# 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. Cardio Vascular Technology

## CURRICULUM AND SYLLABUS

*(From 2022-23 Admitted Students)*

**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 expertise and demonstrate the best of their abilities by way of continuing education, research support and consultancy.

# B.Sc. CardioVascular Technology

## Program Outcomes

On successful completion of the Programs, the graduates of B.Sc. Cardio Vascular 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. CardioVascular 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 | - |
| 22DF102008 | Clinical Microbiology | 3 | - | 2 | - | 4 | - |
| 22DF102009 | Pathology | 3 | - | 2 | - | 4 | - |
| 22PT102010 | Human Anatomy-II | 4 | 1 | 2 | - | 6 | Human Anatomy - I |
| 22PT102011 | Human Physiology-II | 4 | - | 2 | - | 5 | Human Physiology - I |
| 22CC111001 | Clinical Posting-I | - | - | - | - | 4 | - |
| 22CC111002 | Clinical Posting-II | - | - | - | - | 4 | Clinical Posting-I |
| 22CC101019 | National Health Care Delivery System and Medical Records Management | 4 | - | - | 4 | | |

| Course Code | Title of the Course | Lecture | Tutorial | Practical | Project based Learning | Credits | Pre-requisite |
|---|---|---|---|---|---|---|---|
| 22CC111003 | Clinical Posting-III | - | - | - | - | 4 | Clinical Posting-II |
| 22CC111004 | Clinical Posting-IV | - | - | - | - | 4 | Clinical Posting-III |
| 22DF102025 | Research Methodology and Biostatistics | 3 | - | 2 | - | 4 | - |
| 22DF101001 | Research Methodology and Biostatistics for Health Professionals | 4 | - | - | - | 4 | - |
| **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 | |
| 22DF102003 | Medical Biochemistry | 3 | - | 2 | - | 4 | - |
| 22RT101001 | Fundamentals of Medical Physics and Electronics | 3 | - | - | - | 3 | - |
| 22PT101005 | Cardiac Embryology | 2 | 1 | - | - | 3 | - |
| 22CC101008 | Clinical Pharmacology Related To CVT | 3 | - | - | - | 3 | - |
| 22CC102002 | Application Of ECG And Holter Techniques | 4 | - | 2 | - | 5 | - |
| 22CC102011 | Applied Pathology | 4 | - | 2 | - | 5 | Pathology |
| 22CC102015 | Cardiac Instrumentation | 3 | - | 2 | - | 4 | - |
| 22CC101017 | Congenital Heart Disease -I | 4 | - | - | - | 4 | - |
| 22CC102013 | Sterilization and Infection Control | 3 | - | 2 | - | 4 | - |
| 22CC101015 | Medical Psychology | 3 | - | - | - | 3 | - |
| 22CC102012 | Emergency Medicine and Cardiac Life Support- I | 3 | - | 2 | - | 4 | - |
| 22CC102046 | Cardiac Catheterization-II | 4 | - | 2 | - | 5 | Cardiac Catheterization-I |
| 22CC111005 | Clinical Internship-I | - | - | - | - | 20 | Clinical Posting-IV |
| 22CC111005 | Clinical Internship-II | - | - | - | - | 20 | CVT Internship-I |

# 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 | |
| 22CC102044 | Congenital Heart Disease -II | 3 | - | 2 | - | 4 | Congenital Heart Disease -I |
| 22CC102054 | Cardiac Catheterization-I | 4 | - | 2 | - | 5 | - |
| 22CC102055 | Cardiac Evaluation and Therapies-I | 3 | - | 2 | - | 4 | - |
| 22CC102017 | Emergency Medicine and Cardiac Life Support- II | 3 | - | 2 | - | 4 | Emergency Medicine and Cardiac Life Support- I |
| 22CC102047 | Cardiac Evaluation and Therapies-II | 4 | - | 2 | - | 5 | Cardiac Evaluation and Therapies-I |
| 22CC102048 | Advanced Cardiac Care Technology | 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.

*(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. 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, Edition2, 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

*(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. Y. Anjaneyulu and R Marayya "Quality Assurance and Quality Management" BSP Books Private Limited, 2018.
2. Deepak Tripathi "Quality management" Jaico Publishing House, Edition 1, 2009.
3. Apurba S Sastry, Deepashree "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, 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 |
|---|---|---|---|---|---|---|
| **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.

*(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. G. Damodar "English Language for Undergraduate Students", Cambridge University-2019.

### REFERENCE BOOKS:

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

**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 Organization- 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

*(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 Charles W.L. Hill And Steven L. McShane, Principles Of Management, Tata Mc-Craw-Hill Company, New Delhi

2 Griffin, Ricky W., Management. AITBS Publishers and Distributors, New Delhi.


**REFERENCE BOOKS:**


1. Principles of Management by Neeru Vasishth
2. Fundamentals of Management, 9 edition by Robbins


**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 |
|---|---|---|---|---|---|---|
| 22CS102402 | BASIC COMPUTERS AND INFORMATION SCIENCE | 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.

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


**REFERENCE BOOKS:**


1. Pete Matheson "Microsoft Office 365 for Beginners" Microsoft, 2021.
2. Dr Sabah Sayed "Fundamentals of Computer Science" Imperial College Press, 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 |
|---|---|---|---|---|---|---|
| **22CE107601** | **ENVIRONMENTAL SCIENCE** | 2 | - | - | - | 2 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course provides a detailed discussion on natural 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, 6th Edition, 2018.
2. Erach Barucha, *Environmental Studies,* Orient Blackswan, 3rd Edition, 2021.


### REFERENCE BOOKS:


1. Cunningham, W. P. and Cunningham, M. A., *Principles of Environmental Science*, Tata McGraw-Hill Publishing Company, New Delhi, 8th Edition, 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, 3rd Edition, 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_environme nt.htm

# 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 Basarkar"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, 2007.


### REFERENCE BOOKS:


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

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**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; 6th Edition, 2021
3. Inderbir Singh's book of Anatomy; Vol 1,2,3, 3rd Edition, 2020
4. Inderbir Singh's Text book of Human Histology, Jaypee Publishers, 10th Edition, 2022
5. Inderbir Singh's Text book of Human Embryology, Jaypee Publishers, 12th Edition, 2022

**REFERENCE BOOKS**

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

## COURSE CONTENT

### 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, factorsregulating. 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.

### MODULE 2: NERVE MUSCULE PHYSIOLOGY *(12 Periods)*

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.

### MODULE 3: DIGESTIVE SYSTEM *(12 Periods)*

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.

### MODULE 4: RESPIRATORY SYSTEM *(12 Periods)*

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.

### MODULE 5: RENAL SYSTEM *(12 Periods)*

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

### LIST OF EXPERIMENTS:

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

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

## RESOURCES

## BOOKS


1. Guyton & Hall, Text book of Medical Physiology, 13th Edition, Saunders publisher, 2015.
2. K Sembulingam, Essentials of Medical Physiology, 9th Edition, Jaypee Medical Publishers, 2022.
3. G.K. Pal and G.K Pravati, Textbook of Practical Physiology, Orient Longman, 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, 4th Edition, 2019
2. Sharon B .Buchbinder, Introduction to Health Care Management, 2nd Edition, 2011
3. Fandis S, Health Service Management, Analysis& Management, Wasworth publishing, 3rd Edition, 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/

# 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 bio-molecules.

**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

**MODULE1 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 carbohydratesLipid 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 CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22RT101001** | **FUNDAMENTALS OF MEDICAL PHYSICS AND ELECTRONICS** | 3 | - | - | - | 3 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course provides a detailed discussion on Semiconductors, digital and analog circuit, lesser and optical fibers, electricity and electromagnetism.

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

**CO1.** Acquire knowledge about the semiconductor materials.

**CO2.** Apply analog and digital components, sensors and output actuators to assemble simple electrical systems.

**CO3.** Demonstrate adequate knowledge about Medical applications of Lasers.

**CO4.** Understand concepts of electric and magnetic fields

### 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 | - | - | - | - | - | - |
| **CO4** | 3 | - | - | 2 | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | - | - | **2** | **2** | **-** | - | - | - | - |

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

## COURSE CONTENT

### MODULE 1: INTRODUCTION TO SEMICONDUCTORS *(10 Periods)*

Electronics Introduction to Semiconductors- Extrinsic and Intrinsic Semiconductors- Formation of p-n Junction, p-n Junction diode-Half wave and Full wave rectifiers using diodes, Efficiency: Bipolar Junction Transistor-Forward and reverse bias characteristics.

### MODULE 2: INTRODUCTION TO DIGITAL AND ANALOG CIRCUITS *(10 Periods)*

Digital Fundamentals: Logic gates, Universal gates, Laws of Boolean Algebra, De Morgan's Theorem, Sum of products and product of sums. Operational Amplifiers: Op-Amp Definition, Op-Amp characteristics, differential and Common mode operation, Inverting & Non-Inverting Amplifier and Op-Amp applications.

