpretation
4. Preparation of thick and thin blood smear for malarial parasite (Leishman/Giemsa/JSB)
5. RBC counting
6. WBC counting
7. Platelet counting
8. Hb Estimation: Sahli's method, Cyanmetha hemoglobin method, Oxyhemoglobin method.,
9. Absolute Eosinophil count
10. Preparation of smear and staining with Giemsa and Leishman stain.
11. ESR (Wintrobe and Westergren method)
12. Routine Examination of urine
13. Cytological examination of CSF and other body fluids
14. Physical and Microscopic examination of seminal fluid including sperm count
15. Packed cell volume (Macro & Micro)
16. Absolute Eosinophil count
17. Preparation of M/40 Calcium chloride, Brain thromboplastin and standardization, Cephalin , Adsorbed plasma, Perform BT, CT, Hess test, PT and APTT

RESOURCES

TEXT BOOKS:

1. Godkar, Darshan P. Godkar, Textbook of Medical Laboratory Technology, Book Bundle publishers, Vol 1 and 2, Edition 3, 2021
2. Ramnik Sood, Modern Medical Laboratory Technology: Methods and Interpretation, Jaypee Brothers Medical Publishers, Edition 7, 2023.

REFERENCE BOOKS:

1. Kanai L. Mukherjee, Medical Laboratory Technology, McGraw-Hill Companies, Volume 1,2&3, Edition 1, 2013.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=AZS2wb7pMo4
2. https://www.youtube.com/watch?v=6Eiq1xD4aPQ
3. https://www.youtube.com/watch?v=bm99zrq3ijo
4. https://www.youtube.com/watch?v=yScM38Phj0c

WEB RESOURCES:

1. https://www.sigmaaldrich.com
2. https://my.clevelandclinic.org/health/diagnostics/22155-bacteria-culture-test
3. https://www.britannica.com/science/bacteriology

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102013	**FUNDAMENTALS OF HISTOLOGY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on various diseases related to human body and learn normal and abnormal histology

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate basic knowledge on histology of alimentary tract and cardiovascular system

CO2. Differentiate cellular abnormity of digestive system

CO3. Understand basic pathology related to respiratory and urinary system.

CO4. Demonstrate the various disease related to reproductive and nervous system.

CO5. Understand concept of diseases related to Endocrine and sense organs

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
CO6	3	2	-	-	-	-	1	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: ALIMENTARY SYSTEM AND CIRCULATORY SYSTEM ***(09 Periods)***

Alimentary System: Diseases of mouth, Diseases of Esophagus- Esophageal varices., Circulatory System: Diseases of Blood vessels- Atheroma, Arteriosclerosis, heart block. Disorders of Blood Pressure-Hyper & Hypotension.

Module 2: DIGESTIVE SYSTEM ***(08 Periods)***

Digestive System: Gastritis, Peptic ulceration, Appendicitis microbial diseases, food poisoning, hernia, Intestinal obstructions & mal absorption., Accessory Digestive glands: Salivary glands- mumps., Liver – hepatitis, liver failure, cirrhosis., Pancreas- pancreatitis., Gall Bladder- Gall stones, jaundice and cardiovascular diseases.

Module 3: RESPIRATORY SYSTEM AND URINARY SYSTEM ***(09 Periods)***

Respiratory System: Upper respiratory tract infection, Bronchi, Asthma, Pneumonia, Lung abscess, Tuberculosis, Lung Collapse., Urinary System: Glomerulonephritis, Nephrotic syndrome, renal failure, renal calculi, Urinary obstruction, Urinary tract infection.

Module 4: REPRODUCTIVE SYSTEM AND NERVOUS SYSTEM ***(10 Periods)***

Reproductive system: Sexually transmitted diseases, Pelvic inflammatory disease, disorder of cervix (CIN), Disease of ovaries, ectopic pregnancy, prostatitis, Infertility., Nervous System: Neuronal damage, ICP, Cerebral Infarction, head injury, Alzheimer's disease, dementia.

Module 5: ENDOCRINE SYSTEM AND SENSE ORGANS ***(09 Periods)***

Endocrine System: Pituitary: Hyper & Hypo secretions, Thyroid: Goiter., Adrenal: Cushing Syndrome, Addison Disease., Pancreas: Diabetes., Sense Organs: Ear: Otitis., Eye: Cataract.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To study squamous cell from cheek cells (Buccal mucosa)
2. To study stained slide preparation from organs of digestive system
3. Study of stained slides of liver, pancreas, gall bladder
4. Study of various types of microscope and draw diagram in practical notebook
5. To study stained slide preparation from organs of circulatory system
6. To study stained slide preparation from organs of Respiratory system
7. To study stained slide preparation from organs of Nervous system
8. To study stained slide preparation from organs of Urinary system
9. To study stained slide preparation from organs of Endocrine system

RESOURCES

TEXT BOOKS:

1. Harsh Mohan, Textbook of Pathology, jaypee Brothers Medical Publisher, Edition 9, 2023.
2. Harsh Mohan, Practical Pathology, visionias Publisher, Edition 5, 2021.

REFERENCE BOOKS:

1. Praful B. Godkar, Text book of Laboratory Technology clinical Laboratory Scieces and Molecular Diagnosis, Bhalani Publishing House, Vol 1 and 2, Edition 3, 2020.
2. Kanai L. Mukherjee, Medical Laboratory Technology, McGraw-Hill Companies, Volume 1,2 & 3, Edition 3, 2013.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=0U5J_unEM-Q
2. https://www.youtube.com/watch?v=zb3TLOl0mws
3. https://www.youtube.com/watch?v=29NxjKdQbd0
4. https://www.youtube.com/watch?v=1WOcWthZjrE

WEB RESOURCES:

1. https://3d4medical.com
2. https://www.kenhub.com
3. https://www.amboss.com

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102012	**SYSTEMATIC BACTERIOLOGY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on various classification of Bacteria, morphology, antigenic structure, pathogenesis and laboratory diagnosis.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Perform and identify the bacteria under the microscope by using various staining techniques.

CO2. Understand Gram Positive bacteria properties, pathogenesis, diagnosis and treatment.

CO3. Learn gram Negative bacteria classification, Pathogenesis, diagnosis and treatment.

CO4. Understand various classification of Spirochetes and pathogenesis, Diagnosis and treatment.

CO5. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	3	-	3	1	-	-	-
CO2	3	2	-	1	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	3	1	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**3**	**1**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION TO BACTERIOLOGY ***(09 Periods)***

Staining techniques in bacteriology: significance of staining in bacteriology., Principle, reagent preparation, procedure and interpretation of following stains-Simple Stain, Negative Stain, Gram Stain, Albert's Stain, Neisser's Stain, Ziel-Neelsen Stain, Capsule staining, Flagella Staining, Spore Staining, and Fontana stain. Biochemical Test: Catalase, Coagulase, Indole, Methyl red, Voges Prokauer, Urease, Citrate, Oxidase and TSIA.

Module 2: BACTERIOLOGY-1 ***(09 Periods)***

Introduction, Classification, Various characteristics (morphological, cultural and biochemical), pathogenesis and laboratory diagnosis of Staphylococcus, Streptococcus, Pneumococcus, Neisseria gonorrhea and Neisseria meningitis, Haemophilis and Corynebacterium.

Module 3: BATERIOLOGY-2 ***(09 Periods)***

Introduction, Classification, Various characteristics (morphological, cultural and biochemical), pathogenesis and laboratory diagnosis of Enterobacteriaceae: Escherichia coli, Klebsiella, Citrobacter, Enterobacter, Proteus, Salmonella, Shigella, Yersinia enterocolitica and Yersinia pestis.

Module 4: BATERIOLOGY-3 ***(09 Periods)***

Introduction, Classification, Various characteristics (morphological, cultural and biochemical), pathogenesis and laboratory diagnosis of Clostridia of wound infection, Mycobacterium tuberculosis complex, Atypical Mycobacteria and M. leprae, Spirochetes – Treponema, Borrellia and leptospira, Bordetella and brucella.

Module 5: BACTERIOLOGY-4 ***(09 Periods)***

Introduction, Classification, Various characteristics (morphological, cultural and biochemical), pathogenesis and laboratory diagnosis of Mycoplasma, Rickettsia, Chlamydia, Actinomyces, Pseudomonas and Burkholderia, Brief introduction about non sporing anaerobic cocci and bacilli

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of basic staining techniques for identification of bacteria
2. To prepare the reagents for biochemical test
3. To perform bacteria isolation from the clinical samples

RESOURCES

TEXT BOOKS:

1. Mackie and McCartney, Practical Medical Microbiology, Elsevier publisher, Edition 14, 1996.
2. Ananthanarayana and Paniker's, Textbook of Microbiology, Universities press (india) Pvt. Ltd, Edition 12, 2022.
3. Godkar, Darshan P. Godkar, Textbook of Medical Laboratory Technology, Book Bundle publishers, Vol 1 and 2, Edition 3, 2021.

REFERENCE BOOKS:

1. Kanai L. Mukherjee, Medical Laboratory Technology, McGraw-Hill Companies, Volume 1,2&3, 2013.
2. Ramnik Sood, Modern Medical Laboratory Technology: Methods and Interpretation, Jaypee Brothers Medical Publishers, Edition 7, 2023.
3. Satish Gupte, The short Textbook of Medical Microbiology (including Parasitology), Jaypee brothers medical Publisher, Edition 10, 2010.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=AZS2wb7pMo4
2. https://www.youtube.com/watch?v=6Eiq1xD4aPQ
3. https://www.youtube.com/watch?v=bm99zrq3ijo
4. https://www.youtube.com/watch?v=yScM38Phj0c

WEB RESOURCES:

1. https://www.sigmaaldrich.com
2. https://my.clevelandclinic.org/health/diagnostics/22155-bacteria-culture-test
3. https://www.britannica.com/science/bacteriology

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102011	METABOLISM OF BIOMOLECULES	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on all the major metabolic pathways occurring in our body such as carbohydrates, proteins, lipids, nucleic acid, enzymes and the deficiency diseases related to them.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the Basic knowledge of carbohydrates and its metabolisms

CO2. Acquire basic knowledge on proteins metabolism.

CO3. Understand the Basic knowledge of lipids metabolisms

CO4. Analyse the functional and structural concepts of Vitamins and Minerals

CO5. Analyze different types of enzymes and nucleic acids

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	3	-
CO3	3	1	3	-	-	-	-	-	-	1
CO4	2	1	-	-	-	-	-	-		1
CO5	3	-	-	-	-	3	1	-	-	-
CO6	3	3	1	3	-	-	1	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**3**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: CARBOHYDRATE METABOLISM ***(08 Periods)***

Carbohydrate Metabolism: Introduction, Importance and Classification, Digestion and Absorption, Metabolism: - Glycolysis, Citric acid cycle, Gluconeogenesis, Glycogenolysis, Glycogenesis, Disorders of carbohydrate metabolism.

Module 2: PROTEIN METABOLISM ***(08 Periods)***

Protein Metabolism: Introduction, Importance and classification, Important properties of proteins, Digestion & absorption of Proteins, Protein synthesis, Metabolism of proteins and Disorders of protein metabolism and Urea Cycle

Module 3: LIPID METABOLISM ***(08 Periods)***

Lipid: Introduction & Classification, Digestion & absorption of fats, Lipoproteins, Fatty acid biosynthesis & fatty acid oxidation.

Module 4: VITAMINS ANDMINERAL ***(11 Periods)***

Fat soluble vitamins(A,D,E,K) – Water soluble vitamins – B-complex vitamins. Definition, classification - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity., Mineral –Macro minerals and microminerals Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals – Sodium, Potassium, Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper.

Module 5: NUCLEIC ACID AND ENZYMES ***(10 Periods)***

Nucleic Acid: Introduction, Functions of Nucleic acid Functions of energy carriers., Enzymes: Introductions, Importance & Classifications, Properties of enzymes, Mechanism of enzyme action, Factors affecting enzyme action, Enzyme kinetics and enzyme inhibiters.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To determine the presence of carbohydrates by Molisch test
2. To determine the presence of reducing sugar by Fehling solutions
3. To determine the presence of reducing sugar by Benedicts method
4. To determine starch by Iodine test
5. Determination of Glucose in serum & plasma
6. Estimates of blood Glucose by Folin& Wu method
7. Determination of Urea in serum, plasma & urine.
8. Determination of Creatinine in serum or plasma

9. Determination of serum Albumin

10. Determination of Cholesterol in serum or plasma

RESOURCES

TEXT BOOKS:

1. U Satyanarayana, Biochemistry, Elsevier Publisher, Edition 4, 2013.
2. Dm Vasudevan, Concise Textbook of Biochemistry for Paramedical Students, Jaypee Brothers Medical Publishers, Edition 2, 2021.

REFERENCE BOOKS:

1. P Ramamoorthy, Textbook of Biochemistry for Paramedical Students, Jaypee Brothers Medical Publishers, Edition 2,2021
2. Lal H, Biochemistry for Medical Laboratory Technology Students, CBS Publishers & Distributors Pvt. Ltd, Edition 2, 1905.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=1sMz-Cc3-ps
2. https://www.youtube.com/watch?v=Xsrpz_ejMhw
3. https://www.youtube.com/watch?v=72zKnccyH-w
4. https://www.youtube.com/watch?v=P9dsMYkoFgM

WEB RESOURCES:

1. https://www.news-medical.net
2. portlandpress.com/essaysbiochem
3. https://www.ncbi.nlm.nih.gov/pmc

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102016	**APPLIED CLINICAL BIOCHEMISTRY**	**3**	**-**	**2**	**-**	**4**

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on basic concepts of Biochemistry and understand the structural, functional and metabolic properties of biomolecules

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. To Understand the Basic knowledge of Quality Control and Basic Reference Values

CO2. To Develop Basic knowledge about the basic principles Biochemical Procedures

CO3. To Enhance the Ideology on clinical biochemistry automated concepts

CO4. Ability to learn the different types of Clinical diagnostic enzymes

CO5. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	1	-	-	-	-
CO4	3	2	-	2	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**-**	**2**	**-**	**1**	**-**	**-**	**-**	**-**

Correlation Leve ls: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: QUALITY CONTROL AND BASIC REFERENCE VALUES ***(15 Periods)***

Hazards & safety measures in clinical Biochemistry laboratory, Quality control and quality assurance in a clinical biochemistry laboratory, Laboratory organization, management and maintenance of records. Principles of assay procedures, Normal range in blood, Serum, Plasma and Urine and reference values for: Glucose, Proteins, Urea, Uric acid, Creatinine, Bilirubin and Lipids.

MODULE 2: BIOCHEMICAL PROCEDURES ***(10 Periods)***

Principles, procedures for estimation & assessment of the following including errors involved and their corrections, Sodium, Potassium and Chloride, Iodine, Calcium, Phosphorous and Phosphates., Instruments for detection of Radioactivity, Applications of Radioisotopes in clinical biochemistry, Enzyme linked immune sorbent assay.

MODULE 3: CLINICAL BIOCHEMISTRY ***(12 Periods)***

Automation in clinical biochemistry., Method of estimation and assessment for: Glucose tolerance test, Insulin tolerance test, Xylose excretion test., Gastric analysis, Clearance test for renal function., Qualitative test for: Urobilinogen's, Barbiturates, T3, T4 and TSH, Ketosteroids.

MODULE 4: CLINICAL DIAGNOSTIC ENZYMES ***(08 Periods)***

Enzymes: Principles, Clinical significance and, Procedures for estimation, Acid phosphatase, Alkaline phosphatase, Lactate dehydrogenase, Aspartate transaminase: SGOT and SGPT, Creatine phosphokinase., Qualitative analysis of Renal calculi, Chemical examination of Cerebrospinal fluid, Brief knowledge about rapid techniques in clinical biochemistry.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Estimation of Glucose tolerance test (GTT).
2. Estimation of Insulin tolerance test (ITT).
3. Determination of Uric acid in Urine.
4. Determination of Creatinine clearance.
5. Determination of Urea clearance.
6. Determination of Serum acid phosphatase.
7. Determination of Serum Alkaline phosphatase.
8. Determination of Serum Lactate dehydrogenase.
9. Determination of T3, T4 and TSH
10. Estimation of Glucose in Urine and in Blood.
11. Estimation of Protein in Urine and Blood.
12. Estimation of Urea in blood.
13. Estimation of uric acid in blood.
14. Estimation of serum Bilirubin
15. Estimation of Total Cholesterol in blood.
16. Estimation of HDL Cholesterol.
17. Estimation of LDL Cholesterol.
18. Estimation of TG
19. Estimation of Creatinine in Blood
20. Estimation of serum calcium, Inorganic phosphate

RESOURCES

TEXT BOOKS:

1. U. Satyanarayana, U. Chakrapani, Biochemistry, Elsevier, Edition 3, 2020.
2. Vasudevan DM, Textbook of Biochemistry for Medical Students, Jaypee Brothers Medical Publishers, Edition 1, 2019
3. Indumati V, Sowbhagya Lakshmi, Integrated Textbook of Biochemistry, Paras Medical Publishers, Edition 2, 2021.
4. Naik Pankaja, Essentials of Biochemistry, Jaypee Brothers Medical Publishers, Edition 5, 2017.

REFERENCE BOOKS:

1. Agrawal Poonam, Concepts In Biochemistry With Clinical Approach For Undergraduate Medical Students, CBS Publishers & Distributors Pvt Ltd, Edition 1, 2020.
2. Prasad R Manjeshwar, Textbook of Biochemistry for Physiotherapy Students, Sheetal Distributors, Edition 1, 2020.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=F59RwK9hya8
2. https://www.youtube.com/watch?v=OKLxwCdkBn8
3. https://www.youtube.com/watch?v=jcz99_-JcZ8

WEB RESOURCES:

1. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_students/medicalbiochemistry.pdf
2. https://www.qmul.ac.uk/library/media/library/using-the-library/media-folder-images-library/Principles-Of-Biochemistry-Introductory-Series.pdf
3. https://rajneeshrajoria.weebly.com/uploads/4/9/0/6/49069889/biochemistry_bicm101.pdf

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102017	**IMMUNOLOGY AND BACTERIAL SEROLOGY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides details on Morphology of Bacteria, Principles & Practices of Sterilization, Basic knowledge on Immunology, Identification of Bacteria, Diseases caused by bacteria, Viruses, Fungi, its Laboratory Diagnosis & Preventive Measures to be taken.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Apply knowledge on various types of Infections, Basic Immunology of Human Body Immunity, Types of Antigen, and Types of Antibodies.