### MODULE 3: INTRODUCTION TO LASERS AND OPTICAL FIBERS *(10 Periods)*

**LASERS**: Introduction, Characteristics of Laser, Absorption, Spontaneous and Stimulated emissions, Population and Population inversion, Laser pumping, Lasing action, Types of laser: Nd-YAG Laser and Semiconductor laser (Construction, working and advantages), Lasers in Medical Application (Ophthalmology, Gastroenterology, Dermatology and Urology). **OPTICAL FIBERS**: Introduction, Basic Principles and structure of optical fibers, acceptance angle and numerical aperture, Types of optical fibers (Qualitative), Applications of optical fibers in Medical industry.

### MODULE 4: INTRODUCTION TO ELECTRICITY *(10 Periods)*

Electricity & Electromagnetism - Electric charge- Conductors and insulators- Coulomb`s law- Electric field-Electric lines of force properties of lines of force- Electric field strength-Capacity- Units of capacity- Potential energy of a charged conductor-Principle of a condenser- Capacity of a parallel plate condenser-Electric current and its units- Potential difference-Electromotive Force-Ohm’s law.

### MODULE 5: INTRODUCTION TO ELECTROMAGNETISM *(05 Periods)*

Magnetic Field and Magnetic Induction-Magnetic Flux-Direction of Magnetic Field and Current - Ampere’s Law-Application of Ampere’s Law. Electromagnetic induction, laws of mutual induction and self induction.

***Total Periods: 45***

## EXPERIENTIAL LEARNING

1. Use simulation tools to design and analyze p-n junction diodes, half wave, and full wave rectifiers.
2. Design and implement simple digital circuits
3. With a case study, elaborate the importance of operational amplifier in the medical equipment.
4. Construct a simple circuit with a battery, wires, and resistors. Measure current, voltage, and resistance using multimeters and observe the relationship between them.

## RESOURCES

### TEXT BOOKS:


1. Electronic Devices and Circuits, S.Salivahanan, N.Sureshkumar, McGraw Hill.
2. Integrated Electronics Analog Digital Circuits, Jacob Millman and D. Halkias, McGraw Hill
3. Principles of Laser Materials Processing, EKannatey-Asibu,y John Wiley & Sons, Inc Publication.
4. Unified Physics-V Electricity, Magnetism And Electronics - J.P. Agarwal


### REFERENCE BOOKS:


1. Principles of Electronic Devices & Circuits: Analog and Digital, BL Theraja | RS Sedha , S. Chand Publications.
2. Introduction to Electricity and Magnetism, John Dirk Walecka,World Scientific Publishing Co Pte Ltd .


### VIDEO LECTURES:

1. https://www.youtube.com/watch?v=JA3sCmrv11M&list=PLgMDNELGJ1CaNcuuQv9xN07ZWkXE-wCGP&index=2
2. https://www.youtube.com/watch?v=WgWozOgMXKo&list=PLp6ek2hDcoNCj_QQA2CmW1JIHAm5aD7o_&index=2
3. https://www.youtube.com/watch?v=x1-SibwIPM4&list=PLyQSN7X0ro2314mKyUiOILaOC2hk6Pc3j&index=2

### WEB RESOURCES:

1. https://ncert.nic.in/ncerts/l/leph206.pdf
2. https://www.sitams.org/assets/pages/hands/material/AP/unit-II%20Lasers%20and%20Fibre%20Optics.pdf
3. https://www.careerlauncher.com/cbse-ncert/images/revision/class-XII/physics.pdf

# PROGRAM CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22PT101005** | **CARDIAC EMBRYOLOGY** | 2 | 1 | - | - | 3 |

**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 developmental stages of embryo, scope and recent advances in embryology.

**CO2.** Apply the anatomical knowledge of developmental events during early embryonic life in clinical practice.

**CO3.** Analyze the concepts of normal developmental anatomy with developmental defects related to heart and blood vessels.

**CO4.** Apply the knowledge of embryology in counselling, diagnosing, and treating the vulnerable conditions in clinical practice.

**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 | 1 | - | - | 1 | - | - | - | 1 |
| **CO2** | 3 | 2 | 1 | - | - | 1 | - | - | - | 1 |
| **CO3** | 3 | 2 | 1 | - | - | 1 | - | - | - | 1 |
| **CO4** | 3 | 2 | 2 | - | - | 1 | 2 | - | - | 1 |
| **CO5** | 3 | 2 | 1 | - | - | 1 | 2 | - | - | 1 |
| **CO6** | 3 | - | - | - | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **2** | **1** | **-** | **-** | **1** | **2** | **-** | **-** | **1** |

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

## COURSE CONTENT

**Module 1: INTRODUCTION TO HUMAN EMBRYOLOGY** ***(06 Periods)***

Different stages of development, Subdivisions of Embryology, Recent advances, Scope of embryology, and History.

**Module 2: GENERAL EMBRYOLOGY** ***(06 Periods)***

Cell, Cell division, Gametogenesis, Fertilization, Formation of – Germ layers, Primitive streak, Notochord, Neural tube, Sub-divisions of Intra Embryonic Mesoderm, Folding's of Embryo, Extra Embryonic membranes, and Twinning.

**Module 3: DEVELOPMENT OF HEART** ***(06 Periods)***

Heart tube - Arterial end, Venous end; Formation of – Cardiac wall, Atrioventricular septum, Interatrial septum, Interventricular septum, Aorticopulmonary septum, Chambers of the Heart, Valves of the Heart, Conducting system of the heart, and Pericardium.

**Module 4: DEVELOPMENT OF BLOOD VESSELS** ***(06 Periods)***

Vasculogenesis, Angiogenesis; Development of - Arterial system, Pharyngeal Arch arteries & its Derivatives, Arteries of Head & Neck, umbilical arteries, Arteries of the limbs, Venous system, Lymphatic system, Lymphoid organs, and Foetal circulation.

**Module 5: APPLICATION OF EMBRYOLOGY IN CLINICAL PRACTICE** ***(06 Periods)***

Pregnancy, Embryonic development in days, Foetal development in weeks, Pregnancy dating, Milestones of Pregnancy, Teratology, Prenatal Diagnosis, and Techniques.

***Total Periods: 30***

## EXPERIENTIAL LEARNING

**LIST OF EXPERIMENTS:**

1. Demonstration of charts related to different stages in embryonic development, scope and recent advances in embryology.
2. Demonstration of charts and models showing developmental events in early embryonic period.
3. Demonstration of charts and models stating that, normal developmental events and possible developmental defects of heart.
4. Demonstration of charts and models stating that, normal developmental events and possible developmental defects of blood vessels.
5. Demonstration of charts showing stages of pregnancy in days and weeks, precautionary measures, early diagnosis of defects using various techniques.

*(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. Inderbir Singh's, Text book of Human Embryology, Jaypee Publishers, 13th Edition, 2023.
2. Vishram Singh, Text book of Clinical Embryology, Elsevier India publishers,3rd Edition, 2022**.**
3. Richard Tunstall and Susan Standring, Gray's Anatomy - The anatomical basis of clinical practice, Elsevier publishers, 42nd Edition 2020.


### REFERENCE BOOKS


1. Gary C. Schoenwolf PhD, Larsen's Human Embryology, Churchill Livingstone publishers, 5th Edition, 2014.
2. Yogesh Sontakke, Text book of Human Embryology, CBS Publishers, 2nd Edition, 2022.
3. B.D. Chaurasia' s (Krishna Garg), Human Embryology, CBS Publishers, 2nd Edition, 2017.


### VIDEO LECTURES:

1. https://www.youtube.com/watch?v=fHQ7ojcp8kk
2. https://www.youtube.com/watch?v=pMswpOE7xOE&t=9s
3. https://www.youtube.com/watch?v=pjxrnY6gc6o
4. https://www.youtube.com/watch?v=e7ObXrdtXek
5. https://www.youtube.com/watch?v=30IefUAiYEU
6. https://www.youtube.com/watch?v=JGazlA46OKg
7. https://www.youtube.com/watch?v=AJwllNTHh9A
8. https://www.youtube.com/watch?v=pMswpOE7xOE&list=TLPQMjcwNTIwMjMISrOu0ZQ4NQ&index=4
9. https://www.youtube.com/watch?v=zpcY4VQHUc0
10 https://www.youtube.com/watch?v=Yv4_uucaddo

### 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
11. https://medicostimes.com/mbbs-first-year-books-pdf/

# 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.

# PROGRAM CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22CC101008** | **CLINICAL PHARMACOLOGY RELATED TO CVT** | 3 | - | - | - | 3 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course will cover general pharmacology with special emphasis on common drugs used, route of administration, types of formulations, dose and frequency of administration, side effects and toxicity, management of toxic effect, drug interaction, knowledge of chemical and trade names, importance of manufacture and expiry dates and instructions about handling each rerecording and charting of the drug.

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

**CO1.** Demonstrate the Drug Dosage Calculation

**CO2.** Demonstrate the drug Dispensing and Storage of Drugs in Safe Containers

**CO3.** Recording, Charting of the Drug used for Clinical Emergencies

**CO4.** Reporting of Errors and Breakage of the Drug

**CO5.** Demonstrates the use of drugs in various Diagnostic and Emergency Procedures

**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 | 2 | - | - | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **1** | **3** | **-** | **-** | **3** | **1** | **-** | **3** | **1** |

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

## COURSE CONTENT

**Module 1: ANTI-ANGINAL AGENTS** ***(08 Periods)***

Introduction of pharmacology, route of administration, dosage preparation, Beta blockers-propranolol, atenolol, metoprolol, bisoprolol carvedilol, esmolol., transdermal nitrate patches Calcium channel blockers-nifedipine, verapamil, diltiazem, amlodipine, Nicorandil, Trimetazidine, Ranolazine, Ivabradine. Nitrates-nitro-glycerine, isosorbide dinitrate, isosorbide mononitrate

**Module 2: ANTI-FAILURE AGENTS** ***(09 Periods)***

Diuretics-furosemide, torsemide, thiazide diuretics, metolazone, spironolactone, combination diuretics, Angiotensin converting enzyme (ACE) inhibitors ARB (Angiotensin Receptor Blocker) – Valsartan Cosart an Telmisartan – captopril Enalapril, ramipril, lisinopril, ACE inhibitors for diabetics and hypertensive renal disease, Digitalis and acute inotropes – digoxin, odoubutamine, dopamine, adrenaline, noradrenaline, isoprenaline, Beta Blockers – Carvedilol, Bisoprolol, metoprolol.

**Module 3: ANTI-HYPERTENSIVE DRUGS AND ANTI- ARRHYTHMIC AGENTS** ***(10 Periods)***

Anti-hypertensive drug: Diuretics, beta-blockers, ACE inhibitors, calcium antagonists, direct Vasodilators, centrally acting and peripherally acting vasodilators. Anti arithmetic drugs: Amiodarone, adenosine, verapamil, diltiazem, lidocaine, mexiletine, Phenytoin, flecainide, bretylium, atropine, Isoprenaline, Angiotensin Receptor Blocker – Valsartan Losartan Telmisartan Olmesartan

**Module 4: ANTITHROMBOTIC AGENTS** ***(08 Periods)***

Platelet inhibitors: aspirin, clopidogrel, Prasugrel, ticagrelorm Anticoagulants: heparin, low molecular weight heparin, warfarin fondaparinux_ Fibrinolytics: streptokinase, urokinase, Tenecteplase reteplase Glycoprotein 2b3a antagonists: abciximab, tirofiban, eptifibatide

**Module 5: MISCELLANEOUS DRUGS** ***(10 Periods)***

Protamine, Narcotics: morphine, pethidine, fentanyl, Sedatives: diazepam, midazolam, Steroids: hydrocortisone, prednisolone, Antihistamines: diphenhydramine, Antibiotics: penicillin, cephalosporins, aminoglycosides, Antacids and proton pump inhibitors Anesthetic agents: local general

***Total Periods: 45***

## EXPERIENTIAL LEARNING

**LIST OF EXPERIMENTS:**

1. Performing Drug Dosage Calculation ratio and proportion method
2. Maintaining the Storage of Drugs
3. Knowledge of Onset Actions of Drugs used in Emergency

4. Maintaining records for Expiration dating and national drug code rules
5. Knowledge of Medication dispensing and error prevention

## RESOURCES

### TEXT BOOKS:

1. K D Tripathi books of Essentials of Medical Pharmacology, 8th Edition, Jaypee brothers' medical publishers, 2018

### REFERENCE BOOKS:

1. Tara v Shanbaug Pharmacology for Nurses and Medical Graduates, 4th Edition, Elsever, 2020

### VIDEO LECTURES:

1. https://www.youtube.com/@AM_Fouda/about
2. https://www.youtube.com/@NIHClinicalCenter
3. https://www.youtube.com/watch?v=3bBNDqq2NmM

### WEB RESOURCES:

1. https://accesspharmacy.mhmedical.com/book.aspx?bookid=2988
2. https://uscmed.sc.libguides.com/c.php?g=377957&p=2558284
3. https://www.researchgate.net/publication/303718804_Essential_Web_Resources_in_Pharmacy

# PROGRAM CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22CC102002** | **APPLICATION OF ECG AND HOLTER TECHNIQUES** | 4 | - | 2 | - | 5 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** Acquire knowledge about equipment used, working principles and applications of electrodes, ECG machine, TMT and Holter. Understand the basic ECG deflexions and interpretation of normal ECG and acquire knowledge on ECG features of chamber enlargements and conduction disturbances. Understand the role of exercise stress testing and Holter monitoring in diagnosing cardiac conditions.

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

**CO1.** Understand the ECG machine, its working principle and artifacts of ECG.

**CO2.** Acquire knowledge on normal ECG deflections, its ECG features and interpretation of ECG

**CO3.** Acquire knowledge on chamber enlargements and conduction disturbances and its ECG characteristics.

**CO4.** Understand the concept, equipment used, indications and contraindications, protocols, procedure and interpretation of exercise stress testing.

**CO5.** Understand the concept, equipment used, indications and contraindications, protocols, procedure and interpretation of Holter monitoring.

**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 | - | 1 | - | - | - | - | - | - |
| **CO3** | 3 | - | - | - | - | - | - | - | - | - |
| **CO4** | 3 | 1 | - | 3 | - | - | - | - | - | - |
| **CO5** | 3 | - | - | 2 | - | - | - | - | - | - |
| **CO6** | 3 | 2 | - | 3 | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **1** | **-** | **3** | **-** | **-** | **-** | **-** | **-** | **-** |

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

**COURSE CONTENT**

**Module 1: BASICS OF ECG** ***(12 periods)***

Introduction to ECG: Definition, uses, ECG Paper, Standardization and Calibration; ECG Electrodes: Introduction, types and working principle; ECG Machine: Parts, working principle; Electrical field of the heart, Conventional ECG leads: basic principles, derivation, placement and orientation of frontal and horizontal plane leads; Technique of ECG recording: Equipment settings, patient preparation, procedure, recording and equipment maintenance;

**Module 2: NORMAL DEFLECTIONS OF ECG** ***(12 periods)***

Cardiac action potential; Basic action of ECG, electrocardiological significance on cardiac anatomy, normal ECG deflections: P wave: genesis, normal and abnormal ECG characteristics; QRS complex: Genesis and naming of QRS complex and T wave: morphology, normal and abnormal ECG characteristics; Segments and intervals in ECG: Types, ECG characteristics, normal and abnormal values; Electrical Axis: Definition, derivation and naming the degree of hexaxial reference system, Types and significance of electrical axis;

**Module 3: INTERPRETATION OF ECG & ARTIFACTS** ***(12 periods)***

Heart rate: methods to calculate heart rate; Rhythm assessment: how to interpret rhythm in ECG; Sinus rhythm: definition & ECG characteristics, Sinus tachycardia, sinus bradycardia and sinus arrythmia: introduction and ECG characteristics; Steps in interpretation of ECG and how to make final diagnosis; Normal Electrocardiographic Variants: True dextrocardia, Technical dextrocardia, Persistent Juvenile Pattern, Athletic Heart Syndrome; ECG artifacts: Introduction, types, causes and pitfalls in ECG interpretation.

**Module 4: ECG ABNORMALITIES** ***(12 periods)***

ECG in atrial enlargements: Introduction, mechanism, ECG characteristics, ECG criteria in right and left atrial enlargement; ECG in ventricular hypertrophy: Introduction, mechanism, ECG characteristics, ECG criteria in right and left ventricular hypertrophy; Biatrial enlargement and biventricular hypertrophy: Mechanism and ECG characteristics. SA blocks: Introduction, mechanism, types and ECG characteristics; AV blocks: Introduction, mechanism, types and ECG characteristics; Bundle Branch Blocks: Introduction, mechanism, types and ECG characteristics; Hemi blocks: Introduction, mechanism, types and ECG characteristics;

***Module 5:*** **EXERCISE STRESS TESTING AND HOLTER MONITORING** ***(12 Periods)***

Exercise Stress Testing: Introduction, indications & contraindications, equipment and materials used, types of non-pharmacological stress tests, Treadmill test: protocols, patient preparation, procedure, interpretation, termination, post procedural care and complications; Holter monitoring: Introduction, indications & contraindications, equipment and materials used, patient preparation, procedure, interpretation.