CO2 Learn Various types of Antigen Antibody Reactions in laboratory & in-Vivo, Complement system & its Functions, Structure & function of Immune system.

CO3 Learn Immune Response to various Infections in the body, Immunodeficiency Diseases occurring in humans.

CO4 Learn Different types of Hypersensitivity reactions, Various Autoimmune reactions in Humans

CO5 Learn Transplantation & Tumor Immunity & Immunohematology.

CO6 Work individually or in teams to solve problems with effective communication.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	2	3	-	2	1	-	2	3
CO2	3	3	2	-	1	2	-	-	3	-
CO3	2	3	-	-	-	3	-	-	3	1
CO4	2	2	3	-	-	-	-	-	2	1
CO5	3	2	1	-	1	2	-	-	3	2
CO6	2	1	-	-	-	-	-	-	2	-
Course Correlation Mapping	**3**	**2**	**2**	**3**	**1**	**2**	**1**	**-**	**2**	**2**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module :1 INTRODUCTION TO IMMUNOLOGY ***(08 Periods)***

Immunology - Infection - Classification, sources, types & methods of transmission, Factors predisposing to microbial pathogenicity, Types of infectious diseases
Antigen - Definition, Types & Biological classes of antigens Antibodies - Definition, Properties, Structure, Types and functions of antibodies and monoclonal antibodies Hospital acquired infection - Causative agents, transmission methods, prevention and control of hospital Acquired infections.

Module: 2 ANTIGEN AND ANTIBODY REACTION ***(12 Periods)***

Antigen antibody reactions-Agglutination, Precipitation, Opsonization, Activation of compliment, Neutralization. Structure and functions of immune system-central & peripheral lymphoid organs, cells of lymphoreticular system, T & B cell maturation, Null cells, MHC.

Module 3: IMMUNE RESPONSE ***(08 Periods)***

Immune response -Humoral immunity and cell mediated immune response, Immunodeficiency diseases occurring in human body.

Module 4: HYPERSENSITIVITY REACTION ***(09 Periods)***

Hypersensitivity reactions - Definition & types of hypersensitivity reactions, Autoimmune disorders - mechanisms, classification & pathogenesis of autoimmune diseases

Module :5 TRANSPLANT IMMUNOLOGY **(08 Periods)**

Transplantation Immunology & Tumor Immunology, Immunohematology

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF Practical's :

1. Perform Serological Tests like CRP, Widal, ASLO, RA, RPR
2. Perform Immuno chromotography tests of HIV, HBsAg, HCV, Malaria, Dengue Syphilis
3. Principles and practice of Hospital Accuried Infections

RESOURCES

TEXT BOOKS:

1. Mackie and McCartney, Practical Medical Microbiology, Elsevier, 1 Edition 4, 1996.
2. Ananthanarayan and Panikers, Text book of Microbiology, Universities Press Pvt. Ltd, Edition 12, 2022.
3. Satish Gupte, The short Textbook of Medical Microbiology, Japee Brothers Medical Publishers, Edition 1, 2020.

REFERENCE BOOKS:

1. Ukherjee, Medical laboratory Technology, CPS Publishers, vol. I, II, III, 2022.
2. Prescott, Harley, Microbiology, McGraw Hill Publishers, Edition 7, 2008.

VIDEO LECTURES:

1. https://youtu.be/k9QAyP3bYmc
2. https://youtu.be/ncL98_r-pLs
3. https://youtu.be/vwcTRNvxzt8

WEB RESOURCES:

1. https://www.cdc.gov/infectioncontrol/index.html
2. https://www.who.int/teams/integrated-health-services/infection-prevention-control
3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8325443/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102018	**APPLIED HAEMATOLOGY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on safety precautions, automation basics, and quantitative assays for coagulation factors and Karyotyping. Topics include safety measures, quality assurance, biomedical waste management, and automation concepts. The curriculum delves into bone marrow examination, red cell anomalies, leucocyte disorders, L.E. cell phenomenon, and various conditions like anemia, Leukemia, chromosomal studies, bleeding disorders, and radiation hazards. It emphasizes laboratory diagnosis for specific anemias, including iron deficiency, megaloblastic, pernicious, and hemolytic anemias.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Perform safe hematology, apply automation, and analyze bone marrow samples.

CO2 Identify red cell anomalies, count reticulocytes, demonstrate LE cells.

CO3 Analyze coagulation factor deficiencies, perform karyotyping, apply cytochemical stains.

CO4 Diagnose hematological disorders, perform chromosomal studies, manage radioisotopes.

CO5 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	1	-	3	-	-	-	-	-	-
CO2	3	1	-	2	-	-	-	-	-	-
CO3	3	1	-	3	-	-	-	-	-	-
CO4	3	1	-	3	-	-	-	-	-	-
CO5	3	1	-	2	-	-	-	-	-	-
Course Correlation Mapping	**3**	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: BLOOD CELL COUNTER ***(12 Periods)***

Safety precautions in Haematology, Basic concepts of automation in Haematology with special reference to: Blood cell counter., Bone marrow examination; Composition and functions, Aspiration of bone marrow (Adults and children) Processing of aspirated bone marrow (Preparation & staining of smear) Examination of aspirated bone marrow (differential cell counts and cellular ratios) Processing and staining of trephine biopsy specimens

Module 2: RED CELL ANOMALIES ***(11 Periods)***

Red cell anomalies: Morphological changes such as variation in size shape & staining character. Reticulocytes: Definition, different methods to count, Absolute reticulocyte count and IRF (Immature reticulocyte fraction) and significance of reticulocytes, Lupus Erythematosus (L.E) cell phenomenon., Definition of L.E. cell., Demonstration of L.E. cell by various methods., Clinical significance.

Module 3: COAGULATION FACTORS STUDYING AND KARYOTYPING ***(11 Periods)***

Correction studies for Factor deficiency: Basic concepts of automation of Coagulometer, Quantitative assay of coagulation factors-Principle, Procedure, Screening of inhibitors, Inhibitors against coagulation factors, Karyotyping: Chromosomal studies in haematological disorders (PBLC and Bone marrow) Cyto-chemical staining: Principles, method and significance.

Module 4: QUANTITATIVE ASSAY OF COAGULATION FACTORS ***(11 Periods)***

Definition, classification and laboratory diagnosis of Leukemia., Chromosomal studies in various haematological disorders and their significance., Laboratory diagnosis of bleeding disorders with special emphasize to Hemophilia A, B & Von-Willebrand disease., DIC and Platelet disorder (Qualitative and quantitative)., Laboratory approach for investigating thrombosis. Using radioisotopes measurement of: Blood volume, Determination of Red cell volume and Plasma volume, Red cell life span, Platelet life span, Radiation hazards and its prevention and Disposal of radioactive material

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Study of WBCs anomalies
2. To Calculating INR and determining the ISI of thromboplastin
3. Quantitative Factor assays: Factor VIII, Factor IX, Factor VII, Factor X and Factor V
4. Quantification of inhibitors (Bethesda method)
5. APLA: Lupus Anticoagulant (LA)
6. Anti-cardiolipin antibodies (ACA)
7. Perform Euglobulin clot lysis test (ELT)

8. Urea clot solubility test for factor XIII
9. To estimate serum iron and total iron binding capacity.
10. Screening tests for enzymes deficiency: Pyruvate Kinase, G6PD
11. To estimate Hb-F, Hb-A2 in a given blood sample.
12. To estimate plasma and urine Hemoglobin in the given specimens.
13. To demonstrate the presence of Hb-S by Sickling and Solubility tests.
14. Perform Hb electrophoresis (alkaline)
15. Perform osmotic red cell fragility.
16. Detection of Fibrin degradation products (FDPs
17. To perform various platelet function tests such as whole blood clot retraction test, prothrombin consumption index (PCI) Platelet adhesion, aggregation and PF3 availability test.
18. Estimation of Protein C, S
19. Peripheral Blood Lymphocyte Culture

RESOURCES

TEXT BOOKS:

1. Henry,s, Clinical Diagnosis and Management by Laboratory Methods, Elsevier, Edition 24, 2022.
2. Renu Saxena, Hara Prasad Pati, de Gruchy's, Clinical Haematology in Medical Practice, WILEY Publishers, Edition 6, 2012.
3. Dacie and Lewis, Practical Haematology, Elsevier, Edition 12, 2016.

REFERENCE BOOKS:

1. B. Godkar, Darshan, Textbook of Medical Laboratory Technology, Bhalani Publishing House, Volume 1 and 2, Edition 3, 2005.
2. Kanai L Mukherjee, Medical Laboratory Technology, CBS Publishers and Distributors Pvt. Ltd, Volume 3, 2022.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=jlHpk2-WS4k
2. https://www.youtube.com/watch?v=m4qxI0V8iYs
3. https://www.youtube.com/watch?v=tsp_hYMMS44

WEB RESOURCES:

1. https://ashpublications.org/bloodadvances/article/3/5/769/246724/High-risk-of-adverse-pregnancy-outcomes-in-women
2. https://www.urmc.rochester.edu/encyclopedia/content.aspx?contenttypeid=90&contentid=p02117

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102019	**APPLIED HISTOPATHOLOGY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course focuses on essential aspects of histopathology practice, including laboratory safety and quality assurance. It emphasizes specimen collection and transport, fixation, decalcification, tissue processing (manual and automated), embedding, microtomy, and cryostat techniques. Major importance is given to staining principles, routine H&E staining, special stains, enzyme histochemistry, handling of special tissues, and basic concepts of electron microscopy required for accurate diagnostic histopathology.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Acquire knowledge on basic histopathology laboratory practices and safety.

CO2 Understand tissue fixation, processing, embedding, and microtomy techniques.

CO3 Gain knowledge on routine and special staining procedures.

CO4 Learn cryostat techniques, special tissue handling, and enzyme histochemistry.

CO5 Work individually or in teams with effective communication and professional skills.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	3	-
CO3	3	1	3	-	-	-	-	-	-	1
CO4	3	1								1
CO5	3	-	-	-	-	3	1	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: BASIC CONCEPT OF ROUTINE METHODS TISSUE EXAMINATION ***(10 Periods)***

Safety measures in a histopathology laboratory., Basic concepts about routine methods of examination of tissues: Collection and transportation of specimens for histological examination., Basic concepts of fixation Various types of fixatives used in a routine histopathology laboratory : Simple fixatives, Compound fixatives, Special fixatives for demonstration of various tissue elements Decalcification: Criteria of a good decalcification agent, Technique of decalcification followed with selection of tissue, fixation, and decalcification, neutralization of acid and thorough washing, Various types of decalcifying fluids: Organic & Inorganic Acid, chelating agents, Use of Ion-exchange resigns and Electrophoretic decalcification and treatment of hard tissues which are not calcified., Processing of various tissues for histological examination: Procedure followed by Dehydration, Clearing, Infiltration and routine timing schedule for manual or automatic tissue processing., Components & and principles of various types of automatic tissue Processors.

Module 2: EMBEDING AND MICROTOME ***(10 Periods)***

Embedding: Definition, Various types of embedding media, Section Cutting, Introduction regarding equipment used for sectioning, Microtome Knives, Sharpening of Microtome Knives, Honing, Stropping, various types of microtome and their applications., Faults in paraffin section cutting with reason and remedy., Freezing Microtome and various types of Cryostats., spreading the sections and attachment or mounting of sections to glass slides.

Module 3: STAINING AND MOUNTING ***(10 Periods)***

Staining, Impregnation and Mountants, Theory of Staining, Classifications of Dyes, Principles of Dye Chemistry., Stains and Dyes and their uses., Types of Stains, Chemical Staining Action, Mordants and Accentuators, Metachromasia., Use of Controls in Staining Procedures, Preparation of Stains, solvents, aniline water and buffers etc., Commonly used mountants in histotechnology lab., General Staining Procedures for Paraffin Infiltrated and Embedded tissue, Nuclear Stains and Cytoplasmic stains, Equipment and Procedure for manual Staining and Automatic Staining Technique, Mounting of Cover Slips, Labeling and Cataloguing the Slides., Routine Staining Procedures: Hematoxylin and Eosin Staining, various types of Hematoxylins, Mallory's Phosphotungstic Acid Hematoxylin (PTAH)

Module 4: CRYOSTAT AND SPECIAL STAIN ***(07 Periods)***

Cryostat sectioning, its applications in diagnostic histopathology: Special Staining Procedures for detection of Connective tissue elements, Trichrome staining, muscle fibers, elastic, reticulin fibers, collagen fibers etc., Metachromatic staining such as toluidine blue on frozen sections: Principles of metal impregnation techniques., Demonstration and identification of minerals and pigments, removal of Pigments/artifacts in tissue sections., Demonstration of Proteins & nucleic acids., Demonstration of Carbohydrates, lipids, fat & fat like substances., Demonstration of bacteria and fungi in tissue section.

Module 5: SPECIAL TISSUE AND MUSEUM TECHNIQUES ***(08 Periods)***

Tissue requiring special treatment i.e. eye ball, bone marrow, and muscle biopsy, under calcified or unclarified bones, whole brain, and whole lungs including other large organs., Enzyme histochemistry: Diagnostic applications and the demonstration of Phosphatases, Dehydrogenases, Oxidases & Peroxidases., Vital staining., Neuro-pathological techniques., Museum techniques. Electron Microscope: working principle and its components, Processing, embedding and ultra-microtomy, Micrometry and Morphometry

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of instruments used for dissection.
2. Use of antiseptics, disinfectants and insecticides in a tissue culture processing laboratory
3. Preparation of Helly‘s fluid
4. Preparation of Zenker‘s fluid
5. Preparation of Bouin‘s fluid of Corney‘s fluid
6. Preparation of 10% Neutral formalin
7. Preparation of Formal saline
8. Preparation of Formal acetic acid
9. Preparation of Pereyn‘s fluid
10. Testing of melting point of paraffin wax and perform embedding of given tissue in paraffin block
11. To process a bone for decalcification
12. To prepare ascending and descending grades of alcohol from absolute alcohol Processing of tissue by manual and automated processor method
13. To demonstrate parts and types of microtomes.
14. To learn sharpening of microtome knife (Honing and stropping technique), and types of disposable blades in use (High and Low Profile).
15. To perform section cutting (Rough and Fine)
16. To practice attachment of tissue sections to glass slides
17. To learn using tissue floatation bath and drying of sections in oven (60-65C)
18. To perform & practice the Haematoxylin and Eosin staining technique
19. To perform & practice the Mallory‘s Phospho tungstic Acid Haematoxylin (PTAH)
20. To learn mounting of stained smears
21. To cut frozen section and stain for Haematoxylin and Eosin, Metachromatic stain Toluidin blue-_o‘ and Oil Red _O‘ staining for the demonstration of fat
22. To prepare Schiff‘s reagent in the lab and do Periodic Acid Schiff‘s (PAS) stain on a paraffin section
23. To prepare ammonical silver bath in the laboratory and stain paraffin embedded section for the demonstration of reticulin fibers.
24. To stain a paraffin section for the demonstration of smooth muscle by Van Gieson‘s Stain
25. To perform Masson‘s trichrome stain on a paraffin section for the demonstration of collagen fiber, muscle fiber and other cell elements.

26. To stain the paraffin section for the demonstration of the elastic fibers (EVG).
27. To stain Decalcified paraffin embedded section for the presence of calcium salts (Von Kossa's method).
28. To stain a paraffin section for the following Mucicarmine, Alcian blue.
29. To stain a paraffin section for the demonstration of iron (Perl's stain)
30. To stain for nucleic acid (DNA and RNA Feulgen Staining
31. To stain for nucleic acid (DNA and RNA Methyl Green-Pyronin Staining
32. To stain for nucleic acid (DNA and RNA Enzymatic method

RESOURCES

TEXT BOOKS:

1. C.F.A. Culling, Handbook of Histopathological techniques: Including Museum Techniques, Butterworth Heinemann Publishers, Edition 3, 2023.
2. Lynch's Medical Laboratory Technology, Philadelphia publishers, Edition 4, 1983.
3. F.J. Baker and R.E. Silverton, Introduction to Medical Laboratory Technology, Butterworth Publishers, Edition 5, 1966.

REFERENCE BOOKS:

1. S. Kim Suvarna Christopher Layton, Bancroft's Theory and Practice of Histological Techniques, Elsevier Health Sciences, Edition 8, 2018.
2. B.Godkar, Darshan, Textbook of Medical Laboratory Technology, Bhalani Publishing House, Volume 1 and 2, Edition 3, 2005.
3. Kanai L Mukherjee, Medical Laboratory Technology, CBS Publishers and Distributors Pvt. Ltd, Volume 3, 2022.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=J9Ixve9sR_k
2. https://www.youtube.com/watch?v=7-LIbAWPc-g
3. https://www.youtube.com/watch?v=ml4fBEmH8Sg
4. https://www.youtube.com/watch?v=8xvjGSQS2Qg

WEB RESOURCES:

1. https://www.verywellhealth.com/histopathology-2252152
2. https://en.wikipedia.org/wiki/Frozen_section_procedure
3. https://www.leicabiosystems.com/knowledge-pathway/an-introduction-to-routine-and-special-staining/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22CC101006	**BASIC PHARMACOLOGY AND DRUG ADMINISTRATION**	3	-		-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: The Course will cover General Pharmacology with Special Emphasis on common drugs used, Route of Administration, Type of formulations, Dose and frequency of administration, Side effects and Toxicity, Management of Toxic effects, Drug interactions, Knowledge of chemical and trade names, Importance of Manufacturing and expiry dates and instruction about handling each drug.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Acquire knowledge on principles of basic pharmacology.