***60 periods***

**EXPERIENTIAL LEARNING**

**LIST OF EXPERIMENTS:**

1. Demonstration of components, working principle and uses of ECG machine.
2. Demonstration of technique of ECG recording and maintenance of ECG machine.
3. Demonstration of interpretation of ECG and how to identify waveforms, segments and intervals of ECG.
4. Understanding the importance of ECG waveforms and interpretation in making diagnosis.
5. Demonstration of interpretation of ECG and how to identify and interpret chamber enlargements.
6. Demonstration of interpretation of ECG and how to identify and interpret conduction disturbances.
7. Demonstration of components, working principle, patient preparation and procedure of treadmill test.
8. Acquire knowledge on interpretation and diagnosis of TMT and understand the importance of termination and post procedural care of TMT.
9. Demonstration of components, working principle, patient preparation and procedure of Holter monitoring.
10. Acquire knowledge on interpretation of Holter monitoring and diagnosis of abnormal rhythm conditions.

## RESOURCES

**TEXT BOOKS:**


1. Narasimhan C. "Leo Schamroth An Introduction to Electrocardiography" 8th edition, Wiley India Exclusive, 2018.
2. John Hampton "The ECG Made practical 7th edition, Elsevier, 2019.
3. Atul Luthra "ECG Made Easy" 6th edition, Jaypee Brothers, 2020


**REFERENCE BOOKS:**


1. David G. Strauss "Marriott's Practical Electrocardiography" 13th Edition, Lippincott Williams and Wilkins, 2013.
2. Borys Surawicz "Chou's Electrocardiography Practice: Adult and Paediatric" 6th Edition, Saunders publications, 2008.


**VIDEO LECTURES:**

1. https://www.drnajeeblectures.com/ecg-interpretation/
2. https://www.youtube.com/watch?v=V76P6Qr-ktM

3. https://ecgwaves.com/

**WEB RESOURCES:**

1. https://ecgwaves.com/the-best-ecg-book-recommended-ekg-book/
2. https://www.amazon.in/Ecg-Beginners-Subramanian-Anandaraja/dp/9351526607
3. https://litfl.com/ecg-library/ecg-references/

# SCHOOL CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22DF102008** | **CLINICAL MICROBIOLOGY** | 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.** Identify the bacteria by using various cultural methods and apply sterilization techniques in the health care.

**CO2.** Understand Morphology, cultural characteristics, Infections caused, Laboratory Diagnosis, Treatment of various Disease-causing bacteria in Humans.

**CO3.** Learn Morphology, disease caused and lab diagnosis of various fungi effecting Humans.

**CO4.** Understand general properties of viruses, diseases caused, lab diagnosis and prevention of Various viruses effecting Humans.

**CO5.** Understand classification, pathogenesis, lab diagnosis and prevention of various disease causing parasites in humans.

**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 | 2 | - | 2 | 1 | - | - | 1 |
| **CO2** | 3 | 2 | 2 | - | 1 | 2 | - | - | - | - |
| **CO3** | 3 | 2 | - | - | - | 2 | - | - | - | 1 |
| **CO4** | 3 | 2 | 2 | - | - | - | - | - | - | 1 |
| **CO5** | 3 | 2 | 2 | - | 1 | 2 | - | - | - | 1 |
| **CO6** | 3 | 2 | - | - | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **2** | **2** | **2** | **1** | **2** | **1** | **-** | **-** | **1** |

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

## COURSE CONTENT

**Module :1 GENERAL MICROBIOLOGY** ***(10 Periods)***

Morphology and classification of microorganisms, Growth, nutrition and multiplication of bacteria, Sterilization and Disinfection - Principles and use of equipment's of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptics and disinfectants. Culture Media, Methods of Identification of Bacteria. Immunology - antigen, Antibodies, Immunity, vaccines, types of vaccine and immunization schedule. Hospital acquired infection - Causative agents, transmission methods, prevention and control of hospital Acquired infections.

**Module: 2 SYSTEMIC BACTERIOLOGY** ***(10 Periods)***

Classification of bacteria, morphology, infections caused, lab diagnosis, treatment and prevention of common bacterial infections. Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Corynebacterium diphtheriae, Clostridium, Enterobacteriaceae - Shigella, Salmonella, Klebsiella, E.coli, Proteus, Vibrio cholerae, Pseudomonas ,Spirochetes, Mycobacteria.

**Module 3: MYCOLOGY** ***(08 Periods)***

Morphology, disease caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi (Aspergillus, Zygomycetes and Penicillium)

**Module 4: VIROLOGY** ***(10 Periods)***

General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Dengue, Influenza, Chikungunya, Rabies and Poliomyelitis.

**Module :5 PARASITOLOGY** **(07 Periods)**

Classification, pathogenesis, lab diagnosis and prevention of Entamoeba, Giardia, Malaria, Hookworm, Roundworm and Filarial worms.

***Total Periods: 45***

## EXPERIENTIAL LEARNING

**LIST OF Practical's:**

1. Compound microscope and its application in microbiology.
2. Demonstration of sterilization equipment's: hot air oven, autoclave, bacterial filters. Demonstration of commonly used culture media, nutrient broth, nutrient agar, blood agar, chocolate agar, Macconkey medium, L J media, Robertson cooked meat media, MacConkey agar with LF & NLF, Nutrient agar with staph colonies. Anaerobic culture, Methods and Antibiotic susceptibility test.
3. Demonstration of common serological tests: Widal, VDRL, ASLO, CRP, RF, Rapid tests for HIV, Hbsag and HCV.
4. Gram staining.
5. Acid fast staining.
6. Principles and practice of Biomedical waste management.

## RESOURCES

### TEXT BOOKS:

1. Anathanarayana&Panikar: Medical Microbiology - Revised 10th edition University Press.
2. Textbook of Microbiology - Baveja, 5th edition, Arya Publications
3. Textbook for Laboratory technicians by RamnikSood. Jaypee Publishers

### REFERENCE BOOKS:

1. Bailey & Scott's Diagnostic Microbiology, 15th edition, Elsevier publisher, 2021.
2. Jagdish Chaner "Textbook of Medical Mycology" 4th Edition, Jaypee brothers Medical Publishers, 2018

### VIDEO LECTURES:

1. https://www.youtube.com/watch?v=_Fk1D7FIIg4
2. https://www.youtube.com/watch?v=F7TBfCJTZ54
3. https://www.youtube.com/watch?v=_waCHq1AaNk

### 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/

# SCHOOL CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22DF102009** | **PATHOLOGY** | 3 | - | 2 | - | 4 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course provides a detailed discussion on basic pathology of cell injury, inflammation, Immunopathology, Environmental and nutritional disorders, and Neoplasia.

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

**CO1.** Demonstrate the concept of cell Injury and events in cell injury

**CO2.** Understand Basic knowledge on Inflammation

**CO3.** Gain knowledge on concept of Immune System & Immunity Disorders.

**CO4.** Learn the different types of Environmental and Nutritional Disorders.

**CO5.** Understand the nature and types of Neoplasia and its evolution.

**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 | - | - | - | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **1** | **3** | **-** | **-** | **3** | **1** | **-** | **3** | **1** |

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

## COURSE CONTENT

**Module 1: CELL INJURY** ***(09 Periods)***

Cellular adaptation, Cell injury & cell death. Introduction to pathology. Overview: Cellular response to stress and noxious stimuli. Cellular adaptations of growth and differentiation. Overview of cell injury and cell death. Causes of cell injury. Mechanisms of cell injury. Reversible and irreversible cell injury. Examples of cell injury and necrosis.

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

General features of inflammation, Acute inflammation, Chemical mediators of inflammation

Outcomes of acute inflammation, Morphologic patterns of acute inflammation, Chronic inflammation. Granulomatous Inflammation, Healing By Repair, Scar formation And Fibrosis, Cutaneous Wound Healing, Healing By First Intention, Healing By Second Intention, Edema, Hemostasis and Thrombosis, Infarction, Shock

**Module 3: IMMUNE SYSTEM & IMMUNITY DISORDERS** ***(11 Periods)***

Immunopathology – a. Immune system: General concepts. b. Hypersensitivity: type and examples, antibody and cell mediated tissue injury with examples. Secondary immunodeficiency including HIV infection. Auto-immune disorders: Basic concepts and classification, SLE. c. AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education.

**Module 4: ENVIRONMENTAL AND NUTRITIONAL DISORDERS & INFECTIOUS DISEASE** ***(09 Periods)***

Environmental and nutritional disorders. Occupational Hazards, Radiationinjury, Marasmus

Kwashiorkar, Immunopathology –Infectious diseases –Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis. b. Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery. c. Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Rickttsia, Chlamydial infection, HIV infection. d. Fungal disease and opportunistic infections. e. Parasitic diseases: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst.

**Module 5: NEOPLASIA** ***(07 Periods)***

Neoplasia: Definition, classification, Biological behaviour : Benign and Malignant, Carcinoma and Sarcoma. d. Malignant Neoplasia: Grades and Stages, Local & Distant spread. e. Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Benign & Malignant epithelial tumoursEg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumoursEg: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma

***Total Periods: 45***

## EXPERIENTIAL LEARNING

### LIST OF EXPERIMENTS:

1. Collection of blood and anticoagulants used.
2. Discussion different types of microscopic disease conditions in pathology.
3. Staining of slide by Leishman method.
4. Studies of peripheral blood smear.
5. Estimation of hemoglobin by Sahli's method and discussion of other methods used.
6. Erythrocyte sedimentation Rate
7. Identification of various instruments in pathology lab & their uses
8. Bleeding Time, Clotting Time.
9. Demonstration of Pathological specimens

## RESOURCES

### TEXT BOOKS:


1. Harsh Mohan "Textbook of Pathology with Pathology Quick Review" Jaypee Brothers Medical Publishers, 8th Edition, 2019.
2. Ramadas Nayak " Textbook of Pathology for Allied Health Sciences" Jaypee Brothers Medical Publishers, 1st Edition, 2018
3. Ramadas Nayak, Sharada Rai "Essentials in Hematology and Clinical Pathology" Jaypee Brothers Medical Publishers, Second Edition, 2018


### REFERENCE BOOKS:


1. David J. Magee, James E. Zachazewski, William S. Quillen, Robert C. Manske, "Pathology and Intervention in Musculoskeletal Rehabilitation" Saunders Publisher Pvt. Ltd. 2nd Edition, 2018.
2. Vinay Kumar, Abul K. Abbas, Jon C. Aster, Manoj K. Singh. Robbins and Cotran Pathologic Basis of Disease (Two Vol Set), 10e, Publisher Elsevier Health Science, South Asia Edition, 2020.


### VIDEO LECTURES:

1. https://www.youtube.com/watch?v=-Ph2uhw9BhE
2. https://www.youtube.com/watch?v=JcGKDDvk5AQ
3. https://www.youtube.com/watch?v=LaG3nKGotZs

### WEB RESOURCES:

1. https://www.aai.org/AAISite/media/Education/HST/Archive/Riina_Caroline_Presentation.pdf
2. https://drnaitiktrivedi.com/wp-content/uploads/2020/04/1.-CELL-INJURY-AND-CELLULAR-ADAPTATION.pdf
3. https://www.pearson.com/content/dam/one-dot-com/one-dot-com/us/en/higher-ed/en/products-services/course-products/fremgen-6e-info/pdf/Sample_ch04_final.pdf

# SCHOOL CORE

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

**Pre-Requisite** 22PT102008-Human Anatomy-I

**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:

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; 6th Edition, 2021
3. Inderbir Singh's book of Anatomy; Vol 1,2,3, 3rd Edition, 2020
4. Inderbir Singh's Text book of Human Histology, Jaypee Publishers, 10th Edition, 2022
5. Inderbir Singh's Text book of Human Embryology, Jaypee Publishers, 12th Edition, 2022
6. A. k. Datta, Essentials of human anatomy; Current books international publishers; Volume: 1,2,3,4; 10th Edition 2019.
7. Richard Tunstall and Susan Standring, Gray's Anatomy - The anatomical basis of clinical practice, Elsevier publishers, 42nd Edition 2020.
8. Rachel koshi, Cunningham's manual of practical Anatomy, Oxford University Press publishers, Volume - 1,2,3; 16thEdition 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** 22PT102009 Human Physiology-I

**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** ***(14Periods)***

Introduction: Physiological anatomy and nerve supply of the heart and blood vessels. Organization 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** ***0(8 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** ***(18Periods)***

Introduction: Organization 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, 9th Edition, Jaypee Medical Publishers, 2022.
2. D Venkatesh,Basics Of Medical Physiology 4Th Edition,Wolters Kluwer,2023
3. G.K. Pal and G.K Pravati pal, Textbook of Practical Physiology, Orient Longman, 2003

### REFERENCE BOOKS:

1. Ganong, Review of medical physiology, 23th edition, The McGraw hill,2023.
2. Guyton & Hall, Text book of Medical Physiology, 13th Edition, Saunders publisher, 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 must attend to clinical postings as per scheduled.
2. The Evaluation will follow by logbook, viva and attendance.

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| 22CC101017 | CONGENITAL HEART DISEASES -I | 4 | - | - | - | 4 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course will give detailed knowledge on general and cardiovascular examination, types of acyanotic congenital diseases. Understand the morphology, pathophysiology and clinical presentation of all acyanotic congenital heart diseases. Understand the importance of ECG, chest X ray, Echo and Cardiac Catheterization in making the diagnosis. Acquire knowledge about management plan of acyanotic congenital heart diseases.

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

**CO1.** Understand cardiac embryology, anatomic orientation and possible cardiac malposition

**CO2.** Acquire knowledge on general physical examination, cardiovascular examination and chest X -ray interpretation and clinical importance in diagnosing acyanotic congenital heart diseases

**CO3.** Understand embryology, anatomic classification, pathophysiology, clinical presentation, diagnosis and management of shunt lesions

**CO4.** Understand embryology, anatomic classification, pathophysiology, clinical presentation, diagnosis and management of left ventricular inflow and outflow obstructive and regurgitant lesions

**CO5.** Understand embryology, anatomic classification, pathophysiology, clinical presentation, diagnosis and management of right ventricular inflow and outflow obstructive and regurgitant lesions

**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 | - | - | - | - | - | - |
| CO3 | 3 | 2 | - | 1 | - | - | | - | - | - |
| CO4 | 3 | 2 | - | 1 | - | - | - | - | - | - |
| CO5 | 3 | 2 | - | 1 | - | - | - | - | - | - |
| CO6 | 3 | - | - | 1 | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **2** | **-** | **1** | **-** | **-** | **-** | **-** | **-** | **-** |

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

**COURSE CONTENT**

**Module 1: APPROACH TO CONGENITAL HEART DISEASES - I** ***(12 periods)***

Cardiac Embryology and Fetal Circulation-Introduction and classification of congenital heart disease, Clinical approach to congenital heart diseases: General physical examination, Cardiovascular Examination: Jugular venous pressure and waveform, Assessing the pulses, Inspection and palpation of the heart, heart sound and murmurs

**Module 2: APPROACH TO CONGENITAL HEART DISEASES - II** ***(12 periods)***

Chest X ray: Standard approach to chest X ray, Interpretation of cardiac chamber, Pulmonary arterial and venous flow, Cardiomegaly, Interpretation chest x ray in congenital heart diseases., Segmental approach to congenital heart diseases by echocardiography, Cardiac Malpositions, Paediatric echo views.

**Module 3: ACYANOTIC CONGENITAL HEART DISEASES -I** ***(12 periods)***

Atrial Septal Defect: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Ventricular Septal Defect: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Patent Ductus Arteriosus: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Atrioventricular Septal Defect: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management

**Module 4: ACYANOTIC CONGENITAL HEART DISEASES -I** ***(12 periods)***

Aortopulmonary window: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Partial anomalous pulmonary venous connection: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Ebsteins Anomaly: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management

**Module 5: OBSTRUCTIVE AND REGURGITANT LESIONS** ***(12 periods)***

Left Ventricular Inflow obstruction: Cor triatriatum sinister, Supravalvular mitral ring, Parachute mitral valve., Right Ventricular Inflow obstruction: Cor triatriatum Dexter., Congenital Aortic Stenosis: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Congenital Pulmonary Stenosis: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management, Coarctation of aorta,
Regurgitant lesions: MR, AR, PR and TR.

***Total Periods 60***

## EXPERIENTIAL LEARNING

**LIST OF EXPERIMENTS:**

1. Demonstrate the general physical examination
2. Perform the pulse examination, BP measurement, Inspection of the chest.
3. Demonstrate how to identify clubbing, cyanosis

4. Demonstrate the auscultation of heart sounds

5. Demonstrate interpretation of chest X ray, Pedaitric Echo Views

**RESOURCES**

**TEXT BOOKS:**

1. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine by Douglas P. Zipes
2. Park's Pediatric cardiology for practitioners- Myung D Park
3. Perloff's Clinical recognition of congenital heart disease: Joseph K. Perloff, Ariane J. Marelli
4. Echocardiography in pediatric heart disease by A. Rebecca Sinder
5. Latest edition of Moss and Adams' Heart disease in Infants, Children and Adolescents including the Fetus and Young Adult

**REFERENCE BOOKS:**

1. Feigenbaum's Echocardiography – 8th edition
2. Cardiology and Cardiac Catheterisation. The Essential Guide
   Edited By John Boland, John Edward Boland, David W. M. Muller, David Muller
3. Echo Manual: Tajik

**Web Resources**

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5299826/
2. https://radiopaedia.org/articles/acyanotic-congenital-heart-disease
3. https://link.springer.com/article/10.1007/s12098-017-2454-6

**VIDEO LECTURES:**

1. https://www.youtube.com/watch?v=tsPtZ0hgKIk
2. https://www.youtube.com/watch?v=0Jfxh-dZg7s
3. https://www.youtube.com/watch?v=v61r6LHrmL8

# PROGRAM CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| 22CC102015 | CARDIAC INSTRUMENTATION | 3 | - | 2 | - | 4 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** Understand the basic principles of ultrasound and gain knowledge of equipments used, working principle and clinical applications of different modalities used in echocardiography and cardiac catheterization.