CO2. Understand the General considerations of Cholinergic Drugs

CO3. Gain knowledge on anesthetic and Analgesics drugs.

CO4. Identify the mechanism of various drugs related to Cardiovascular& Respiratory system.

CO5. Learn about various drugs related to microbial infections and other diseases

CO6. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	-	-
CO3	3	1	3	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	3	1	-	-	-
CO6	3	-	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION ***(10 periods)***

General pharmacological principles - Definition - Routes of drug administration Pharmacokinetics, Pharmacodynamics - Adverse drug effects, Drugs acting on Autonomic Nervous System, Peripheral Nervous System and Drugs acting on Central Nervous system.

Module 2: CHOLINERGIC DRUGS ***(05 Periods)***

General considerations-Cholinergic system & drugs-Anticholinergic drugs-Adrenergic drugs-antiadrenergic drugs.

Module 3: ANAESTHETICS & ANALGESICS ***(10 periods)***

Skeletal muscle relaxants-Local anaesthetics, General anaesthetics-Ethyl & Methyl alcohol-Sedatives - Hypnotics- Antiepileptics - Drugs used in mental illness - Opioid analgesics and Non opioid Analgesics - Nonsteroidal Anti inflammatory drugs.

Module 4: CARDIOVASCULAR & RESPIRATORY DRUGS ***(10 periods)***

Cardiovascular drugs - Cardiac glycosides, Antiarrhythmic drugs, Antianginal drugs, Antihypertensives and Diuretics, Erythropoietin, Drugs affecting-coagulation, Fibrinolytic and Antiplatelet drugs, Treatment of cough and Antiasthmatic drugs. Drugs on Respiratory system.

Module 5: ANTIMICROBIAL AND OTHER DRUGS ***(10 periods)***

General consideration-Antibiotics-Antibacterial agents- -Antifungal- -Antiviral- Antiseptic-Disinfectant-.Corticosteroids, Antithyroid drugs and Drugs for Diabetes Mellitus, Treatment of Vomiting, Constipation, Diarrhoea and Treatment of peptic ulcer, Vitamins, Vaccines.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Understanding of inculcate knowledge on various drugs.
2. Understanding the terminologies and basic principles of pharmacokinetic.
3. Observation and understanding the pharmacological action and mechanism of action of common drugs used for different disease conditions.
4. understanding therapeutic uses and adverse effects of common drugs.
5. Demonstrate the intended to discuss the various modalities of drug delivery and instruments.

RESOURCES

TEXT BOOKS:

1. Tara V Shanbag, Pharmacology: Prep Manual for Undergraduates, Elsevier Publications, Edition 2, 2012.
2. Padmaja Uday kumar, Pharmacology for Dental and Allied Health Sciences, Jaypee Brothers Medical Publishers, Edition 4, 2016.

REFERENCE BOOKS:

3. KD Tripathi, Essentials of Medical Pharmacology, Jaypee Brothers Medical Publishers, Edition 8, 2018.
4. R S Sataskar, Pharmacology and Pharmacotherapeutics, Popular Prakashan Ltd, Edition 21, 2015.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=LLv29S7Hm3U
2. https://www.youtube.com/watch?v=r-gJaMoMon0
3. https://www.youtube.com/watch?v=oKtIzV2T69Y

WEB RESOURCES:

1. https://www.slideshare.net/specialclass/antibiotics-2173921
2. http://www.harpercollege.edu/ls-hs/nur/120/sdolezal/lesson8_files/lesson8.ppt
3. https://repo.knmu.edu.ua/bitstream/123456789/10408/1/Anti-inflammatory

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102029	**MEDICAL PARASITOLOGY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed Knowledge on classification Pathogenesis, Diseases caused by different parasites that infect humans, various Diagnostic methods to identify them & Treatment, Preventive measures to be followed to combat these infections.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Gain Knowledge on different protozoan parasites, study the diseases caused by them their diagnosis, treatment.

CO2 Learn about different parasites which we come across daily, infections caused by them & diagnostic methods to identify these infections.

CO3 Study important Cestodes- Taenia, Echinococcus, D.latum, H.nana Lab diagnosis, treatment and prevention of theses Parasitic infections

CO4 Gain knowledge about Trematodes-Schistosoma, Fasciola, Paragonimus westwrmani, Clonorchis sinensis Lab diagnosis, treatment and prevention of theses Parasitic infections

CO5 Nematodes- Ascaris, Ancylostoma, Enterobius, Strongyloides, Trichuris, Wuchereria Lab diagnosis, treatment and prevention of theses Parasitic infections

CO6 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	3	1	-	-	-
CO2	3	2	2	-	2	-	-	-	3	-
CO3	3	2	2	-	1	3	-	1	-	1
CO4	3	2	2	-	2	-	-	-	-	1
CO5	3	2	2	-	3	2	1	-	-	-
CO6	3	2	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**2**	**1**	**2**	**3**	**1**	**1**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: MODULE I ***(08 Periods)***

General introduction to parasitology, Protozology Entamoeba, Balantidium coli, Trichomonas, Giardia, Leishmania

Module 2: MODULE II ***(08 Periods)***

Trypanosoma, Malaria, Toxoplasma, Microsporidium, Isospora, Cyclospora

Module 3: MODULE III ***(10 Periods)***

Cestodes- Taenia, Echinococcus, D.latum, H.nana

Module 4: MODULE IV ***(08 Periods)***

Trematodes-Schistosoma, Fasciola, Paragonimus westwrmani, Clonorchis sinensis

Module 5: MODULE V ***(11 Periods)***

Nematodes- Ascaris, Ancylostoma, Enterobius, Strongyloides, Trichuris, Wuchereria

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Stool examination
2. Saline mount
3. Iodine mount
4. Peripheral smear examination for malaria and filariasis
5. Serological tests for detection of parasitic infections.

RESOURCES

TEXT BOOKS:

1. Dr. Reba Kanungo, Ananthanarayana Panikers Medical Microbiology, The Orient Blackswan Publishers, Edition 10, 2017.
2. World health Organization, Basic Laboratory methods in Parasitology, World Health Organization Publications, standard edition, 2017.

REFERENCE BOOKS:

1. Chatterjee KD, Parasitology Protozoology and Helminthology, CBS Publishers, Edition 13, 2019.
2. Subhash Chandra Parija, Textbook of Medical parasitology: Protozoology and Helminthology, All India Publishers and Distributors, Edition 4, 2013.

VIDEO LECTURES:

1. https://youtu.be/o34AP14F-_I
2. https://youtu.be/Akaq02B5-AA
3. https://youtu.be/zZAQPwsG3tM

WEB RESOURCES:

1. https://www.cdc.gov/parasites/index.html
2. https://www.ncbi.nlm.nih.gov/books/NBK8262/
3. https://www.who.int/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102024	VIROLOGY AND MYCOLOGY	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed Knowledge on classification , structures of viruses, Pathogenesis, Diseases caused by various Medical important Viruses its Diagnosis & Treatment, Classification of Fungi based on the diseases caused, pathogenesis Diseases caused Laboratory diagnosis& treatment of medically important Fungi

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Apply Knowledge on General properties & different methods of cultivation of medically important viruses understand the virus host mechanisms, Classify & study the different diseases caused & laboratory diagnosis of Pox Virus, Herpes virus.

CO2 Learn about different viruses causing deadly diseases like Polio, Mumps, Influenza, Measles, Dengue, Chikungunya & its laboratory diagnosis, Preventive measures.

CO3 Study medically important viruses for healthcare works like Rabies, Hepatitis, HIV, Various viruses which are carcinogenic to humans, Lab diagnosis, treatment and prevention of theses viral infections in hospitals.

CO4 Apply knowledge on Mycology, Classification Lab diagnosis of different fungal infections occurring in humans.

CO5 Study in detail about different fungi which causes opportunistic, systemic infections in patients, different toxins produced by fungi, various antifungal agents to combat fungal infections.

CO6 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	3	1	-	-	-
CO2	3	2	2	-	2	3	-	-	3	-
CO3	3	2	2	-	1	-	-	1	-	1
CO4	3	1	2	-	2					1
CO5	3	2	2	-	3	2	1	-	-	-
CO6	3	2	-	-	-	-	-	-	-	-
Course Correlation Mapping	**2**	**2**	**2**	**1**	**2**	**3**	**1**	**1**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO VIRUS ***(08 Periods)***

Introduction: Discovery of viruses, nature and definition of viruses, general properties, concept of viroids, virusoids, satellite viruses and Prions. Cultivation of viruses, Virus host interaction, Bacteriophage.

Module 2: VIROLOGY I ***(12 Periods)***

Poxviruses, Herpes Simplex Virus (HSV)-Varicella-Zoster Virus, Cytomegalovirus, Epstein-Barr Virus, Picornaviruses, Enteroviruses- Poliovirus, Rhinoviruses, Orthomyxoviruses, Influenza Virus ,Paramyxoviruses, Parainfluenza Virus-Mumps,Measles, Respiratory Syncytial Virus (RSV), Arboviruses-Chikungunya, Dengue, Kyasanur Forest Disease (KFD), Other arboviruses associated with various diseases

Module 3: VIROLOGY II ***(10 Periods)***

Description of morphology, pathogenesis, diagnosis and prophylaxis:Rhabdoviruses, Hepatitis Viruses, HIV, Viruses Causing Gastroenteritis, Rotavirus, Oncogenic Viruses, brief description of swine flu, Ebola,COVID19 with diagnosis. TORCH profile, Symptoms, mode of transmission, prophylaxis and control.

Module 4: INTRODUCTION TO MYCOLOGY ***(08 Periods)***

Introduction to Mycology, Classification and Laboratory Diagnosis of Fungal Infections, Mycoses.

a. Superficial Mycoses, Malassezia furfur, Tinea nigra, Tinea Piedra. b. Dermatophytes c. Subcutaneous Mycoses. Mycetoma, Rhinosporidiosis, Sporotrichosis and Chromomycosis.

Module 5: PATHOGENESIS OF MYCOLOGY ***(07 Periods)***

Pathogenesis and diagnosis: Systemic mycoses, Histoplasmosis, Blastomycosis, Coccidiodomycosis, Paracoccidiodomycosis, Opportunistic fungi Aspergillosis, Penicillosis, Pneumocystis Candidiasis, Cryptococcosis, Mycotoxins and antifungal agents.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Immunochromatographic method for the detection of HbsAg in Human Serum.
2. Detection of Anti-HBC Antibodies in serum by ELISA test.
3. Determination of Hbe Antigen in Serum.
4. Detection of Anti-Hbe Antibodies in serum.
5. Detection of Anti-HCV Antibodies in serum.
6. Detection of HIV-1 and HIV-2 by screening method based on ELISA.

7. Rapid Enzyme Immunoassay for the Simultaneous screening and Differentiation of HIV-1 and HIV-2 antibodies in Human Serum.
8. Detection of Human Anti-HIV-1 Antibodies in serum by Immunoblotting techniques.
9. Quantitative Immunoassay for CD4 and CD8 T-Lymphocytes by Immunocapture.
10. Determination of CD4 and CD8 cells in blood by using flow cytometry.
11. Torch-ELISA test.
12. Quantitative Determination of serum IgG class antibodies to *Toxoplasma gondii* by ELISA.
13. Determination of Rubella IgM by ELISA.
14. Determination of IgM class antibodies to cytomegalovirus by ELISA.
15. Determination of IgG class antibodies to Herpes simplex 1 virus by ELISA.
16. Determination of IgM class antibodies to Herpes simplex virus type 1 and 2 by ELISA.
17. Study of superficial mycoses and dermatophytes.
18. Study of Candida Albicans
19. Determine fungi by methane blue staining
20. Perform lactophenol cotton blue techniques
21. Immunochromatographic method for the detection of HbsAg in Human Serum.

RESOURCES

TEXT BOOKS:

1. Dr. Reba Kanungo, Ananthanarayana & Panikar textbook of Medical Microbiology, The Orient Blackswan, Edition 10, 2017.
2. Jagadish Chander, Text Book of Medical Mycology, Jaypee brothers Medical Publishers, Edition 4, 2018.

REFERENCE BOOKS:

1. John Willard Rippon, Medical Mycology: the pathogenic fungi and pathogenic actinomycetes, sunders publishers, Edition 1, 1982.

VIDEO LECTURES:

1. https://youtu.be/Elr1k4Quaio
2. https://youtu.be/Pfon1FidMUo
3. https://youtu.be/8OJNXCgIzSM

WEB RESOURCES:

1. https://www.who.int/
2. https://asv.org/asv2024/
3. https://msafungi.org/meetings/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF111001	**CLINICAL INTERNSHIP-I**	-	-	-	-	20

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Develop communication skills to deal with patients and health care professionals.

CO2. Apply appropriate medical devices and techniques to diagnose the patient illness.

CO3. Develop skills in formulating various medical documentation procedures.

CO4. Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

Guidelines:

The internship program will be divided into two semesters, each spanning six months. Throughout each semester, students will engage in six hours of daily practice, accumulating a total of 720 hours of practical training. A key requirement of the program is for students to diligently maintain a work logbook, which will be endorsed by their supervisor or trainer. At the conclusion of the internship, candidates must submit their completed work logbook along with a certificate issued by the training institute.

The evaluation of candidates' training will be overseen by both internal and external examiners appointed by the University/Board. This evaluation will take the form of practical and viva examinations. The extended internship period affords students the opportunity to continuously develop confidence and enhance their clinical service delivery skills. They will demonstrate proficiency in both beginning and intermediate procedures, while also observing advanced and specialized techniques.

By the end of the clinical training, students will have practiced all the skills acquired through classroom and clinical instruction. They are expected to commit to a minimum of six hours of daily work, with the possibility of additional hours depending on the requirements of the healthcare setting.

1. Demonstrate professional interpersonal, oral, and written communications skills sufficient to serve the needs of patients and the public including an awareness of how diversity may affect the communication process.
2. Perform pre-analytical, analytical, and post-analytical processes:
    - Demonstrate ability to understand investigation/test requisition.
    - Collecting the relevant clinical samples alongwith complete and accurate documentation with proper safety measures in relation to sample accountability.
    - To transport the samples with precautionary measures to the relevant lab section.
    - Demonstrate the ability to prepare clinical sample for processing.
    - To demonstrate the knowledge of accurate sample processing for the required lab investigation. Perform routine clinical laboratory tests in clinical chemistry, hematology/ haemostasis, immunology, immune haematology, microbiology, Histopathology, Cytopathology, body fluid analysis, and laboratory operations.
    - Perform mathematical calculations related to all areas of the clinical laboratory
    - Ability to record the test results/data.
    - To demonstrate the ability to interpret the test reports and its documentation in lab records.
    - Demonstrate ability to release the report to the right person in minimum turn-around-time (TAT).
3. Perform problem solving and troubleshooting techniques for laboratory methodologies Correlate laboratory test results with patient diagnosis and treatment.
4. To follow basic quality assessment protocol of clinical laboratory.
5. Demonstrate routine laboratory techniques sufficient to orient new employees within the clinical laboratory.
6. Apply basic scientific principles in learning new techniques/procedures; demonstrate application of principles and methodologies.
7. Utilize computer technology applications to interact with computerized instruments and laboratory information systems.

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF111002	**CLINICAL INTERNSHIP-II**	-	-	-	-	20

Pre-Requisite 22DF111001 Clinical Internship-I

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides basic knowledge on hospital setup, care of patient, primary illness observation, and handling basic clinical instruments at training hospital.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Develop communication skills to deal with patients and health care professionals.

CO2. Apply appropriate medical devices and techniques to diagnose the patient illness.

CO3. Develop skills in formulating various medical documentation procedures.

CO4. Work individually and in teams following ethical practice.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	-	-	2	-	1
CO2	3	1	1	3	-	-	-	-	-	1
CO3	3	-	-	2	-	-	3	1	-	-
CO4	3	-	1	2	-	1	1	1	-	1
Course Correlation Mapping	**3**	**1**	**1**	**3**	**-**	**1**	**2**	**2**	**-**	**1**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

.

Guidelines:

The internship program will be divided into two semesters, each spanning six months. Throughout each semester, students will engage in six hours of daily practice, accumulating a total of 720 hours of practical training. A key requirement of the program is for students to diligently maintain a work logbook, which will be endorsed by their supervisor or trainer. At the conclusion of the internship, candidates must submit their completed work logbook along with a certificate issued by the training institute.

The evaluation of candidates' training will be overseen by both internal and external examiners appointed by the Mohan Babu University. This evaluation will take the form of practical and viva examinations. The extended internship period affords students the opportunity to continuously develop confidence and enhance their clinical service delivery skills. They will demonstrate proficiency in both beginning and intermediate procedures, while also observing advanced and specialized techniques.

By the end of the clinical training, students will have practiced all the skills acquired through classroom and clinical instruction. They are expected to commit to a minimum of six hours of daily work, with the possibility of additional hours depending on the requirements of the healthcare setting.

1. Demonstrate professional interpersonal, oral, and written communications skills sufficient to serve the needs of patients and the public including an awareness of how diversity may affect the communication process.
2. Perform pre-analytical, analytical, and post-analytical processes:
    - Demonstrate ability to understand investigation/test requisition.
    - Collecting the relevant clinical samples alongwith complete and accurate documentation with proper safety measures in relation to sample accountability.
    - To transport the samples with precautionary measures to the relevant lab section.
    - Demonstrate the ability to prepare clinical sample for processing.
    - To demonstrate the knowledge of accurate sample processing for the required lab investigation. Perform routine clinical laboratory tests in clinical chemistry, hematology/haemostasis, immunology, immunohaematology, microbiology, Histopathology, Cytopathology, body fluid analysis, and laboratory operations.
    - Perform mathematical calculations related to all areas of the clinical laboratory
    - Ability to record the test results/data.
    - To demonstrate the ability to interpret the test reports and its documentation in lab records.
    - Demonstrate ability to release the report to the right person in minimum turn-around-time (TAT).
3. Perform problem solving and troubleshooting techniques for laboratory methodologies Correlate laboratory test results with patient diagnosis and treatment.
4. To follow basic quality assessment protocol of clinical laboratory.
5. Demonstrate routine laboratory techniques sufficient to orient new employees within the clinical laboratory.
6. Apply basic scientific principles in learning new techniques/procedures; demonstrate application of principles and methodologies.
7. Utilize computer technology applications to interact with computerized instruments and laboratory information systems.