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

**CO1.** Understand the history, basic principles of ultrasound, its clinical applications and transducer design, types and its uses.

**CO2.** Acquire knowledge on transmission of US energy, image creation, signal processing and different modes used in echocardiography.

**CO3.** Acquire knowledge on different types of echo machine, knobs of echo machine and make use of instrumentation in image optimization.

**CO4.** Understand basic principles of Doppler Echocardiography and acquire knowledge on types, uses, limitations of Doppler Echocardiography.

**CO5.** Acquire knowledge about X ray production, types of equipment, hardware's used in Cath lab and its clinical applications.

**CO6.** Understand the importance of radiation safety measures and sterility maintenance in cathlab.

**CO-PO Mapping Table:**

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

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

**COURSE CONTENT**

**Module 1: PHYSICS & INSTRUMENTATION - I *(09 periods)***

History of Echocardiography; Basic principles of Ultrasound; Interaction of US beam with tissue; Transducer: Design, types, advantages and limitations; Manipulation of US beam; Resolution: definition, types & its significance;

**Module 2: PHYSICS & INSTRUMENTATION - II *(09 periods)***

Creating image, Display and recording; Transmitting Ultrasound Energy: Pulse Echo System; Modes of echo: A -mode, B – mode, M – Mode, 2D – Principal, advantages, disadvantages, Adult Echo views ,clinical applications; Tradeoffs in image creation; Signal Processing;

**Module 3: ULTRASOUND EQUIPMENT *(9 periods)***

Echo Machine: Types, uses; Knobology: Definition, different knobs on echo machine and its clinical implications; 2D Artifacts: Definition, types, how to identify it and methods to prevent it; Tissue Harmonic Imaging: Principle, uses and limitations; Biological effects of ultrasound, Equipment maintenance., Storage of images and retrieval of data.

**Module 4: DOPPLER ECHOCARDIOGRAPHY *(9periods)***

Doppler Echocardiography: Principles, Doppler Formats: Pulsed and Continuous wave Doppler – principal, advantages and limitations; Color flow imaging – Principle, Advantages, Technical limitations; Doppler Artifacts; Tissue Doppler Imaging; Hemodynamic assessment by Doppler: Flow patterns, Volume quantification methods, Continuity equation, Bernoulli's equation, Pressure half time, PISA method.

***Module 5:*** **CARDIAC CATHETERIZATION EQUIPMENTS *(9 Periods)***

Equipment's used in Cath lab: X ray production and theory; C- ARM, Radiation Safety; Medical asepsis; Cardiac Physiology Monitors, ACT and IABP; Cardiac Pacemakers: Types, parts of pacemaker, appropriate modes of pacemakers, working application., Cardiac Defibrillator: Definition, components, types, Defibrillator electrodes, working principle, factors to consider during defibrillation, Implantable cardioverter defibrillator.,

***Total Periods 45***

**EXPERIENTIAL LEARNING**

**LIST OF EXPERIMENTS:**

1. Knowledge of basic principles of ultrasound and its importance in clinical application.
2. Demonstration of transducers, knobs of echo machine and techniques of image optimization.
3. Understanding the clinical applications of 2D and Doppler Echocardiography.
4. Demonstration of cardiac catheterization equipments, hardwares and its maintenance.
5. Knowledge of working principles of equipments used in Cath lab.

**RESOURCES**

**TEXT BOOKS:**


1. William F. Armstrong, Thomas Ryan "Feigenbaum's Echocardiography"- Wolters Kluwer India, 8th edition, 1 January 2019.
2. Sidney K. Edelman "Understanding Ultrasound Physics" - E.S.P. Ultrasound, 4th edition, 1 July 2012.
3. John G Webster "Medical Instrumentation: Application and Design" - John Wiley & Sons, 3rd Edition, 2006.
4. John Boland, John Edward Boland, David W. M. Muller, David Muller "Cardiology and Cardiac Catheterisation: The Essential Guide" – CRC Press, 1st edition, September 2001.
5. Kenneth A. Ellenbogen "Cardiac pacing and ICD's - Elsevier, 30 March 2016.


**REFERENCE BOOKS:**


1. Leslie Cromwell, Fred J Weibell & Erich A Pfeiffer" Biomedical Instrumentation & Measurement"- Prentice Hall, 2nd Edition, 2001.
2. Jae K. Oh, Garvan C. Kane "The Echo Manual" - Lippincott Williams and Wilkins, 4th edition, 24 November 2018.


**Web Resources**

1. https://www.youtube.com/watch?v=9LjtPWfsjFw
2. https://www.youtube.com/watch?v=w7VfXjrgjWo
3. https://ecgwaves.com/topic/two-dimensional-2d-echocardiography/
4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3727500/
5. https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/cardiac-catheterization

## PROGRAM CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22CC102012** | **EMERGENCY MEDICINE AND CARDIAC LIFE SUPPORT-I** | 3 | - | 2 | - | 4 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course is designed to train the skills of CPR for victims of all ages, use of an automated external defibrillator and relief of choking.

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

**CO1** Promptly recognize several life- threatening emergencies, give high – quality cardiopulmonary resuscitation and delivery appropriate ventilations and early use of an AED

**CO2** Identify the arrhythmias and apply high performance team management

**CO3** demonstrate the use a defibrillator in event of a cardiac emergency

**CO4** Understand types of tachyarrhythmia and understand the principles of treatment and know how to perform.

**CO5** Apply invasive and noninvasive cardiac pacing safely and effectively.

**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 | 2 | 1 | 1 |
| **CO2** | 3 | 1 | - | 3 | - | - | 2 | 2 | 1 | 1 |
| **CO3** | 3 | - | - | 3 | - | - | - | 2 | - | 1 |
| **CO4** | 3 | - | - | 2 | - | - | - | 1 | - | 1 |
| **CO5** | 3 | - | - | 2 | - | - | - | - | - | 1 |
| **CO6** | 3 | 1 | - | - | - | 1 | 2 | 1 | 1 | 1 |
| **Course Correlation Mapping** | **3** | **1** | | **2** | **-** | **1** | **2** | **2** | **1** | **1** |

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

## COURSE CONTENT

**Module 1: BASIC LIFE SUPPORT** ***(16 Periods)***

Introduction of BLS, Airway, Barrier devices for giving breaths., alternative airway, Adult Basic life support., Pregnant Basic life support., post cardiac arrest., opioid algorithm chocking., opoid algorithm., emergency drugs, Other life threatening emergencies, Heart attack, stroke, Drowning, Anaphylaxis, Gastro intestinal bleeding, Comparison of In hospital and out hospital .

**Module 2: ADVANCED CARDIAC LIFE SUPPORT** ***(10 Periods)***

Introduction, Respiratory arrest Vs Cardiac arrest, Bradycardia, Rhythm, Managing bradycardia., Tachycardia, Stable and Unstable, Managing Tachycardia., Shockable rhythm, Ventricular fibrillation, Pulseless ventricular Tachycardia., Management, Non Shockable rhythm, Pulseless electrical activity, Asystole, Management., Selected special situations, Post cardiac arrest care.

**Module 3: DEFIBRILLATOR** ***(8 Periods)***

Basics about defibrillation, types of defibrillator, manual external and internal defibrillator, semi automated external defibrillator, automated external defibrillator, implantable cardioverter defibrillator, wearable cardiac defibrillator, indications of defibrillation, procedural steps for defibrillation, energy levels (joules) , paddle versus adhesive patches

**Module 4: CARDIOVERSION AND PACING AND VENTILATION** ***(11 Periods)***

Introduction, Basics of Cardioversion, Indications Of Cardioversion, refractory period , Abnormal rhythm, Types of cardioversion, chemical cardioversion, electrical cardioversion, procedure, Procedure, Difference between Defibrillation and cardioversion. Introduction of Transcutanous pacing, indication, contraindication, procedure., Transvenousvenous pacing, indication, contraindication, procedure, ambulatory ventilator and drugs used.