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF101003	**CLINICAL LABORATORY PRACTICES**	4	-	-	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course introduces the essential principles for the effective operation and management of clinical and research laboratories. Key topics include understanding different levels of laboratory services, detailing necessary infrastructure (space, personnel, equipment), mastering best practices for specimen handling and documentation, establishing Standard Operating Procedures (SOPs) and biosafety protocols (BSL-1 to BSL-4), and integrating ethical considerations with rigorous Quality Assurance (QA) and accident management. The goal is to ensure efficient, safe, and compliant laboratory performance.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Differentiate between various levels of laboratory services and describe their specific functions within the healthcare system.

CO2 Design and evaluate the essential infrastructure requirements for a functional laboratory, including space, personnel, equipment, and supply management.

CO3 Execute the correct procedures for the collection, labeling, handling, transportation, and recording of biological specimens, adhering to quality control measures.

CO4 Develop effective Standard Operating Procedures (SOPs) and apply comprehensive safety and biosafety protocols for different levels of laboratory environments (BSL-1 to BSL-4)

CO5 Analyze and integrate ethical principles and quality assurance practices (Internal and External QA) into laboratory operations to ensure reliable and compliant service delivery.

CO6 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	1	-	-	-	3	1	-	-	-
CO2	3	2	1	-	-	-	-	-	3	-
CO3	3	2	2	-	-	-	-	-	-	1
CO4	2	2	1							1
CO5	3	3	2	-	-	3	1	-	-	-
CO6	3	-	2							
Course Correlation Mapping	**3**	**2**	**2**	**-**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: LABORATORY SERVICES ***(12 Periods)***

levels of laboratories – Primary level, Secondary level and tertiary level. Reference laboratories, Research laboratories and specific disease reference laboratories.

Module 2: INFRASTRUCTURE IN THE LABORATORY ***(12 Periods)***

Laboratory space: Reception, specimen collection, quality water supply, power supply, work area, specimen / sample / slide storage, cold storage, record room, wash room, biomedical waste room, fire safety, etc., Personnel in the laboratory: Qualifications as per NABL document., Equipment: Listing, cleaning, maintenance, SOP, verification of performance: Internal quality control., Reagents and materials: Purchase, maintenance, storage, use.

Module 3: SPECIMEN COLLECTION, STORAGE AND TRANSPOST ***(12 Periods)***

General guidelines of collection, labelling, handling, transportation storage of specimens. Care in handling specimens. Accession list, Worksheet, Reporting test results, Specimen rejection record, Recording of Laboratory data, Maintenance of records.

Module 4: STANDARD OPERATING PROCEDURE AND SAFETY IN THE LABORATORY ***(12 Periods)***

Definition, format, text of SOP, types of SOP., General safety measures, biosafety precautions, levels of biosafety laboratories: BSL1, BSL2, BSL3, BSL4.

Module 5: ETHICAL CONSIDERATIONS AND QUALITY ASSURANCE ***(12 Periods)***

Non – maleficence, beneficence, risk minimization, institutional arrangement, ethical review, transmission of ethical values, voluntariness, compliance., Internal and external quality assessment.

Accidents and emergencies in the laboratory.

Total Periods: 60

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Writing SOP of equipment maintenance, practical procedures done in the laboratory
2. Demonstration of blood collection, storage and transportation
3. Observation of quality control
4. Demonstration of various samples collection procedure from blood.
5. Demonstration of types of laboratory

RESOURCES

TEXT BOOKS:

1. ICMR (2008) guidelines for good clinical laboratory practices.
2. NIH : DAIDS guidelines for Good Clinical Laboratory Practice Standards; 2011.
3. WHO : Good Clinical Laboratory Practice (GCLP), 2009.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=NsZEnY6x8XE
2. https://www.youtube.com/watch?v=RiJ5SR2TwYY
3. https://www.youtube.com/watch?v=szWnuOofLLI

Web Resources:

1. https://medicoinfo.org/blood-specimen-collection-processing-importance-procedure/
2. https://globalhealthlaboratories.tghn.org/training-materials/good-clinical-laboratory-practice-online-course/

PROGRAM CORE

Course Code	Course Title	L	T	P	S	C
22DF102003	**MEDICAL BIOCHEMISTRY**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on basic concepts of Biochemistry and understand the structural, functional and metabolic properties of biomolecules.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand the Basic knowledge of carbohydrates and lipids and its metabolisms

CO2 Acquire basic knowledge on proteins and DNA structure

CO3 Analyse the functional and structural concepts of Vitamins and Minerals

CO4 Analyze different types of enzymes and nutrients

CO5 Understand the nature and types of Acid base Balance and Clinical Chemistry

CO6 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	1	-	-	-	-
CO4	3	2	-	2	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-
CO6	3	-	-	1	-	-	-	-	-	2
Course Correlation Mapping	**3**	**2**	**-**	**1**	**-**	**1**	**-**	**-**	**-**	**2**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

MODULE 1 CARBOHYDRATE AND LIPIDS ***(12 Periods)***

Introduction, Cell structure, Cell membrane structure and function, Carbohydrate Chemistry – Definition, general classification with examples, Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. Metabolism of carbohydrates Lipid Chemistry – Definition, general classification and functions of Lipids, Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol, Essential fatty acids and their importance, Lipoproteins: Definition, classification, properties, Sources and function Ketone bodies. Metabolism of lipids.

MODULE 2: PROTEINS AND NUCLEIC ACID ***(10 Periods)***

Amino-acid Chemistry – Amino acid chemistry: Definition, Classification, Peptide bonds, Peptides: Definition, biologically important peptides, Protein chemistry: Definition, Classification, Functions of proteins, properties and structure of proteins. Metabolisms Proteins. Nucleotide and Nucleic acid Chemistry - Nucleic acids: Purines and pyrimidine-Structure of DNA – Watson & Crick model of DNA Structure of RNA – Types of RNA

MODULE 3: VITAMINS AND MINERALS ***(10 Periods)***

Fat soluble vitamins(A,D,E,K) – Water soluble vitamins – B-complex vitamins. Definition, classification - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity. Mineral -Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper.

MODULE 4: ENZYMES AND NUTRITION ***(08 Periods)***

Enzymes – Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic enzymology (clinical significance of enzymes) Nutrition – Introduction, Importance of nutrition Calorific values, Respiratory quotient Definition, and its significance Energy requirement of a person - Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food. Balanced diet, Nutritional disorders. Marasmus – Kwasoirkar

MODULE 5: ACID BASE BALANCE AND CLINICAL CHEMISTRY ***(05 Periods)***

Acid-Base balance – Definition of Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system Role of lungs and kidneys in acid base balance, Acid base imbalance. Clinical Biochemistry - Normal levels of blood and urine constituents, Relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate.

Total Periods: 45

EXPERIENTIAL LEARNING

LISTOFEXPERIMENTS:

QUALITATIVE TESTS OF MONOSACCHARIDES (GLUCOSE AND FRUCTOSE)

1. Molisch's test
2. Fehling's test
3. Benedict's test
4. Seliwanoff's test

QUALITATIVE TESTS OF LIPIDS

5. *Solubility tests*
6. *Emulsification tests*
7. *Saponification tests*

QUALITATIVE TESTS OF PROTEINS

8. Isoelectric precipitation tests
9. Heat coagulation tests

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in CHO.)

RESOURCES

TEXT BOOKS:

1. U. Satyanarayana, U. Chakrapani "Biochemistry" Elsevier, 2020.
2. Vasudevan DM. "Textbook of Biochemistry for Medical Students" Jaypee Brothers Medical Publishers. 2019
3. Indumati V, Sowbhagya Lakshmi, "Integrated Textbook of Biochemistry" Paras Medical Publishers, 2021.
4. Naik Pankaja. "Essentials of Biochemistry" Jaypee Brothers Medical Publishers. 2017
5. Agrawal Poonam "Concepts In Biochemistry With Clinical Approach For Undergraduate Medical Students", CBS Publishers & Distributors Pvt Ltd, 2020
6. Prasad R Manjeshwar, "Textbook of Biochemistry for Physiotherapy Students" Sheetal Distributors. 2020

REFERENCE BOOKS:

1. MN Chatterjee and Rana Shinde, Textbook of Medical Biochemistry, 8th edition, JPB, 2012.
2. Denise R Ferrier, Lippincott's Illustrated Reviews Biochemistry, 7th edition, Lippincot Williams and Wilkins, 2016
3. Prasad R Manjeshwar."Textbook of Biochemistry for Physiotherapy Students" Sheetal Distributors. 2020.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=F59RwK9hya8
2. https://www.youtube.com/watch?v=OKLxwCdkBn8
3. https://www.youtube.com/watch?v=jcz99_-JcZ8

Web Resources:

1. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_students/medicalbiochemistry.pdf
2. https://www.qmul.ac.uk/library/media/library/using-the-library/media-folder-images-library/Principles-Of-Biochemistry-Introductory-Series.pdf
3. https://rajneeshrajoria.weebly.com/uploads/4/9/0/6/49069889/biochemistry_bicm101.pdf

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22CC105001	**BASIC LIFE SUPPORT AND FIRST AID MANAGEMENT**	-	1	2	-	2

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION: The Course will cover various aspects of basic life support and first aid essential for health care and allied health sciences professionals.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Acquire knowledge on Basic life support techniques.
CO2. Perform basic first aid to minimize the maximum risk.
CO3. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	-	-
CO3	3	1	3	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstrate the procedure of Choking and Drowning
2. Perform the Asthmatic attack
3. Demonstrate the first aid for Shock, from blood and fluid loss
4. Determine the Heart attack and Wound bleeding
5. Demonstrate first aid for foreign bodies in eyes, nose and ear, bites and stings
6. Perform first aid for fainting, hypoglycemic coma and Head injury
7. Demonstrate the first aid for Skin Burns.
8. Perform cardio pulmonary resuscitation for adult and pediatric.
9. Determine the following recovery position, bandages, lifting, carrying and moving causality

RESOURCES

TEXT BOOKS:

1. Dr. Mekkanti Manasa, A Hand Book on First ais Practices: First Aid Saves Life, Notion Press, Edition 1, 2022
2. Rai Pv, Manual of First Aid: Management of General injuries, Sports injuries and Common Ailments, JPB publishers, Edition 1, 2012.

REFERENCE BOOKS:

1. Dhruva Chaudhry, ISCCM Textbook of Critical Care Medicine, Jaypee Brothers Medical Publishers, Edition 2, 2023.
2. C. Manivannam, Textbook of First Aid and Emergency Nursing, EMMESS Medical Publishers, Edition 3, 2020.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=6THKEJ_Ciag
2. https://www.youtube.com/watch?v=DE45ks9miIw
3. https://www.youtube.com/watch?v=XJGPzl3ENKo
4. https://www.youtube.com/watch?v=x1oo76Y_87A

WEB RESOURCES:

1. https://cpr.heart.org/en/cpr-courses-and-kits/healthcare-professional/basic-life-support-bls-training
2. https://www.verywellhealth.com/basic-first-aid-procedures-1298578

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22CC105002	**ENHANCING CONCENTRATION**	-	1	2	-	2

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION: The Course will cover use of meditation as a tool to shift from purely an IQ Orientation, towards a balance between IQ (Intelligent Quotient) and EQ (Emotional Quotient) leading to holistic being which is the demand and need in the industry and society.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Acquire knowledge on Focus, Concentration and conducive environment.

CO2. Understand importance of meditation.

CO3. Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	-	-
CO3	3	1	3	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstrate the Enhancing concentration-decluttering the mind-create
2. Understand the time-ambition vs Aspiration-making choices.
3. Demonstrate the Joy at work-connectivity with people with people-prepare for exams.
4. Determine the Power of Observation-self within- power of the heart.
5. Perform the physical relaxation to completely relax all the parts of the body.
6. Perform the remove tension and improve the readiness to start the meditation session.
7. Demonstrate Self observation to gain insight into once inner experiences during the meditation.

RESOURCES

TEXT BOOKS:

1. Aditi Singhal, How to Improve Your Concentration, Ebury Press Publisher, Edition 1, 2020.
2. Dr. S k Tiwari, Essentials of Repertorizatio, B Jain Publishers Pvt Ltd., Edition 6, 2022.

REFERENCE BOOKS:

1. Marus Aurelius, Meditations: The Annotated Edition, Basic Book Publisher, Edition 1, 2022.
2. Eric Phillips, Focus, Increase your focus, Better Concentration and Free from Distraction-Focus on Your Goals and What Really Matters, Edition 3, 2015.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=VjCGOjRPFiw
2. https://www.youtube.com/watch?v=Hzi3PDz1AWU
3. https://www.youtube.com/watch?v=thcEuMDWxoI
4. https://www.youtube.com/watch?v=Hu4Yvq-g7_Y

WEB RESOURCES:

1. https://www.health.harvard.edu/mind-and-mood/tips-to-improve-concentration
2. https://www.healthline.com/health/mental-health/how-to-improve-concentration

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22DF102027	**CYTOGENETICS: PROCEDURES AND INTERPRETATIONS**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed Knowledge on chromosome structure, its identification, constitutional chromosome patterns, Genetic disorders and inborn errors of metabolism, Prenatal cytogenetics, Forensic identity testing.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand various procedure of identification of chromosomes.

CO2 Gain the knowledge on constitutional chromosome patterns.

CO3 Understand concepts of Genetic disorders and inborn errors of metabolism

CO4 Demonstrate the Prenatal cytogenetics

CO5 Apply various techniques to Forensic identity testing

CO6 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	3	1	-	-	-
CO2	3	1	2	-	2	-	-	-	3	-
CO3	3	1	2	-	1	-	-	1	-	1
CO4	3	1	2	-	2	-	-	-	-	1
CO5	3	2	2	-	3	2	1	-	-	-
CO6	3	3	-	-	-	-	-	-	-	1
Course Correlation Mapping	**3**	**2**	**2**	**1**	**2**	**3**	**1**	**1**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: IDENTIFICATION OF CHROMOSOMES ***(09 Periods)***

Introduction, Important definitions, Normal chromosome structure, important aspects of cytogenetics studies, use of cell culture for cytogenetic studies, Tissue culture laboratory, Equipment and instruments, tissue culture media, General methods of preparation of cell culture.

Module 2: CONSTITUTIONAL CHROMOSOMAL PATTERNS ***(09 Periods)***

Study of constitutional chromosome patterns: Introduction, clinical significance, specimen, culture media, procedure of harvesting, chromosome staining and karyotyping analysis.

Module 3: GENETIC DISORDERS AND NEWBORN ERRORS ***(09 Periods)***

Genetic disorders and inborn errors of metabolism: Introduction, Patterns of Inheritance, Autosomal disorders; Autosomal dominant disorder, Autosomal recessive disorder, Sex linked disorder, Clinical importance of inborn errors of metabolism.

Module 4: PRENATAL CYTOGENETICS ***(09 Periods)***

Prenatal cytogenetics: Chromosomal Aneuploidy syndrome, Structural chromosomal abnormal: Wolf-Hirschhorn syndrome, Chi du Chat Syndrome., Other Cytogenetic Disorders: Fragile x Syndrome and Breakage syndrome., Prenatal Chromosomal diagnosis.

Module 5: FORENSIC IDENTITY TESTING ***(09 Periods)***

Forensic identity testing: Introduction, Specimen collection in Forensics, DNA Extraction, Forensic DNA analysis, Use of PCR Techniques., Gender determination, mitochondrial DNA sequencing., Parentage testing: Use of polymerase chain reaction (PCR) in paternity testing, Use of RFLP in paternity testing, Human Leukocyte antigen (HLA) in paternity testing, Serum Protein system in Paternity testing, Red cell enzymes in paternity test.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Preparation of Amniotic fluid culture by flask method.
2. Preparation of amniotic fluid coverslip culture (in situ)
3. Diagnosis of Hematopoietic Neoplasms Using Molecular Techniques.
4. Diagnosis of lymphomas by using Molecular techniques.

RESOURCES

TEXT BOOKS:

1. Praful Godkar, Textbook of Medical Laboratory Technology – Clinical Laboratory Sciences and Molecular Diagnosis, Balani Publications, Volume 1 and 2, Edition 3, 2014.
2. Kumar and Srivastava, Textbook of Molecular cytogenetics, Narendra Publishing House, Edition 1, 2019

REFERENCE BOOKS:

1. D.E. Rooney, Human Cytogenetics, Wiley-Blackwell Publications, Edition 1, 2009.
2. Prof. P.K. Gupta FNA, Cytogenetics, Rastogi Publications, Edition 2, 2022.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=E_Ky8ig3328
2. https://www.youtube.com/watch?v=1XLn7m0rens&t=1s
3. https://www.youtube.com/watch?v=KeeIrY4BGWE

WEB RESOURCES:

1. https://www.nature.com/scitable/topicpage/karyotyping-for-chromosomal-abnormalities-298/
2. https://www.genome.gov/genetics-glossary/Cytogenetics

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22DF102028	**ESSENTIALS OF STEM CELL TECHNOLOGY**	2	-	2	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed Knowledge on Stem cell differentiation, collection, preservation, analysis of stem cell and clinical applications of stem cells.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Acquire knowledge on various types of stem cell

CO2 Understand development of embryonic stem cell.

CO3 Gain knowledge on stem cell therapy.

CO4 Learn about clinical applications of stem cell

CO5 Study various organs and its stem cell.

CO6 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	-	1	-	3	1	-	-	-
CO2	3	1	2	-	2	-	-	-	3	-
CO3	3	1	2	-	1	-	-	1	-	1
CO4	3	1	2	-	2	-	-	-	-	1
CO5	3	2	2	-	3	2	1	-	-	-
CO6	3	2	-	-	-	-	-	-	-	-
Course Correlation Mapping	**3**	**2**	**2**	**1**	**2**	**3**	**1**	**1**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO STEM CELL ***(06 Periods)***

Stem cells-Introduction Definition and basics of stem cells, Classification of stem cells different types of stem cells human embryonic stem cells, adult stem cells etc., Sources of Stem cells Fetus and various adult tissues., Advantages of stem cells., Blastocyst culture – various stages of embryonic development. In vitro fertilization., Xeno-free derivation of stem cells- Alternative feeder cells and feeder free culture., Cryopreservation of stem cells- Conventional slow-freezing method and vitrification method., Properties of stem cells self renewal, clonality and plasticity., Pluripotent nature of stem cells- Extrinsic and Intrinsic factors., Cellular models to study pluripotent nature of stem cells., Characterization of human embryonic stem cells- expression of cell surface marker, karyotyping etc., Stem cell niche- bone marrow microenvironment and stem cell niche.

Module 2: EMBRYONIC STEM CELL DEVELOPMENT ***(06 Periods)***

Stem cells and their developmental potential., Characteristics of stem cells- trans differentiation of stem cells., Controlled differentiation of human embryonic stem cells., In vivo and In vitro differentiation of human embryonic stem cells., Application of stem cells.

Module 3: THERAPEUTIC CLONING ***(06 Periods)***

Therapeutic cloning strategies. Derivation and propagation of human embryonic stem cells., Reproductive cloning by SCNT uses of SCNT., Limitations of cloning- Hurdles to improve the efficiency of therapeutic cloning., Stem cell research and ethics- translational medicine ethic.

Module 4: HEMATOPOITIC STEM CELL ***(06 Periods)***

Hematopoietic stem cells(HSC) basics., Development and Regulation of HSC., Clinical application of HSC- gene therapy- using hematopoietic stem cells HSC for leukemia etc., Mesenchymal stem cells(MSC)- differentiation and identification., Characteristics of mesenchymal stem cells., Clinical applications of stem cells-stem cells in tissue engineering., Stem cells and regenerative medicine., iPS- induced pluripotent stem cells.

Module 5: ORGANIC STEM CELL ***(06 Periods)***

Skeletal muscle stem cells- development and functions., Liver stem cells- Organisation and functions., Tumor stem cells- basics., Differences and similarities of cancer stem cells and stem cells., Cancer stem cell signaling- NOTCH pathway., Canonical wnt signaling pathways in hematopoietic stem cells., Stem cell therapies in animal models., Uses and benefits of stem cell for human beings.

Total Periods: 30

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstrate various methods to collect stem cell.
2. Perform the Preservation of Stem cell
3. Analysis of Stem cell
4. Demonstrate various therapeutic techniques of stem cell.

RESOURCES BOOKS

1. Dr. Pankaj Kaingade, Stem Cell Biology, Evince pub Publishing, Edition 1, 2019.
2. Mark Berman, The Stem Cell Revolution, Author house Publications, Edition 1, 2015.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=E_Ky8ig3328
2. https://www.youtube.com/watch?v=1XLn7m0rens&t=1s
3. https://www.youtube.com/watch?v=KeeIrY4BGWE

WEB RESOURCES:

1. https://www.nature.com/scitable/topicpage/karyotyping-for-chromosomal-abnormalities-298/
2. https://www.genome.gov/genetics-glossary/Cytogenetics

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22DF102030	BLOOD FILM MORPHOLOGY-A PRACTICAL GUIDE	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand the importance of blood film observation.

CO2 Identify the red blood cells from stained and unstained smears.

CO3 Analyze blood film for white blood cells.

CO4 Identify morphology of Platelets, Pregnancy, Pediatrics and Parasite

CO5 Analyze and interpret various diseased blood smear

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	3	-
CO3	3	1	3	-	-	-	-	-	-	1
CO4	3	1								1
CO5	3	-	-	-	-	3	1	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: COURSE INTRODUCTION ***(09 Periods)***

Describes the background to the blood film. It provides you with an overview of what takes place in a laboratory when a film of blood is analyzed. '1.1 - Course Overview' describes the background to the blood film. It explains how a FBC analyser works in '1.2 - The Analyser' and the potential sources of error in analyser results. It then explains which blood counts should trigger the making of a blood film and how that blood film is made in '1.3 - Importance of Making a Blood Film'. The '1.4 - A methodical approach to blood film analysis' lesson ends by suggesting and demonstrating a systematic method for blood film analysis. Module 1 ends with a graded 'End of Module 1 Quiz' for you to complete and a supplementary reading list.

Module 2: RED CELL MORPHOLOGY ***(09 Periods)***

This 'Red Cell Morphology' module takes you through a systematic method of examination of red cell morphology. It starts with a basic approach in '2.1 Red Cell Morphology Basics', then examines red cell quantity and red cell quality in '2.2 Describing Microcytic, Macrocytic and Normocytic Anaemias in blood films' and '2.3 Recognising and describing common poikilocoytes'. At each step, you are taught a method, provided with the theoretical framework for interpreting abnormalities, and shown examples of abnormalities highlighting their clinical significance in '2.4 Recognising and describing red cell inclusion'. 'The 'Red Cell Morphology' Module ends with a graded 'End of Module 2 Quiz' and a supplementary reading list.

Module 3: WHITE CELL MORPHOLOGY ***(09 Periods)***

This 'White Cell Morphology' a systematic method of examination of white cell morphology, following the template for blood film analysis in '3.1 A framework for analysing white cell quantitative disorders'. It starts by examining problems of white cell quantity, then examines the many important variants of white cell quality by using a a unique structured process for analysing an abnormal white cell population in '3.2 Analyzing an abnormal leukocyte population'. This takes you through the morphology of reactive white cells, lymphoproliferative diseases, leukaemias and myelodysplasia in '3.3 Analysing lymphoproliferative disorders', '3.4 Analysing acute leukaemias' and '3.5 Examining qualitative changes in white cells' . At each step you are taught a method, provided with the theoretical framework for interpreting abnormalities, and shown examples of abnormalities highlighting their clinical significance. You will be required to complete a grade End of Module 3 quiz and look up the supplementary reading list.

Module 4: PLATELETS, PREGNANCY, PAEDIATRICS AND PARASITES ***(09 Periods)***

This '4Ps of Morphology - Platelets, Pregnancy, Paediatrics and Parasites' an assortment of important specific areas of blood film morphology. It first completes the systematic analysis of the blood film by discussing quantitative and qualitative changes in platelets in '4.1 Platelets (Thrombocytopenia & Thrombocytosis)'. In '4.2 Pregnancy', we then discuss the important physiologic and pathologic changes in the FBC and film during pregnancy. The '4.3 Paediatric' lecture emphasises that children are not just little adults by showing how the normal ranges for the FBC and normal appearance of films can differ at different ages, and then discussing a framework for morphologic diagnosis in paediatric anaemia, thrombocytopenia and pancytopenia. The '4.4 Parasite' lesson concludes with a review of malaria – demonstrating the lifecycle of the parasite, the morphologic appearance of different species, and a system to distinguish between different species. You are expected to complete a graded 'End of Module 4' quiz and look up the supplementary reading list.

Module 5: BLOOD FILM ANALYSIS ***(09 Periods)***

In this 'Live Blood Film Analysis - Putting it all together' we demonstrate the use of our method for blood film analysis using videos of real slide examinations for the five cases. The presentation format for each case is similar: each case starts by providing a case history and full blood count (FBC) parameters. You are encouraged to consider a differential diagnosis (DDx) for each case. We will follow the template for blood film analysis. Finally we arrive at a morphologic conclusion and ask you how you can help the clinician reach a diagnosis based on the blood film. The case studies are not assessed. However, viewing them is necessary to see how we apply our method and integrate the concepts taught in Module 1 - 4. As this is a module putting everything you have learned together in individual case studies, there will be no graded

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstration of Microcytic anemia
2. Observation of Anemia and thrombocytopenia
3. Analyze the Lymphocytosis
4. Diagnosis of Acute leukaemia
5. Identification of Pancytopenia
6. Peripheral Blood Lymphocyte Culture

RESOURCES

TEXT BOOKS:

1. Henry,s, Clinical Diagnosis and Management by Laboratory Methods, Elsevier, Edition 24, 2022.
2. Renu Saxena, Hara Prasad Pati, de Gruchy's, Clinical Haematology in Medical Practice, WILEY Publishers, Edition 6, 2012.
3. Dacie and Lewis, Practical Haematology, Elsevier, Edition 12, 2016.

REFERENCE BOOKS:

1. B. Godkar, Darshan, Textbook of Medical Laboratory Technology, Bhalani Publishing House, Volume 1 and 2, Edition 3, 2005.
2. Kanai L Mukherjee, Medical Laboratory Technology, CBS Publishers and Distributors Pvt. Ltd, Volume 3, 2022.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=jlHpk2-WS4k
2. https://www.youtube.com/watch?v=m4qxI0V8iYs
3. https://www.youtube.com/watch?v=tsp_hYMMS44

WEB RESOURCES:

1. https://ashpublications.org/bloodadvances/article/3/5/769/246724/High-risk-of-adverse-pregnancy-outcomes-in-women
2. https://www.urmc.rochester.edu/encyclopedia/content.aspx?contenttypeid=90&contentid=p02117

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22DF101002	DESIGN AND INTERPRETATION OF CLINICAL TRIALS	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on design and interpretation of clinical trails.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand the features of randomized clinical trials

CO2 Analysis clinical trials by data

CO3 Understand the ethics of experimentation in humans

CO4 Apply the Consolidated Standards of Reporting Trials to publish research

CO5 Analyze clinical repots as evidence.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	3	-
CO3	3	1	3	-	-	-	-	-	-	1
CO4	3	1								1
CO5	3	-	-	-	-	3	1	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: RANDOMIZATION AND MASKING ***(09 Periods)***

Different types of trial designs, including parallel, crossover, group allocation, factorial, large simple, equivalency, non-inferiority, and adaptive designs., Features of randomized clinical trials used to protect against bias, randomization and masking.

Module 2: OUTCOMES AND ANALYSIS ***(09 Periods)***

Focuses on a key design issue - selecting the primary outcome. We will also cover the gold standard for analysis of clinical trials, which is including all the participants in the analysis regardless of their actual treatment.

Module 3: ETHICS ***(09 Periods)***

Focuses on a key issue in the field of clinical trials, the ethics of experimentation in humans.

Module 4: REPORTING RESULT ***(09 Periods)***

Focus on reporting results of clinical trials in publications. We cover the Consolidated Standards of Reporting Trials (CONSORT) guidelines.

Module 5: RANDOMIZED CLINICAL TRAILS ***(09 Periods)***

Focus on whether RCTs are still the gold standard for evaluating evidence.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. Demonstrate sample variable in health care.
2. Observation of outcomes and analysis
3. Understand ethics in clinical trails
4. Learn report and result.
5. Identification of clinical trails

RESOURCES

TEXT BOOKS:

1. Proschan, Statistical Thinking in clinical Trails, chapman & Hall/CRC Biostatistics Series, Edition 1, 2021.
2. David Machin, Textbook of Clinical Trails, Wiley India pvt Ltd, Edition 2, 2010.
3. Jane Nikles, The Essential Guide to N-of-1 Tarils in Health, Springer Nature, Edition 1, 2015.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=bctaWQTYHJc
2. https://www.youtube.com/watch?v=k40iNSRzdEU
3. https://www.youtube.com/watch?v=MIHQxzSrFjo

WEB RESOURCES:

1. https://www.coursera.org/learn/clinical-trials
2. https://online.stanford.edu/courses/som-xche0030-clinical-trials-design-strategy-and-analysis

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PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22DF102023	**BLOOD BANKING AND GENETICS**	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on concept of blood grouping, compatibility testing in blood transfusion & screening of donated blood for various infectious diseases. Genetics will make students learn about Fundamentals of Heredity. The students will learn about the concept of inheritance in various genetic diseases.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Identify blood group, and Perform Major and Minor compatibility test.

CO2 Prepare various anticoagulants used in Blood bank for blood storage.

CO3 Perform the various components separation by using standard procedure

CO4 Understand genetics, its applications in Laboratory Medicine.

CO5 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	3	-
CO3	3	1	3	-	-	-	-	-	-	1
CO4	2	1								1
CO5	3	-	-	-	-	3	1	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO BLOOD BANK ***(12 Periods)***

Introduction: Red cell antigen, Natural antibodies, Immune Antibodies, Recognition of Hemagglutination reaction in blood grouping., Blood Bank: Introduction to Blood Banking, History and discovery of various blood group systems, ABO blood group system, Rh and other major blood group system, Sources of error in blood grouping and their elimination. ABO grouping: Forward and reverse grouping. Causes of discrimination between forward and reverse grouping, Rh grouping, Compatibility test in blood transfusion: Collection of blood for cross matching from a blood bag, Major cross matching, Minor cross matching.

Module 2: ANTICOAGULANTS USED IN BLOOD BANK ***(11 Periods)***

Use of enzymes in blood bank specially Papain, Complications and hazards of blood transfusion, Laboratory investigations of transfusion reactions and mismatched blood transfusion, Precautions while procurement and storage of grouping antisera. Various anticoagulants used to collect blood for transfusion purposes, Selection of donor and procedure for collection of blood from a healthy donor.

Module 3: BLOOD COMPONENTS SEPARATION ***(11 Periods)***

Preparation of various fractions of blood for transfusion and therapeutic purposes such as: Packed red cells, washed red cells and FROZEN Red cells, Platelet Rich Plasma (PRP), Platelet concentrate and frozen platelets. Fresh plasma (FP), Fresh Frozen Plasma (FFP) and cryoprecipitate, Brief introduction of blood substitute/artificial blood, Haemopheresis: pertaining to Leucocytes, platelets and plasma, Quality control in blood bank.

Module 4: GENETICS ***(11 Periods)***

Continuity of life-heredity, variation; Mendel's laws of inheritance, Chromosomal basis of inheritance; other patterns of inheritance- incomplete dominance, multi parallelism, quantitative inheritance. Chromosomes – bacterial cell and eukaryotic cell; parallelism between genes and chromosomes; genome, linkage and crossing over; gene mapping; recombination; Molecular genetics: DNA as a genetic material- its structure and replication; structure of RNA and its role in protein synthesis, Vectors, plasmids, Human Genetics, Microbial genetics

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To prepare Acid Citrate Dextrose (ACD) and Citrate Phosphate Dextrose (CPD) Solutions
2. Screening of blood donor: physical examination including medical history of the donor
3. Collection and preservation of blood for transfusion purpose
4. Screening of blood for Malaria, Microfilaria, HBs Ag, Syphilis and HIV
5. To determine the ABO & Rh grouping: Direct or preliminary grouping, Indirect or proof grouping, Rh grouping and determination of Du in case of Rh negative
6. To perform Direct and Indirect Coomb's test
7. To perform cross matching, Major cross matching, Minor cross matching
8. Preparation of various fractions of blood.

RESOURCES

TEXT BOOKS:

1. Mukherjee Kanai, L, Medical Laboratory Technology, Tata McGraw-Hill Education, Volume 1 and 2, 2010.
2. Bain B.J, Dacie and Lewis Practical Haematology, Elsevier Publications, Edition 12, 2017.
3. Benjamin Lewin, Genes IX Jones and Bartlett, Publishers, Inc, Edition 1, 2007.
4. Dr. B.D. Singh, Fundamentals of Genetics, Medtech Sciences Press, Edition 6, 2022.

REFERENCE BOOKS:

1. J. Overfield M. Dawson, Transfusion Sciences, VIVA books Publishers, Edition 2, 2017.
2. Harvey G. Klein, Mollisons Blood Transfusion in Clinical Medicine, Wiley-Blackwell publishers, Edition 3, 2014.
3. Gardner, Principles of Genetics, Wiley Publishers, Edition 8, 2006.
4. P.C. Winter, Instant Notes in Genetics, Taylor and Francis Group, Edition 3, 2007.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=mWElzdjjBeQ
2. https://www.youtube.com/watch?v=qNChV85ovhQ
3. https://www.youtube.com/watch?v=Cqq_7Gaae7E
4. https://www.youtube.com/watch?v=PozNhjmxvG0
5. https://www.youtube.com/watch?v=L5XlB8KkKt4
6. https://www.youtube.com/watch?v=Eufcd0oXpz0

WEB RESOURCES:

1. https://www.medicalnewstoday.com/articles/327513
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4524540/
3. https://www.britannica.com/science/genetics

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22DF102022	**CYTOPATHOLOGY**	3	-	2	-	4

Pre-Requisite

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on cytopathology diagnosis techniques, sample collection, Pre-Analytical procedures and clinical interpretation of various diseases

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand various gynecological specimen collection and diagnosis procedures.

CO2 Perform Fina Needle aspiration cytology and staining of aspirated sample.

CO3 Gain Knowledge about body fluids abnormalities.

CO4 Understand the Cryostat section staining and Vital staining for Sex Chromatin

CO5 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	3	1	-	-	-
CO2	3	1	-	-	-	-	-	-	3	-
CO3	3	1	3	-	-	-	-	-	-	1
CO4	2	1								1
CO5	3	-	-	-	-	3	1	-	-	-
Course Correlation Mapping	**3**	**1**	**3**	**-**	**-**	**3**	**1**	**-**	**3**	**1**

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: EXFOLIATIVE CYTOLOGY ***(09 Periods)***

Exfoliative cytology: collection, smear Preparation of gynecological samples-PAP smears and its fixation, Preparation of PAP stains, cell blocks, Staining techniques (PAP, H&E and Giemsa),

Module 2: INTERPRETATION OF BODY FLUIDS ***(09 Periods)***

Interpretation of results and Various body fluid processing like Urine, Sputum, Fluids (Pleural, Pericardial and Peritoneal), CSF etc.