***Total Periods: 45***

**EXPERIENTIAL LEARNING**

**LIST OF EXPERIMENTS:**

1. Demonstration of BASIC LIFE SUPPORT
2. Demonstration of ADVANCED CARDIAC LIFE SUPPORT
3. Demonstration of defibrillator
4. Demonstration of cardioversion
5. Understanding the pacing procedure

**RESOURCES BOOKS**


1. Monstenbjork M.D. "basic life support provider manual " medical creation (2020)
2. Monstenbjork M.D "Advance cardiovascular life support provider manual" medical creation (2021)


**VIDEO LECTURES:**

1. https://youtu.be/fb29LCjX4-E?si=gCgciS4RhXBb4rD2
2 https://youtu.be/qMR0WFByy4c?si=WuHf3gefmXF3c6rU
3. https://youtu.be/S7dm1-1WBww?si=xteqpxWLeXK4eRGo
4. https://youtu.be/fooQi2PRSZk?si=1o1dTfCpQPv1o8nX

**Web Resources:**

1. https://emedicine.medscape.com/article/1344081-overview
2. https://cpr.heart.org/en/resuscitation-science/cpr-and-ecc-guidelines/algorithms

## PROGRAM CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| 22CC102011 | **APPLIED PATHOLOGY** | 4 | - | 2 | - | 5 |

**Pre-Requisite** 22DF102009 Pathology

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course provides a detailed discussion on basic concepts of applied Pathology and understand of disease biology of various systems.

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

**CO1** Demonstrate basic knowledge disease conditions of cardiac diseases

**CO2** To Develop Basic knowledge about Pulmonary Pathophysiology

**CO3** Demonstrate basic knowledge disease conditions of blood and its blood cells.

**CO4** Ability to learn the different types of pathology Related to the nephron and kidney.

**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 | 1 | - | - | - |
| **CO2** | 3 | 1 | - | - | - | - | - | - | 3 | - |
| **CO3** | 3 | 1 | 3 | - | - | - | - | - | - | 1 |
| **CO4** | 3 | 1 | - | - | - | - | - | - | - | 1 |
| **CO5** | 3 | - | - | - | - | 1 | 1 | - | - | - |
| **Course Correlation Mapping** | **3** | **1** | **3** | **-** | **-** | **1** | **1** | **-** | **3** | **1** |

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

## COURSE CONTENT

**Module 1: CARDIOPATHOLOGY** ***(14 Periods)***

Cardiomyopathy-Definition, Types, causes and clinical significance• Pericardial effusion- causes, effects and diagnosis• Congenital heart diseases • Valvular Heart diseases-causes, Pathology & complication. Complications of artificial valves. Atherosclerosis- Definition, risk factors, Pathogenesis, clinical significance and management. • Hypertension-Definition, types and Pathogenesis and clinical manifestations. • Aneurysms-Definition, classification, Pathology and complications. Pathophysiology of Heart failure.

**Module 2: PULMONARY PATHOPHYSIOLOGY** ***(11 Periods)***

Disease conditions of lungs. Pneumonia, Bronchitis, Bronchiectasis, definition types and clinical manifestations. COPD, Asthma, - Definition and types. causes, Pathology & complications• basic Concept of obstructive versus restrictive pulmonary disease. • Pneumoconiosis-Definition, types, Pathology and clinical manifestations • Pulmonary congestion and edema. • Pleural effusion-causes, effects and diagnosis.

**Module 3: HEMATOPATHOLOGY** ***(11 Periods)***

Anemia: Classification, clinical features & lab diagnosis. - Hemostatic disorders, Vascular and Platelet disorders and its laboratory diagnosis. - Coagulopathies - Inherited and Acquired with lab diagnosis. - Leukocytic disorders: Leukocytosis, Leukopenias. - Leukemia: Classification, clinical manifestation, pathology and Diagnosis. Hematogenous pathological disorders.

**Module 4: RENAL PATHOLOGY** ***(11 Periods)***

Disorders related to the kindly diseases. Briefly the causes, mechanism, effects and diagnosis of ARF & CRF. Disease conditions of Glomerulus and nephron Pyelonephritis. Congenital anomalies• End stage renal disease - Definition, causes, effects and role of dialysis and renal transplantation in its management. • Brief concept about obstructive uropathy. Congenital diseases of renal system.

**Module 5: MUSCULOSKELETAL AND NEUROPATHOLOGY** ***(13 Periods)***

Disease conditions of musculoskeletal system like Osteomyelitis: acute, chronic, Rickets/ Osteomalacia, osteoporosis, Paget's disease. – Tumors classification. - Arthritis: Suppurative, Rheumatoid. Osteoarthritis, Gout, Tuberculous. Diseases of central nervous system- Cerebral Oedema & Its Management, Ocular Trauma, Meningitis, Encephalitis, Inflammations and Infections: TB Meningitis, Pyogenic Meningitis, viral meningitis and Brain Abscess.

***Total Periods: 60***

**EXPERIENTIAL LEARNING**

**LIST OF EXPERIMENTS:**

1. Description & diagnosis of the following gross specimens
    a. Atherosclerosis.
    b. Aortic aneurysm.
    c. Myocardial infraction.
    d. Emphysema
    e. Chronic glomerulonephritis.
    f. Chronic pyelonephritis
2. Interpretation & Diagnosis of the following charts
    a. Hematology Chart-AML, CML, Hemophilia, neutrophilia, eosinophilia.
    b. Urine Chart -ARF, CRF, Acute glomerulonephritis.
3. Estimation of Hemoglobin
4. Estimation Bleeding & Clotting time.

**RESOURCES**

**TEXT BOOKS:**


1. Harsh Mohan "Textbook of Pathology with Pathology Quick Review" Jaypee Brothers Medical Publishers, 8th Edition, 2019.
2. Ramadas Nayak "Textbook of Pathology for Allied Health Sciences" Jaypee Brothers Medical Publishers, 1st Edition, 2018
3. Ramadas Nayak, Sharada Rai "Essentials in Hematology and Clinical Pathology" Jaypee Brothers Medical Publishers, Second Edition, 2018


**REFERENCE BOOKS:**


1. David J. Magee, James E. Zachazewski, William S. Quillen, Robert C. Manske, "Pathology and Intervention in Musculoskeletal Rehabilitation" Saunders Publisher Pvt. Ltd. 2nd Edition, 2018.
2. Vinay Kumar, Abul K. Abbas, Jon C. Aster, Manoj K. Singh. Robbins and Cotran Pathologic Basis of Disease (Two Vol Set), 10e, Publisher Elsevier Health Science, South Asia Edition, 2020.
3. Dr.V.K.Srivastava, "Text book of Applied Clinical Pathology & Laboratory Diagnosis, Medico Refresher Publications, 1st edition, 2019.


**VIDEO LECTURES:**

1. https://www.youtube.com/watch?v=JcGKDDvk5AQ
2. https://www.youtube.com/watch?v=-Ph2uhw9BhE
3. https://www.youtube.com/watch?v=LaG3nKGotZs

**Web Resources:**

1. https://www.aai.org/AAISite/media/Education/HST/Archive/Riina_Caroline_Presentation.pdf
2. https://www.pearson.com/content/dam/one-dot-com/one-dot-com/us/en/higher-ed/en/products-services/course-products/fremgen-6e-info/pdf/Sample_ch04_final.pdf
3. https://drnaitiktrivedi.com/wp-content/uploads/2020/04/1.-CELL-INJURY-AND-CELLULAR-ADAPTATION.pdf

# SCHOOL CORE

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

**Pre-Requisite** 22CC111002 Clinical Posting-II

**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 case sheet of the concerned patient in the hospital.

**CO2.** Handled appropriate medical devices to generate patients' data.

**CO3.** Perform various instrumental handling techniques to analyse disorders.

**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 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **CO2** | 3 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **CO3** | 3 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **CO4** | 3 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **Course Correlation Mapping** | **3** | **1** | **-** | **2** | **-** | **1** | **3** | **1** | **-** | **1** |

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

**Note:**

1. Students must attend to clinical postings as per scheduled.
2. The Evaluation will follow by logbook, viva and attendance.

## PROGRAM CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22CC102013** | **STERILIZATION AND INFECTION CONTROL** | 3 | - | 2 | - | 4 |

**Pre-Requisite**

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course provides details on Health care associated infections and Antimicrobial resistance, communicable diseases to Healthcare workers in hospital set up and its preventive measure, importance of sterilization & disinfection in OT's, Wards, ICU's, CSSD.

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

**CO1** Have knowledge on various types of Health care associated infections and Antimicrobial resistance, Surveillance of emerging resistance and changing flora.

**CO2** Gain Knowledge on communicable diseases encountered by Healthcare workers in hospital set up and its preventive measure: Occupationally acquired infections in healthcare professionals by various routes, Preventive measures to combat the spread of these infections by monitoring and control.

**CO3** Learn Importance of sterilization Disinfection of instruments used in patient care rooms, OT's, wards, equipment's.