Module 3: INTERVENTION AND FLUID CYTOLOGY ***(09 Periods)***

Aspiration Cytology principles, indications & utility of the technique with special emphasis on role of cytotechnologist in FNAC clinics and Barr body analysis., Fluid Cytology: Urine, CSF, Body Fluids (Pleural, Pericardial, Ascitic)

Module 4: AUTOMATION IN CYTOLOGY ***(09 Periods)***

Automation in cytology, Liquid based cytology: Principles and preparation, Cytocentrifuge, molecular cytology, Cell Block and Immune-cytochemistry, monoclonal antibodies.

Module 5: CRYOSTAT SECTIONING ***(09 Periods)***

Cryostat sectioning, its applications in diagnostic cytopathology., Enzyme Cytochemistry:, Diagnostic applications, Demonstration of Phosphatases, Dehydrogenases, Oxidases & Peroxidases., Vital staining for Sex Chromatin.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:

1. To perform Papnicolaou's stain on cervical smear
2. To perform Guard's staining for demonstration sex chromatin (Barr bodies on a buccal smear)
3. To perform Shorr's staining for Hormonal assessment
4. To cut frozen sections of Gynaec tissue
5. To perform CSF sample and body fluids by cytospin
6. Should know the various stains used in Cytology lab:‖ May Grunwald Giemsa, H&E, PAS, Grocott's.

RESOURCES

TEXT BOOKS:

1. Mukherjee Kanai L, Medical Laboratory Technology, Tata McGraw-Hill Education, Volume 1 and 2, 2010.
2. Lynch's, Medical laboratory Technology, W.B. Saunders Company, Edition 3, 1976.

REFERENCE BOOKS:

1. F.J. Baker and R.E. Silvertion, Introduction to Medical Laboratory Technology, ELBS Publications, Edition 5, 2014.
2. Paolo Gattuso, Differential Diagnosis in Cytopathology, Cambridge University Press, Edition 2, 2014.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=9n8vmUkUkTk
2. https://www.youtube.com/watch?v=hGCODuBY3Qc
3. https://www.youtube.com/watch?v=rTqSmjXLSEY
4. https://www.youtube.com/watch?v=TmF9TXEUaTo&t=11s

WEB RESOURCES:

1. https://en.wikipedia.org/wiki/Cytopathology
2. https://onlinelibrary.wiley.com/journal/13652303
3. https://my.clevelandclinic.org/health/diagnostics/21714-cytology

PROGRAM ELECTIVE

Course Code	Course Title	L	T	P	S	C
22DF102026	MOLECULAR BIOLOGY IN LABORATORY MEDICINE	3	-	2	-	4

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course explores fundamental molecular biology processes like DNA replication, protein synthesis, and gene regulation. It covers molecular pathology techniques, including nucleic acid analysis and hybridization assays. Students will master Polymerase Chain Reaction (PCR), gene cloning, and advanced nucleic acid amplification methods. The curriculum also introduces biochip technology and involves practical laboratory experiments

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Explain DNA processes, gene regulation, repair, and differentiate mutations.

CO2 Apply nucleic acid analysis to interpret molecular pathology and diagnostic probes.

CO3 Perform, analyze, and troubleshoot PCR and its clinical applications.

CO4 Perform gene cloning, apply probes, utilize advanced nucleic acid amplification.

CO5 Apply, evaluate diverse amplification, array, and lab molecular methods.

CO6 Work individually or in teams to solve problems with effective communication

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	1	-	2	-	-	-	-	-	-
CO2	3	1	-	2	-	-	-	-	-	-
CO3	3	1	-	2	-	-	2	-	-	-
CO4	3	1	-	2	-	-	-	-	-	-
CO5	3	1	-	2	-	-	-	-	-	-
CO6	3	1	-	2	-	-	2	-	-	-
Course Correlation Mapping	**3**	**1**	**-**	**2**	**-**	**-**	**2**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION TO MOLECULAR BIOLOGY ***(09 Periods)***

Introduction, Molecular composition and structure, chromosome structure, Replication of DNA, Protein synthesis: Transcription of DNA to RNA, Translation, Transcriptional control., Regulation of gene expression, The Operon concepts: Lac Operon, Lac Operon Operation, Tryptophan Operon. Mechanisms of DNA repair: Base excision repair and Double-strand break repair., DNA mutation.

Module 2: MOLECULAR PATHOLOGY ***(09 Periods)***

Molecular pathology, Nucleic acid analysis: electrophoretic separation, Nucleic acid Hybridization., Hybridization assays: Liquid-Phase hybridization, Solid-Support Hybridization, Dot/Blot Hybridization, Southeran, Northern and western Hybridizations., Diagnostic application of DNA probes.

Module 3: POLYMERASE CHAIN REACTION ***(09 Periods)***

Polymerase chain reaction: Sources of DNA for PCR, Clinical significance, Components of PCR, The PCR protocol, PCR equipment, determination of length of cDNA, Quality Control in PCR, Practical applications of PCR and Nested PCR

Module 4: GENE CLONING ***(09 Periods)***

Gene cloning: gene cloning methodology, synthesis of cDNA., Probe labelling: Radioactive labelling and Nonradioactive labelling, Applications of DNA (RNA) Probes, The DNA-Probe Methodology., Florescent in situ hybridization technique., Other methods of amplification of nucleic acid: reverse-transcription PCR, Multiplex PCR, Real-Time PCR.

Module 5: AMPLIFICATIONS AND BIOCHIP TECHNOLOGY ***(09 Periods)***

Transcription-mediated amplification, Nucleic acid sequence-based amplification, Standard-displacement amplification., Cleavage/Invader technology, Signal amplification methods, hybridization arrays (Biochip technology), Laboratory experiments.

Total Periods: 45

EXPERIENTIAL LEARNING

LIST OF EXPERIMENTS:	
1.	To perform RNA Isolation from human blood.
2.	To perform RNA Isolation from tissue sample.
3.	To Perform DNAs treatment and RNA purification.
4.	To perform Agarose gel electrophoresis
5.	To perform RNA Isolation from bacteria.
6.	Determination of plasma HIV RNA (Viral load)

7.	Electrophoretic separation of cDNA by using southern blot technique.
8.	Quantitation of separated cDNA by using Electronic UV Transilluminator
9.	Study of Real-time PCR.
10.	Determine the viral load monitoring methods.
11.	Detection of Mycobacterium tuberculosis by Transcriptional Mediated amplification.

RESOURCES

TEXT BOOKS:

1. Praful Godkar, Textbook of Medical Laboratory Technology – Clinical Laboratory Sciences and Molecular Diagnosis, Balani Publications, Volume 1 and 2, Edition 3, 2014
2. Dr. Poonam Agrawal, LIR:Cell and Molecular Biology, Wolters Kluwer India Pvt Ltd, Edition 4, 2022.

REFERENCE BOOKS:

1. Lela Buckingham, Molecular Diagnostic: Fundamentals, Methods and clinical aplications, F.A. Davis Company, Edition 3, 2019.
2. Robert J. Slater, Experiments in Molecular Biology, Humana Press Inc, Edition 3, 1986.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=BbA-pHyirzo
2. https://www.youtube.com/watch?v=vl6Vlf2thvI
3. https://www.youtube.com/watch?v=a5jmdh9AnS4
4. https://www.youtube.com/watch?v=MifDx417SDs

WEB RESOURCES:

1. https://en.wikipedia.org/wiki/Monoclonal_antibody
2. https://www.thermofisher.com/in/en/home/life-science/dna-rna-purification-analysis/rna-extraction/rna-applications/rna-structure-function-studies.html
3. https://www.elprocus.com/what-is-a-biochip-and-types-of-biochips/

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UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22EC101701	AI IN HEALTHCARE	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Concepts of Artificial Intelligence (AI) in Healthcare; The Present State and Future of AI in Healthcare Specialties; The Role of Major Corporations in AI in Healthcare; Applications of AI in Healthcare.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand the fundamental concepts of AI in Healthcare sector.

CO2 Analyse the present state and future of AI in Healthcare specialties for different scenarios.

CO3 Apply design concepts and metrics for AI in Healthcare.

CO4 Demonstrate basic concepts and terminologies of future applications of Healthcare in AI.

CO5 Develop AI applications through AI techniques for healthcare

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	2	-	-	-	-	-	-
CO2	2	3	-	2	-	2	2	-	-	-
CO3	2	-	2	2	-	-	-	-	-	-
CO4	2	-	-	-	2	2	-	-	-	-
CO5			3							
Course Correlation Mapping	2	-	3	2	2	2	2	-	-	-

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO ARTIFICIAL INTELLIGENCE IN HEALTHCARE ***(08 Periods)***

Introduction to AI in Healthcare, Benefits & Risks, AI in the health sector, AI versus human intelligence, The future of AI in health sector, AI & Neural networks.

Module 2: THE PRESENT STATE & FUTURE OF AI IN HEALTHCARE SPECIALTIES ***(10 Periods)***

Artificial Intelligence in: preventive healthcare, Radiology, Pathology, Surgery, Anesthesiology, Psychiatry, Cardiology, Pharmacy, Dermatology, Dentistry, Orthopedics, Ophthalmology.

Module 3: THE ROLE OF MAJOR CORPORATIONS IN AI IN HEALTHCARE ***(08 Periods)***

IBM Watson, The role of Google & Deep mind in AI in Healthcare, Baidu, Facebook & AI in Healthcare, Microsoft & AI in Healthcare.

Module 4: FUTURE OF HEALTHCARE IN AI ***(10 Periods)***

Evidence-based medicine, personalized medicine, Connected medicine, Virtual Assistants, Remote Monitoring, Medication Adherence, Accessible Diagnostic Tests, Smart Implantables, Digital Health and Therapeutics, Incentivized Wellness, Block chain, Robots, Robot-Assisted Surgery, Exoskeletons, Inpatient Care, Companions, Drones, Smart Places, Smart Homes, Smart Hospitals.

Module 5: APPLICATIONS OF AI IN HEALTHCARE ***(09 Periods)***

Case Study 1: AI for Imaging of Diabetic Foot Concerns and Prioritization of Referral for Improvements in Morbidity and Mortality.

Case Study 2: Outcomes of a Digitally Delivered, Low-Carbohydrate, Type 2 Diabetes Self-Management.

Case Study 3: Delivering A Scalable and Engaging Digital Therapy.

Case Study 4: Improving Learning Outcomes for Junior Doctors through the Novel Use of Augmented and Virtual Reality for Epilepsy.

Case Study 5: Big Data, Big Impact, Big Ethics: Diagnosing Disease Risk from Patient Data.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Analyze how the artificial intelligence is used to predict the disease result and Prognosis Assessment of a patient.
2. How does drug discovery happen and how does AI is helping in drug discovery and Labs.
3. Justify that artificial intelligence provide engineering solutions for early detection and Diagnosis of diseases.
4. Demonstrate the prediction of bladder volume of a patient.

(Note: It's an indicative one. Course Instructor may change activities and shall be reflected in course Handout)

RESOURCES

TEXT BOOKS:

1. Dr. Parag Mahajan, *Artificial Intelligence in Healthcare*, Med Manthra Publications, First Edition 2019.
2. Arjun Panesar, *Machine Learning and AI for Healthcare Big Data for Improved Health*, Apress Publications, 2019.

REFERENCE BOOKS:

1. Michael Matheny, Sonoo Thadaney Israni, Mahnoor Ahmed, and Danielle Whicher, *Artificial Intelligence in Health Care: The Hope, the Hype, the Promise, the Peril*, National Academy of Medicine Publication, First Edition 2019.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=-aHBwTQQyNU
2. https://intellipaat.com/blog/artificial-intelligence-in-healthcare/

WEB RESOURCES:

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6616181/
2. https://www.ibm.com/topics/artificial-intelligence-healthcare
3. https://builtin.com/artificial-intelligence/artificial-intelligence-healthcare

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22DS101701	**BIOINFORMATICS**	3	-	-	-	3

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION: This course focus on Biological Data Acquisition, Databases, Data Processing, Methods of Analysis, Applications of Bio-informatics.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Understand basic biological data acquisition in bioinformatics.
CO2 Identify the proper databases for the information search by choosing the biological databases and also submission and retrieval of data from databases.
CO3 Analyze the results of bioinformatics data using text and sequence-based searching techniques.
CO4 Analyze the secondary and tertiary structures of proteins by applying different alignment programs
CO5 Design biological databases by using contextual knowledge on bioinformatics.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	-	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-
CO3	2	3	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-
CO5	3	2	3	3	3	-	-	-	-	-
Course Correlation Mapping	3	3	3	3	3	-	-	-	-	-

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: BIOLOGICAL DATA ACQUISITION ***(09 Periods)***

Biological information, Retrieval methods for DNA sequence, protein sequence and protein structure information

Module 2: DATABASES ***(09 Periods)***

Format and Annotation: Conventions for database indexing and specification of search terms, Common sequence file formats. Annotated sequence databases - primary and secondary sequence databases, protein sequence and structure databases.

Module 3: DATA PROCESSING ***(09 Periods)***

Data – Access, Retrieval and Submission: Standard search engines; Data retrieval tools – Entrez, DBGET and SRS; Submission of (new and revised) data; Sequence Similarity Searches: Local and global. Distance metrics. Similarity and homology. Scoring matrices, PAM and BLOSUM

Module 4: METHODS OF ANALYSIS ***(09 Periods)***

Dynamic programming algorithms, Needleman-Wunsch and Smith-waterman.Heuristic Methods of sequence alignment, FASTA and BLAST; Multiple Sequence Alignment and software tools for pair wise and multiple sequence alignment, CLUSTAL program, Prediction of Tertiary structure of proteins.

Module 5: APPLICATIONS ***(09 Periods)***

Genome Annotation and Gene Prediction; ORF finding; Phylogenetic Analysis, Genomics, Proteomics, Genome analysis – Genome annotation, DNA Microarray, computer aided drug design (CADD).

Total Periods: 45

EXPERIENTIAL LEARNING

1. Calculate the dynamic programming matrix and one or more optimal alignment(s) for the sequences GAATTC and GATTA, scoring +2 for a match, −1 for a mismatch and with a linear gap penalty of d = 2.
2. Determine whether the RNA string GGACCACCAGG should be folded into two substructures.
3. Discuss how to carry out the multiple sequence alignment of the following three sequences: TTTTAAAA, AAAACCCC, CCCCTTTT.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. Lesk, A. K., *Introduction to Bioinformatics*, Oxford University Press, 4th Edition, 2013
2. Dan Gusfield, *Algorithms on Strings, Trees and Sequences: Computer Science and Computational Biology*, Cambridge University Press, 1997.

REFERENCE BOOKS:

1. Baldi, P. and Brunak, S., *Bioinformatics: The Machine Learning Approach*, MIT Press, 2nd Edition, 2001.
2. Mount, D.W., *Bioinformatics Sequence and Genome Analysis*, Cold Spring Harbor Laboratory Press, 2nd Edition, 2004.
3. Tindall, J., *Beginning Perl for Bioinformatics: An introduction to Perl for Biologists*, O'Reilly Media, 1st Edition, 2001.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=liNblw4x50E
2. https://www.youtube.com/watch?v=eZfyWdHnzR0

WEB RESOURCES:

1. https://www.britannica.com/science/bioinformatics
2. https://www.ebi.ac.uk/training/online/courses/bioinformatics-terrified/what-bioinformatics/

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22SS101701	**CONSTITUTION OF INDIA**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides and in-depth knowledge about Constitution of India's Preamble and its Philosophy; Union Legislature; Federalism in India; Judiciary and Public Services; Nation Building. The students can gain first-hand information and knowledge about these dynamics and accordingly act based on these sources in their professional and routine activities.

COURSE OUTCOMES: After successful completion of this course, the students will be able to:

CO1: Demonstrate knowledge in the Parliamentary proceedings, Election Commission, Public Services and Foreign Policy of India.

CO2: Apply the reasoning informed by the various aspects of the Constitution and its provisions to assess societal issues and the consequent responsibilities relevant to the professional engineering practice.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	1	-	-	-	-	3	2	-	-	-
CO2	2	-	-	-	-	3	-	3	-	-
Course Correlation Mapping	**2**	**-**	**-**	**-**	**-**	**3**	**2**	**3**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: PREAMBLE AND ITS PHILOSOPHY ***(09 Periods)***

Introduction to Indian Constitution; Evolution of Indian Constitution; preamble and its philosophy

Module 2: UNION LEGISLATURE ***(09 Periods)***

The Parliament, Parliamentary Structure, Process of Legislation; President of India – Powers and Functions; Prime Minister and Council of Ministers; Constitution Amendment Procedure.

Module 3: FEDERALISM IN INDIA ***(09 Periods)***

Centre-State Administrative Relationship; Governors – Powers and Functions; State Legislature - Composition and powers; Chief Ministers - Powers and Functions; The Election Commission – Powers and Functions.

Module 4: JUDICIARY AND PUBLIC SERVICES ***(09 Periods)***

The Union Judiciary - Supreme Court and High Court; Fundamental Rights and Duties All India Services - Central Civil Services -State Services - Local Services.

Module 5: INTERNATIONAL PARTICIPATION ***(09 Periods)***

Foreign Policy of India; International Institutions Influence: UNO, WTO, WHO, SAARC, International Summits: BRICS, NSS, UNEP – India's Role in International Negotiations; Environmentalism in India.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Review newspapers and submit a report on critical analysis of Indian Civil Servants exercise of powers, in the awake of constitutionally assigned authority.
2. Visit your village Panchayat office or Municipality office and generate a report on your observations about maintained Constitutional symbolism.
3. Watch few videos on recent Indian Independence Day and Republic Day celebrations as marked in New Delhi and present a detailed report, by considering the following aspects:
    a) Comparatively analyze the speeches of the President of India and Prime Minister of India as delivered on these two occasions.
    b) Compare these two events relevance in terms of Indian Armed Forces presence.
    c) Observe, compare and analyse 'flag code' relevance as marked in these two events.
4. Watch a few videos on recent 'proceedings' of any state Legislative Assembly session and submit a detailed report.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. Briji Kishore Sharma, *Introduction to the Constitution of India*, Prentice Hall of India, 2005

REFERENCE BOOKS:

1. Mahendra Pal Singh,V. N. Shukla's, *Constitution of India*, Eastern Book Company, 2011.
2. Pandey J. N., *Constitutional Law of India*, Central Law Agency, 1998

VIDEO LECTURES:

1. Doctrine of Basic Structure: https://www.youtube.com/watch?v=cvUf9ZeEe8Y
2. Significance of the Constitution: https://www.youtube.com/watch?v=vr1Dc_-ZKbQ

WEB RESOURCES:

1. The Constitution of India: https://www.youtube.com/watch?v=of2SoO8i8mM
2. Protection of Constitutional Democracy: https://www.youtube.com/watch?v=smJ99cdPrns

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22CM101702	**COST ACCOUNTING AND FINANCIAL MANAGEMENT**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Cost accounting; cost sheet & preparation of cost sheet; standard costing & variance analysis; financial management & ratio analysis; introduction to investment**.**

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Demonstrate the concepts of Cost Accounting and Management Accounting and the elements of costing.

CO2 Determine the Cost of Production for pricing decisions.

CO3 Apply the Standard Costing and Variance techniques for the control of the cost of production

CO4 Analyze the Profitability and financial condition of an organization using Ratios.

CO5 Apply Capital Budgeting techniques for making investment decisions in an organization.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3				2			1		
CO2	3				2			1		
CO3	3				2			1		
CO4	3				2			1		
CO5	3				2			1		
Course Correlation Mapping	**3**				**2**			**1**		

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: COST ACCOUNTING ***(09 Periods)***

Meaning of Cost and Cost Accounting, Objectives, Scope, Advantages, and Disadvantages – Cost Accounting *Vs* Management Accounting – Elements of Costing – Installation of costing system – Material Control, Labor Control, Overhead Control.

Module 2: COST SHEET & PREPARATION OF COST SHEET (09 Periods)

Analysis of Cost – Preparation of cost sheet, estimate, tender, and quotation (Simple problems) – Importance of Costing while pricing the products

Module 3 STANDARD COSTING & VARIANCE ANALYSIS (09 Periods)

Introduction to Standard Costing & Variances – Variance Analysis: Material variances, Labor variances (Simple Problems).

Module 4 FINANCIAL MANAGEMENT & RATIO ANALYSIS (09 Periods)

Meaning, Objectives - Nature and Scope, Importance of FM – Ratio Analysis**:** Types of Ratios: Solvency Ratios, Liquidity Ratios, Turnover Ratios, and Profitability Ratios - Financial Statement Analysis through Ratios (Simple Problems).

Module 5 INTRODUCTION TO INVESTMENT ***(09 Periods)***

Investment - Meaning and Definition- concept of risk and returns - Capital budgeting techniques – Security Analysis and Portfolio Management (Basic concepts).

Total Periods: 45

EXPERIENTIAL LEARNING

1. Prepare a report on the role of cost accountants in the growth of a company.
2. To visit the manufacturing unit to observe how they used various techniques for analyzing the financial health of a company.
3. Prepare a report on factors influencing the form of business organization.
4. Prepare the cost sheet with practical examples of any two manufacturing companies.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. S.P. Jain and K.L. Narang: *Cost Accounting*, Kalyani Publishers, Ludhiana, 10th edition, 2016.
2. I.M. Pandey, *Financial Management*, Vikas Publishing House Pvt. Ltd., 14th edition, 2016.

REFERENCE BOOKS:

1. The Institute of Company Secretaries of India, *Cost and Management Study Material*, New Delhi.
2. CA Saravana Prasath, *Cost Accounting and Financial management*, Wolters Kluwer India Pvt. Ltd., New Delhi, 2018.

VIDEO LECTURES:

1 https://www.youtube.com/watch?v=ESqO8sFgQa0&list=PLLhSIFfDZcUVE2kzOhEubO9rkvUOAgZbz

2 https://www.youtube.com/watch?v=tzasFmP1CpAhttps://www.youtube.com/watch?v=tzasFmP1CpA

WEB RESOURCES:

1 https://www.tutorialspoint.com/accounting_basics/management_versus_cost_accounting.htm

2 https://www.netsuite.com/portal/resource/articles/financial-management/financial-management.shtml

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22MG101701	**ENTREPRENEURSHIP FOR MICRO, SMALL AND MEDIUM ENTERPRISES**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: To understand the setting up and management of MSMEs and initiatives of Government and other institutions support for growth and development of MSMEs

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the basic of SME and challenges of MSMEs

CO2. Explain the opportunities to Set-Up SSI/SME Units and role of rural & women entrepreneurship.

CO3. Illustrate roles of various institutions supporting MSMEs.

CO4. Understand Management of MSME, NPA & sickness units

CO5. Evaluate role of Government in Promoting Entrepreneurship

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	2	1	2	1	-	-	-	-	-	-
CO2	1	1	2	-	-		2		1	
CO3	2	2	1	-	-	-	-	1	-	-
CO4	3	1	2	-	-	-	-	-	-	-
CO5	2	2	1	-	-	1	-	-	-	-
Course Correlation Mapping	**2**	**2**	**2**	**2**	**1**	**1**	**2**	**1**	1	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: Introduction2 ***(07 Periods)***

Concept & Definition, Role of Business in the modern Indian Economy SMEs in India, Employment and export opportunities in MSMEs. Issues and challenges of MSMEs

Module 2: MSME Setting ***(09 Periods)***

Identifying the Business opportunity, Business opportunities in various sectors, formalities for setting up an enterprise - Location of Enterprise – steps in setting up an enterprise – Environmental aspects in setting up, Incentives and subsidies.

Module 3: MSMEs Supporting Institutions ***(09 Periods)***

Forms of Financial support, Long term and Short term financial support, Sources of Financial support, Development Financial Institutions, Investment Institutions, Central level institutions, State level institutions, Other agencies, Commercial Bank – Appraisal of Bank for loans

Module 4: Management of MSME ***(10 Periods)***

Management of Product Line; Communication with clients – Credit Monitoring System - Management of NPAs - Restructuring, Revival and Rehabilitation of MSME, Problems of entrepreneurs – sickness in SMI – Reasons and remedies –– Evaluating entrepreneurial performance

Module 5: Entrepreneurship Promotion ***(10 Periods)***

MSME policy in India, Agencies for Policy Formulation and Implementation: District Industries Centers (DIC), Small Industries Service Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship & Small Business Development (NIESBUD), National Entrepreneurship Development Board (NEDB)

Total Periods: 45

EXPERIENTIAL LEARNING

1. Present a case study on MSMEs Business Strategies.
2. Collect the data about nearby MSMEs and Present their structures in a PPT
3. Discuss in the group MSMEs opportunities in terms of Orientation and Develop mentation.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. Vasant Desai, *Small Scale Industries and Entrepreneurship*, Himalaya Publishing House, 2003..
2. Poornima M Charanthimath, *Entrepreneurship Development Small Business Enterprises*, Pearson, 2006.

REFERENCE BOOKS:

1. Suman Kalyan Chaudhury, *Micro Small and Medium Enterprises in India Hardcover*, Raj Publications, 2013.
2. Aneet Monika Agarwal, *Small and medium enterprises in transitional economies, challenges and opportunities*, DEEP and DEEP Publications
3. Paul Burns & Jim Dew Hunt, *Small Business Entrepreneurship*, Palgrave Macmillan publishers, 2010.

VIDEO LECTURES:

1. https://sdgs.un.org/topics/capacity-development/msmes
2. https://blog.tatanexarc.com/msme/msme-schemes-in-india-for-new-entrepreneurs-and-start-ups/

WEB RESOURCES:

4. ncert.nic.in/textbook/pdf/kebs109.pdf
5. https://www.jetir.org/papers/JETIR1805251.pdf

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22CB101703	**FORENSIC SCIENCE**	3	-		-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course provides a detailed discussion on Concepts of Forensic Science, Tools and Techniques in Forensic Science, Forensic Photography, Crime Scene Management, Crime Scene Management Laws and Forensic Science.

COURSE OUTCOMES: *After successful completion of the course, students will be able to*:

CO1 Understand the basic concepts of Forensic science.
CO2 Apply various tools and techniques in forensic science for crime investigation.
CO3 Understand Forensic Photography fundamentals.
CO4 Perform Crime scene investigation, scene reconstruction and prepare reports.
CO5 Understand Legal aspects of Forensic Science.

CO-PO Mapping Table:

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3									
CO2	3	3	2	2	2					
CO3	3	3								
CO4	3	3	2	2	2					
CO5	3	3	2	2	2					
Course Correlation Mapping	**3**	**3**	**2**	**2**	**2**					

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION ***(09 Periods)***

Introduction, Need, Scope, Concepts and Significance of Forensic Science, History and Development of Forensic Science, Laws and Basic principles of Forensic Science, Branches of forensic science, Organizational set-up of a Forensic Science Laboratory. Investigative strategies. Expert testimony and eye-witness report.

Module 2: TOOLS AND TECHNIQUES IN FORENSIC SCIENCE ***(09 Periods)***

Basic principles of microscopy, spectroscopy, chromatography, Electrophoresis, Enzyme_Linked Immunosorbent Assay (ELISA), Radio Immuno Assay (RIA). Measuring and optical instruments. Research methodologies; Formation of research design on a specific problem. Central tendency and Dispersion. Test of significance. Analysis of variance, Correlation and Regression.

Module 3: FORENSIC PHOTOGRAPHY ***(8 Periods)***

Basic principles of Photography, Techniques of black & white and color photography, cameras, lenses, shutters, depth of field, film; exposing, development and printing techniques; Different kinds of developers and fixers; UV, IR, fluorescence illumination guided photography; Modern development in photography- digital photography, working and basic principles of digital photography; Surveillance photography. Videography and Crime Scene & laboratory photography.

Module 4: CRIME SCENE MANAGEMENT ***(11 Periods)***

Crime scene investigations, protecting and isolating the crime scene; Documentation, sketching, field notes and photography. Searching, handling and collection, preservation and transportation of physical evidences, Chain of custody and Reconstruction of scene of crime. Report writing.

Module 5: LAW AND FORENSIC SCIENCE ***(8 Periods)***

Legal aspects of Forensic Science: Forensic Science in the Criminal Justice System, The Criminal Investigation Process, Production of Evidence: The Subpoena, The Rules of Evidence, Authentication of Evidence: The Chain of Custody, The Admissibility of Evidence, Laboratory Reports, Examples of Analysis and Reports, Expert Testimony, Getting into Court, Testifying, Being a Witness and an Expert, Considerations for Testimony.

Total Periods: 45

EXPERIENCIAL LEARNING

1. Study of Computer Forensics and different tools used for forensic investigation
2. **Identify and list the steps for hiding and extract any text file behind an image file/ Audio file using Command Prompt**

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXT BOOKS:

1. Houck M.M and Siegel J.A, *Fundamentals of Forensic Science*, Elsevier, 2nd edition, 2010.

2. Sharma B.R, *Forensic Science in Criminal Investigation and Trials*, Universal Publishing Co., New Delhi, 2003.

REFERENCE BOOKS:

1. Nanda B.B and Tewari, R.K, *Forensic Science in India- A vision for the Twenty First Century*, Select Publisher, New Delhi, 2001.
2. James, S.H and Nordby, J.J, *Forensic Science- An Introduction to Scientific and Investigative Techniques*, CRC Press, USA, 2003.
3. Saferstein, Criminalistics, *An Introduction of Forensic Science*, Prentice Hall Inc, USA,2007.
4. Barry, A.J. Fisher, *Techniques of Crime Scene Investigation*, CRC Press, NewYork, 7th edition, 2003.

VIDEO LECTURES:

1. https://nptel.ac.in/courses/106106178
2. https://www.youtube.com/watch?v=X5fo1H7bc0g

WEB RESOURCES:

1. https://www.nist.gov/forensic-science
2. https://www.coursera.org/learn/forensic-science

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22SS101704	**INDIAN HISTORY**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Introduction; Ancient India; Classical and Medieval era; Modern India; India after independence.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Demonstrate contextual knowledge in the evolution of ancient and medieval Indian History and acquire an awareness of societal and cultural transformation.

CO2 Analyze the situations before and after Independence and assess the societal reforms implemented in India after Independence.

CO3 Practice culture transformations and appreciate its influence to adapt themselves in global scenarios.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	-	-	-	-	1	-	-	-	-
CO2	1	2	-	-	-	1	-	-	-	-
CO3	1	1	-	-	-	2	-	-	-	-
Course Correlation Mapping	2	1	-	-	-	2	-	-	-	-

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: INTRODUCTION TO INDIAN HISTORY ***(08 Periods)***

Elements of Indian History; History Sources: Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography; Sociological concepts-structure, system, organization, social institutions, Culture and social stratification (caste, class, gender, power), State& Civil Society.

Module 2: ANCIENT INDIA ***(09 Periods)***

Mohenjo-Daro civilization; Harappa civilization; Mauryan Empire.

Module 3: CLASSICAL & MEDIEVAL ERA ***(12 Periods)***

Classic Era (200 BC - 1200 AD); Hindu - Islamic Era (1200 - 1800 AD).

Module 4: MODERN INDIA ***(06 Periods)***

Age of Colonialism (17th - 19th centuries); First war of Indian Independence; Freedom Struggle (1857-1947)

Module 5: INDIA AFTER INDEPENDENCE (1947 -) ***(10 Periods)***

The Evolution of the Constitution and Main Provisions; Consolidation of India as a Nation; Politics in the States; Indian economy; Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and Inclusion, Changing Nature of Work and Organization.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Prepare a write-up on how to safeguard ancient monuments.
2. Analyze the most famous historically important place you visited.
3. Prepare a presentation on the ancient Seven Wonders of the World with their significance and how they are destroyed.
4. Prepare a presentation on "Wars of the past not only destroyed people and their livelihood but also the people's tradition and culture."
5. Prepare a poster on " Continents that No Longer Exist" with causes

(Note: It's an indicative one. Course Instructor may change activities and shall be reflected in course Handout)

RESOURCES

TEXT BOOKS:

1. K. Krishna Reddy, *Indian History,* Tata McGraw-Hill, 21st reprint, 2017.

REFERENCE BOOKS:

1. Guha, Ramachandra, *India after Gandhi*, Pan Macmillan, 2007.
2. Romila Thapar, *Early India***,** Penguin India, New Delhi 2002.

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22SS101705	**INDIAN TRADITION AND CULTURE**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Basic traits of Indian Culture; Humanistic Reforms under Jainism and Buddhism; Culture in the medieval period; Socio Religious reforms in Indian Culture; Reform movements for harmonious relations.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Demonstrate knowledge of Vedic and Upanishadic culture and society to consider human aspirations, values and theories.

CO2 Understand the contributions of Buddhism and Jainism to Indian culture.

CO3 Examine the cultural conditions and achievements of India under Mouryas and Guptas.

CO4 Analyze social religious reforms and reform movements.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	-	-	-	-	1	-	-	-	-
CO2	3	-	-	-	-	1	-	-	-	-
CO3	2	-	-	-	-	3	-	-	-	-
CO4	2	-	-	-	-	3	-	-	-	-
Course Correlation Mapping	**3**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: BASIC TRAITS OF INDIAN CULTURE ***(08 Periods)***

Meaning and definition and various interpretations of culture - Culture and its features - The Vedic and Upanishad culture and society - Human aspirations and values in these societies - Chaturvidha purushardhas, Chaturashrma and Chaturvarna theory.

Module 2: HUMANISTIC REFORMS UNDER JAINISM AND BUDDHISM ***(09 Periods)***

Salient features of Jainism - contributions of Jainism to Indian culture - Contributions of Aachaarya and Mahaapragya - Buddhism as a humanistic culture - The four noble truths of Buddhism - Contributions of Buddhism to Indian culture.

Module 3: CULTURE IN THE MEDIEVAL PERIOD ***(09 Periods)***

Unifications of India under Mouryas and Guptas and their cultural achievements - Cultural conditions under satavahanas - Contributions to Pallavas and cholas to art and cultural achievements of Vijayanagara rulers

Module 4: SOCIO RELIGIOUS REFORMS IN INDIAN CULTURE ***(09 Periods)***

Western impact on India - Introduction of Western education - social and cultural awakening and social reform movements of Rajaramohan Roy - Dayanandha Saraswathi - Anne Besant (theosophical society).

Module 5: REFORM MOVEMENTS FOR HARMONIOUS RELATIONS ***(09 Periods)***

Vivekananda, Eswarchandravidyasagar and Veeresalingam - emancipation of women and struggle against caste - Rise of Indian nationalism - Mahatma Gandhi – Non-violence and satyagraha and eradication of untouchability.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Identify different cultural festivals of Indian States and prepare a write-up on their uniqueness.
2. India has a rich history with numerous architectural wonders. Prepare a report on any three famous architectural wonders in India.
3. Explore the diverse flavors of Indian cuisine and prepare a poster on the different dishes and their distinctiveness.
4. India is a country of Unity in Diversity. Make a PowerPoint presentation on different traditional dresses of various cultural people.

(Note: It's an indicative one. Course Instructor may change activities and shall be reflected in course Handout)

RESOURCES

TEXT BOOKS:

1. Valluru Prabhakaraiah, *Indian Heritage and Culture*, Neelkamal Publications Pvt. Ltd. Delhi, 1/e, reprint 2015.

REFERENCE BOOKS:

1. L. P. Sharma, *History of Ancient India*, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
2. L. P. Sharma, *History of Medieval India*, Konark Publishers, Pvt. Ltd. New Delhi, 2010.
3. The Cultural Heritage of India Vol-I, II, III, IV, V, The Ramakrishna Mission Institute of Culture, Calcutta

University Elective

Course Code	Course Title	L	T	P	S	C
22ME101704	MANAGING INNOVATION AND ENTERPRENEURSHIP	3	-	-	-	3

Pre-Requisite -
Anti-Requisite -
Co-Requisite -

COURSE DESCRIPTION:
Evolution of entrepreneurship from economic theory Managerial and entrepreneurial competencies; Concepts of Shifting Composition of the Economy Purposeful Innovation & Sources of Innovative Opportunity; The Innovation Process; Innovative Strategies; Entrepreneurial Motivation; Entrepreneurs versus inventors; Ethics and International Entrepreneurship; Strategic Issues in International Entrepreneurship; Problem solving Innovation and Diversification

COURSE OUTCOMES:
After successful completion of the course, students will be able to:

CO1. Demonstrate the principles of innovation process for establishing Industrial ventures.
CO2. Identify and analyze the gaps in an organization for innovation in the context of developed economies
CO3. Develop a comprehensive and well-planned business structure for a new venture.
CO4. Demonstrate knowledge on intellectual property rights, patents, trademarks, copyrights, trade secrets and commercialization of intellectual property.
CO5. Apply ethics in constructive innovation framework and problem solving.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	1		1	1	1	1		
CO2	3	2	1		1					
CO3	3	3	1	1	1					
CO4	3	2	1	1	1	1				
CO5	3	3	3	1	1	1				
Course Correlation Mapping	**3**	**2**	**1**	**1**	**1**	**1**	**1**	**1**		

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: CREATIVITY AND INNOVATION ***(09 Periods)***

Introduction, Levels of innovation, Purposeful innovation and the sources of innovative opportunity, The innovation process, Innovative strategies, Strategies that aim at introducing and innovation, Dynamics of ideation and creativity – Inbound, Outbound; Context and process of new product development, Theories of outsourcing.

Module 2: PARADIGMS OF INNOVATION ***(09 Periods)***

Systems approach to innovation, Innovation in the context of developed economies and Emerging economies, Examining reverse innovation and itsapplication,Performancegap,Infrastructuregap,Sustainabilitygap,Regulatory gap, Preference gap, organizational factors effecting innovation at firm level.

Module 3: SOUCES OF FINANCE AND VENTURE CAPITAL ***(09 Periods)***

Importance of finance, Comparison of venture capital with conventional development capital, Strategies of venture funding, Investment phases, Investment process, Advantages and disadvantages of venture capital, Venture capital developments in India.

Module 4: INTELLECTUAL PROPERTY INNOVATION AND ENTREPRENEURSHIP ***(09 Periods)***

Introduction to Entrepreneurship, Evolution of entrepreneurship from economic theory, Managerial and entrepreneurial competencies, Entrepreneurial growth and development, Concepts, Ethics and Nature of International Entrepreneurship, Intellectual property – forms of IP, Patents, Trademarks, Design registration, Copy rights, Geographical indications, Patent process in India.

Module 5: OPEN INNOVATION FRAME WORK & PROBLEM SOLVING ***(09 Periods)***

Concept of open innovation approach, Difference between open innovations and Cloud innovation approaches, Limitations and Opportunities of open innovation frame work, Global context of strategic alliance, Role of strategic alliance, Problem Identification and Problem Solving, Innovation and Diversification

Total Periods:45

EXPERIENTIAL LEARNING

1. Identify the Innovative Marketing Strategies for Startups
2. Identify the Coca-cola Company Intellectual Property Rights

(Note: It's an indicative one. Course instructor may change the activities and the same shall be reflected in course handout)

CASE STUDIES/ARTICELS:

Contemporary relevant case studies/ Articles will be provided by the course instructor at the beginning.

1. Tesla Inc.: Disrupting the Automobile Industry
   This case study examines how Tesla Inc. disrupted the traditional automobile industry through its innovative electric vehicles and sustainable energy solutions. It discusses the sources of innovative opportunity that Tesla leverages, the ideation and creativity dynamics involved in new product development, and the strategies that the company uses to introduce and market its innovations.
2. Google Inc.: Innovation in Developed Economies
   This case study explores how Google Inc. became a global leader in the technology industry through its innovative search engine, advertising, and cloud computing solutions. It highlights the performance gap that Google addressed, the regulatory and sustainability gaps that it leveraged, and the impact of its innovation strategies on the company's growth and profitability.

3. Flipkart: From Startup to Unicorn
   This case study examines how Flipkart, an Indian e-commerce company, secured venture capital funding to become one of the largest online marketplaces in India. It discusses the importance of finance in entrepreneurship, the advantages and disadvantages of venture capital, and the strategies that Flipkart used to attract venture funding.

4. Patanjali Ayurved: Building a Brand through Intellectual Property
   This case study explores how Patanjali Ayurved, an Indian consumer goods company, built a strong brand through its intellectual property strategies. It discusses the forms of IP that Patanjali leverages, the patent process in India, and the impact of IP on the company's growth and profitability.

5. Procter & Gamble: Innovation through Open Innovation
   This case study analyzes how Procter & Gamble, a global consumer goods company, leveraged open innovation to achieve unprecedented success in product development and marketing. It discusses the difference between open and cloud innovation approaches, the limitations and opportunities of open innovation, and the role of strategic alliances in global innovation.

RESOURCES

TEXT BOOKS:

1. Vinnie Jauhari, Sudhanshu Bhushan, *Innovation Management*, Oxford University Press, 1st Edition, 2014.
2. Drucker, P.F., *Innovation and Entrepreneurship*, Taylor & Francis, 2nd Edition, 2007.

REFERENCE BOOKS:

1. Robert D Hisrich, Claudine Kearney, *Managing Innovation and Entrepreneurship,* Sage Publications, 1st Edition, 2014.
2. V.K. Narayanan, *Managing Technology and Innovation for Competitive Advantage,* Pearson India, 1st Edition, 2002.

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=wWsl48VLfVY
2. https://www.youtube.com/watch?v=dDpQ9ALKX0U
3. https://www.youtube.com/watch?v=Eu_hkxkJGTg

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22LG201701	**PERSONALITY DEVELOPMENT**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course gives awareness to students about the various dynamics of personality development.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Demonstrate knowledge in Self-Management and Planning Career

CO2. Analyze the functional knowledge in attitudes and thinking strategies

CO3. Learn and apply soft skills for professional success.

CO4. Function effectively as an individual and as a member in diverse teams

CO5. Communicate effectively in public speaking in formal and informal situations.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	2	1	-	-	-	-	-	-	-	-
CO2	2	3	-	-	-	-	-	-	-	-
CO3	2	2	-	-	3	-	-	-	-	2
CO4	1	1	-	-	-	-	-	-	3	3
CO5	-	-	-	-	-	-	-	-	-	3
Course Correlation Mapping	2	2	3	-	3	-	-	-	3	3

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: SELF-ESTEEM & SELF-IMPROVEMENT ***(09 Periods)***

Know Yourself – Accept Yourself; Self-Improvement: Plan to Improve - Actively Working to Improve Yourself- Exercises- case studies

Module 2: DEVELOPING POSITIVE ATTITUDES ***(09 Periods)***

How Attitudes Develop – Attitudes are Catching – Improve Your Attitudes – Exercises- case studies

Module 3 SELF-MOTIVATION & SELF-MANAGEMENT ***(09 eriods)***

Show Initiative – Be Responsible Self-Management; Efficient Work Habits – Stress Management – Employers Want People Who can Think – Thinking Strategies- Exercises- case studies

Module 4 GETTING ALONG WITH THE SUPERVISOR ***(09 Periods)***

Know your Supervisor – Communicating with your Supervisor – Special Communication with your Supervisor – What Should you Expect of Your Supervisor? – What your Supervisor expe of you - Moving Ahead Getting Along with your Supervisor- Exercises- case studies

Module 5 WORKPLACE SUCCESS ***(09 Periods)***

First Day on the Job – Keeping Your Job – Planning Your Career – Moving Ahead- Exercises- case studies

Total Periods: 45

EXPERIENTIAL LEARNING

6. List out the self-improvements in you on the charts and explain in detail.
7. Discuss different famous personalities and their attitudes.
8. Describe different personalities with respect to self-motivation and self-management.
9. Imagine you are a supervisor and illustrate different special communications.
10. Assume and Interpret different experiences on the first day of your job.

(Note: It's an indicative one. Course instructor may change the activities and the same shall be reflected in course handout)

RESOURCES

TEXTBOOK:

1. Harold R. Wallace and L. Ann Masters, *Personal Development for Life and Work*, Cengage Learning, Delhi, 10th edition Indian Reprint, 2011. (6th Indian Reprint 2015)
2. Barun K. Mitra, *Personality Development and Soft Skills,* Oxford University Press, 2011.

REFERENCE BOOKS:

1. K. Alex, *Soft Skills*, S. Chand & Company Ltd, New Delhi, 2nd Revised Edition, 2011.
2. Stephen P. Robbins and Timothy A. Judge*, Organizational Behaviour*, Prentice Hall, Delhi, 16th edition, 2014

VIDEO LECTURES:

1. https://www.youtube.com/watch?v=6Y5VWBLi1es
2. https://www.youtube.com/watch?v=H9qA3inVMrA

WEB RESOURCES:

1. https://www.universalclass.com/.../the-process-of-perso...
2. https://www.ncbi.nlm.nih.gov/pubmed/25545842
3. https://www.youtube.com/watch?v=Tuw8hxrFBH8

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22CS101702	**WEB DESIGN FUNDAMENTALS**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: This course is designed to introduce the student to the technologies and facilities of web design: CSS, javascript, and jquery. Students will understand the web design process and use these software technologies together to produce web design projects.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1. Understand the fundamentals of HTML 5 and the principles of web design.

CO2. Construct basic websites using HTML and Cascading Style Sheets.

CO3. Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.

CO4. Learn how to use HTML5 and other Web technologies to develop interactive and responsive web pages.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	3	3	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	2	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-
CO4	2	3	3	-	-	-	-	2	-	-
Course Correlation Mapping	**3**	**3**	**3**	**-**	**-**	**-**	**2**	**2**	-	**-**

Correlation Levels: ***3: High;*** ***2: Medium;*** ***1: Low***

COURSE CONTENT

Module 1: INTRODUCTION ***(09 Periods)***

Elements – Data types - Working with Text - Arranging Text - Displaying Lists - VAR Element - BDO Element - SPAN Element – DIV Element.

Module 2: LINKS AND URLS ***(09 Periods)***

Hyperlinks – URLs - Linking to a Mail System - Creating Tables - Inserting Images in a Web Page – Colors – Form Elements - Multiple-Choice Elements – Multimedia

Module 3: DYNAMIC HTML ***(09 Periods)***

Features of JavaScript - Programming Fundamentals - JavaScript Functions, Events, Image Maps, and Animations – JS Objects - Document Object - Validation, Errors, Debugging, Exception Handling, and Security

Module 4: CASCADING STYLE SHEET ***(09 Periods)***

CSS Syntax - CSS Selectors - Backgrounds and Color Gradients - Fonts and Text Styles - Creating Boxes and Columns - Displaying, Positioning, and Floating an Element - Table Layouts - : Effects, Frames, and Controls in CSS

Module 5: ADVANCED FEATURES OF HTML5 ***(09 Periods)***

Creating Editable Content - Checking Spelling Mistakes - Custom Data Attributes - Client-Side Storage - Drag and Drop Feature - Web Communication –**jQuery -** Fundamentals of jQuery - Callback Functions - jQuery Selectors - jQuery Methods to Access HTML Attributes.

Total Periods: 45

EXPERIENTIAL LEARNING

1. Design a blog layout that includes header, navigation menu, content area, sidebar. Apply appropriate styling to each section.
2. Develop a java script based quiz that presents MCQs to the user and provides immediate feedback on their answers. Keep track of the score and display the final results at the end.
3. Build a web page that displays and image gallery. Each image should be a clickable link that opens the image in a larger view when clicked.

(Note: It's an indicative one. The course instructor may change the activities and the same shall be reflected in course handout.)

RESOURCES

TEXTBOOKS

1. DT Editorial Services, *HTML 5 Black Book*, Dreamtech Press, 2nd Edition, 2016.

REFERENCE BOOKS

1. Jennifer Niederst Robbins, *HTML5 Pocket Reference,* O'Reilly, 5th Edition, 2018.
2. Ben Frain, *Responsive Web Design with HTML5 and CSS3*, Packt, 2nd Edition, 2020.

VIDEO RESOURCES

1. https://www.youtube.com/watch?v=h_RftxdJTzs
2. https://www.youtube.com/watch?v=dlkWNdnO8ek

WEB RESOURCES

1. https://www.w3schools.com/html/
2. https://www.w3schools.com/css/
3. https://www.geeksforgeeks.org/web-technology/
4. https://www.smashingmagazine.com/2021/03/complete-guide-accessible-front-end components/
5. https://css-tricks.com/
6. https://davidwalsh.name/css-optional

UNIVERSITY ELECTIVE

Course Code	Course Title	L	T	P	S	C
22SS101706	**WOMEN EMPOWERMENT**	3	-	-	-	3

Pre-Requisite -

Anti-Requisite -

Co-Requisite -

COURSE DESCRIPTION: Concept & Framework, Status of Women, Women's Right to Work, International Women's Decade, and Women Entrepreneurship.

COURSE OUTCOMES: After successful completion of the course, students will be able to:

CO1 Demonstrate the knowledge of the characteristics and achievements of empowered women and women's empowerment techniques by analyzing women's legal and political status.

CO2 Apply the knowledge of women's rights by analyzing various societal issues and obstacles in different fields, including science and technology.

CO3 Demonstrate the knowledge of the significance of women's participation in policy debates, National conferences, and common forums for equality and development by identifying and analyzing issues.

CO4 Analyze the concept of women's entrepreneurship, government schemes, and entrepreneurial challenges and opportunities.

CO-PO Mapping Table

Course Outcomes	Program Outcomes									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	-	-	1	3	-	1	–	–
CO2	3	1	-	-	-	2	-	-	-	–
CO3	3	1	-	-	-	2	-	-	-	3
CO4	3	1	-	-	-	-	-	-	-	-
Course Correlation Mapping	3	1	-	-	1	3	-	1	–	3

Correlation Levels: 3: High; 2: Medium; 1: Low

COURSE CONTENT

Module 1: CONCEPT & FRAMEWORK ***(09 Periods)***

Introduction– Empowered Women's Characteristics – Achievements of Women's Empowerment **Concept of Empowerment:** Meaning & Concept – Generalizations about Empowerment – Empowerment Propositions – Choices women can make for empowerment – Women's participation in decision making, development process & in Governance. **Framework for Empowerment** – Five levels of equality – Tenets of Empowerment– Elements – Phases and aspects – Techniques – Categories and Models – Approaches.

Module 2: STATUS OF WOMEN ***(09 Periods)***

Legal Status: Present Scenario – Call for Social Change – Significant Trends – Legal & Schemes – Personal Law – Joint Family – Criminal Law – Shift towards Dowry – Deterrent Punishment – Criminal Law (II Amendment) – Discrimination in Employment.

Political Status: Present Scenario – Political Participation & its NatureSocio–economic Characteristics – Political Mobilization: Mass Media – Campaign Exposure – Group Orientation – Awareness of issues and participation – Progress & Future Thrust.

Module 3: WOMEN'S RIGHT TO WORK ***(09 Periods)***

Introduction – Present Scenario – Changes in Policy & Programme – National Plan of Action– Women's Cells and Bureau – Increase in the work participation rate – Discrimination in the labour market – Women in unorganized sector – Issues and Obstacles– Women in Education – Women in Science & Technology – Case Study: Linking Education to Women's Access to resources.

Module 4: WOMEN'S PARTICIPATORY DEVELOPMENT ***(09 Periods)***

Dynamics of social change – conscious participation – Information Explosion – Organized Articulation – National Conference – Common Forums – Participatory Development – New Issues Identified – Role of other Institutions.

Module 5: WOMEN ENTREPRENEURSHIP ***(09 Periods)***

Introduction – Definition – Concept – Traits of women Entrepreneurs – Role of Women Entrepreneurs in India – Reasons for Women Entrepreneurship – Government schemes & Financial Institutions to develop Women Entrepreneurs – Key policy recommendations – Project Planning – Suggestions and measures to strengthen women entrepreneurship – Growth & Future challenges – Training and Opportunities – Case Study: Training Women as Hand–pump Mechanics– Case Study: Literacy for Empowering Craftswomen

Total Periods: 45

EXPERIENTIAL LEARNING

1. Prepare poster presentation on "impact of women's self-help groups on their empowerment and socio-economic development."
2. Prepare a comparative analysis chart on the status of women in various countries.
3. Prepare a presentation on women and cultural responsibilities in different societies.
4. Prepare a presentation on the women of the past, present and future in terms of responsibilities and duties.
5. Prepare a presentation on the great women entrepreneurs of India.

(Note: It's an indicative one. Course Instructor may change activities and shall be reflected in course Handout)

RESOURCES

TEXT BOOKS:

1. SahaySushama, *Women and Empowerment,* Discovery Publishing House, New Delhi, 2013.
2. NayakSarojini, Jeevan Nair, *Women's Empowerment in India*, Pointer Publishers, Jaipur, 2017.

REFERENCE BOOKS:

1. Baluchamy. S, *Women's Empowerment of Women*, Pointer Publishers, Jaipur, 2010.
2. Khobragade Grishma, *Women's Empowerment: Challenges and Strategies Empowering Indian Women*, Booksclinic Publishing, Chhattisgarh, 2020.

WEB RESOURCES:

1. https://www.economicsdiscussion.net/entrepreneurship/women–entrepreneurs–in–india
2. https://www.businessmanagementideas.com/entrepreneurship–2/women entrepreneurs