**CO4** Gain knowledge on Universal health precautions, Blood spill management, needle stick injury, Biomedical waste management Treatment of Biohazard samples

**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 | 2 | 3 | - | 2 | 1 | - | 2 | 3 |
| **CO2** | 3 | 3 | 2 | - | 1 | 2 | - | - | 3 | - |
| **CO3** | 3 | 3 | 3 | - | 2 | 3 | - | - | 3 | 1 |
| **CO4** | 2 | 2 | 3 | - | - | - | - | - | 2 | 1 |
| **CO5** | 1 | 1 | - | - | - | - | - | - | 2 | - |
| **Course Correlation Mapping** | **3** | **3** | **2** | **3** | **1** | **2** | **1** | **-** | **2** | **2** |

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

## COURSE CONTENT

**Module :1 HEALTH CARE ASSOCIATED INFECTIONS** ***(10 Periods)***

Health care associated infections and Antimicrobial resistance: Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting like Methicillin Resistant Staphylococcus aureus infections, Infections caused by *Clostriduium difficle*, Vancomycin resistant enterococci etc. Catheter related blood stream infections, Ventilator associated pneumonia, Catheter Related urinary tract infections, Surveillance of emerging resistance and changing flora.

**Module: 2 COMMUNICABLE DISEASE TO HEALTHCARE** ***( 10Periods)***

Disease communicable to Healthcare workers in hospital set up and its preventive measure: Occupationally acquired infections in healthcare professionals by respiratory route (tuberculosis, varicella-zoster, respiratory synctial virus etc), blood borne transmission (HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc), oro faecal route (Salmonella, Hepatitis A etc), direct contact ( Herpes Simplex Virus etc). Preventive measures to combat the spread of these infections by monitoring and control.

**Module 3: STERILIZATIONS IN OT** ***( 10Periods)***

Importance of sterilization: Disinfection of instruments used in patient care: Classification, different methods, advantages and disadvantages of the various methods. Disinfection of the patient care unit Infection control measures for ICU's Rooms: Gaseous sterilization, One Atmosphere Uniform Glow Discharge Plasma (OAUGDP). Equipments: classification of the instruments and appropriate methods of sterilization. Central supply sterile department: the four areas and the floor plan for instrument cleaning, high-level disinfecting and sterilizing areas.

**Module 4: UNIVERSAL PRECAUTIONS IN OT** ***(15 Periods)***

Standard and universal precautions, Blood spill management, needle stick injury, Biomedical waste management Treatment of Biohazard samples, Blood collection procedure.

***Total Periods: 45***

**EXPERIENTIAL LEARNING**

**LIST OF Practical:**

1. Demonstration of sterilization instruments Autoclave, Hot-airoven
2. Gaseous sterilization of OT's, Patient wards, ICU's
3. Collection of specimen from outpatient units, inpatient units, minor operation theater and major operation theater for sterility testing.
4. Interpretation of results of sterility testing.

**RESOURCES**

**TEXT BOOKS:**


1. Dwarkadas K Baheti, Vandana V Laheri " Text book of Understanding Anesthetic Equipment & Procedures: A Practical Approach" Jaypee Brothers Medical Publishers, 1st edition. 2015.
2. Anathanarayana & Panikar" Text book of Medical Microbiology, Jaypee Brothers Medical Publishers, 10th edition, University Press, 2022.
3. C.P. Baveja "Textbook of Microbiology" Arya Publications, 5th Edition, 2019.


**REFERENCE BOOKS:**


1. Connie R. Mahon MS, Donald C. Lehman " Text book of Diagnostic Microbiology" Saunders, 6th edition, 2018.
2. Dwarkadas K Baheti, Vandana V Laheri " Text book of Understanding Anesthetic Equipment & Procedures: A Practical Approach" Jaypee Brothers Medical Publishers, 1st edition. 2015.
3. Parmeshwar Kumar, Shakti Gupta, Arti Kapil " Text book of Disinfection and Sterilization Practices in Indian Operation Theatres, Lambert Academic publishing, 2018.


**VIDEO LECTURES:**

1. https://youtu.be/p_52PvJVxG8
2. https://youtu.be/mXEyw8635uc
3. https://youtu.be/32KyVb-Ggn8

**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 |
|---|---|---|---|---|---|---|
| **22CC101015** | **MEDICAL PSYCHOLOGY** | 3 | - | - | - | 3 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course provides a detailed discussion on various behavioral patterns of individuals, theories of development, normal and abnormal aspects of motor, social, emotional, and language development, and communication and interaction skills appropriate to various age groups.

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

**CO1** Understand the fundamental concepts of psychology and its branches.

**CO2** Acquire knowledge of basic concepts of growth and development of personality.

**CO3** Apply the concepts of Attention, Perception, and Sensation to assess the psychology of humans.

**CO4** Understand the fundamental concepts of conflicts, frustration, and its type.

**CO5** Analyse the theoretical concepts of Intelligence and Emotions.

**CO6** Acquire knowledge of basic theories of learning and types of personality.

### CO-PO Mapping Table:

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

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

## COURSE CONTENT

**Module 1: INTRODUCTION TO PSYCHOLOGY** ***(07 Periods)***

**Schools**: Structuralism, functionalism, behaviourism, Psychoanalysis.

**Methods:** Introspection, observation, inventory, and experimental method.

**Branches:** pure psychology and applied psychology; Psychology and physiotherapy

**Module 2: GROWTH AND DEVELOPMENT** **(08 Periods)**

**Life span:** Different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age)., **Heredity and environment:** Role of heredity and environment in physical and psychological development, "Nature v/s Nurture controversy

**Module 3: ATTENTION, PERCEPTION AND SENSATION** **(08 Periods)**

**Sensation:** Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation, movement, equilibrium, and visceral sense., **Attention:** Types of attention, Determinants of attention (subjective determinants and objective determinants)., **Perception:** Gestalt principles of organization of perception (principle of figure-ground and principles of grouping), factors influencing perception (experience and context).

**Illusion and hallucination**: Different types.

**Module 4: MOTIVATION, FRUSTRATION AND CONFLICT** **(08 Periods)**

**Motivation:** Motivation cycle (need, drive, incentive, reward), Classification of motives, Abraham Maslow's theory of need hierarchy, **Frustration:** sources of frustration., **Conflict:** types of conflict, Management of frustration, and conflict

**Module 5: INTELLIGENCE AND EMOTIONS** **(08 Periods)**

Three levels of analysis of emotion (physiological level, subjective state, and overt behavior).

Theories of emotion., Stress and management of stress., **Intelligence:** Theories of intelligence, Distribution of intelligence, Assessment of Intelligence., **Reasoning:** Deductive and inductive reasoning.

**Problem-solving:** Rules in problem-solving (algorithm and heuristic)., **Creative thinking:** Steps in creative thinking, traits of creative people.

**Module 6: INTELLIGENCE AND EMOTIONS** **(06 Periods)**

**Factors affecting learning.**

**Theories of learning:** trial and error learning, classical conditioning, Operant conditioning, insight learning, social learning theory.

**The effective ways to learn:** Massed/Spaced, Whole/Part, Recitation/Reading, Serial/Free recall, Incidental/Intentional learning, Knowledge of results, association, organization, and mnemonic methods.

**Personality**

**Approaches to Personality:** type & trait, behaviouristic, psychoanalytic, and humanistic approach.

**Personality Assessment:** observation, situational test, questionnaire, rating scale, interview, and projective techniques.

**Defence Mechanisms:** denial of reality, rationalization, projection, reaction formation, identification, repression, regression, intellectualization, undoing, introjection, acting out

***Total Periods: 45***

## EXPERIENTIAL LEARNING

1. Demonstration of various behavioral patterns and disorders.
2. Illustration on psychosocial disorders.
3. Demonstration of different personalities and disorders.
4. Analysis of intelligence quotient.
5. A clinical study on counselling the patient.
6. Demonstrating the concepts of problem-solving in psychosocial problems.

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

## RESOURCES

**BOOKS:**


1. Robert A Baron -Text Book Psychology, Jaypee Publishers, 2020
2. T.Ramalingam, Psychology for Physiotherapist – Jaypee Publishers 2nd Edition, 2019
3. Niraj Ahuja-Text Book of Psychiatry-Jaypee Publishers, 4th Edition, 2019


**VIDEO LECTURES:**

1. www.britannica.com
2. www.alliant.edu

**WEB RESOURCES:**

1. www.psychology.com
2. http://www.guides.lib.uw.edu

# 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** |

*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 ayush 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, 4th Edition, 2019
2. Sharon B. Buchbinder, Introduction to Health Care Management, 2nd Edition, 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 |
|---|---|---|---|---|---|---|
| **22CC111002** | **CLINICAL POSTING-II** | - | - | - | - | 4 |

**Pre-Requisite** Clinical Posting-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:

**CO5.** Develop case sheet of the concerned patient in the hospital.

**CO6.** Handled appropriate medical devices to generate patients' data.

**CO7.** Perform various instrumental handling techniques to analyse disorders.

**CO8.** 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 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **CO2** | 3 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **CO3** | 3 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **CO4** | 3 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **Course Correlation Mapping** | **3** | **1** | **-** | **2** | **-** | **1** | **3** | **1** | **-** | **1** |

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

**Note:**

1. Students must attend to clinical postings as per scheduled.
2. The Evaluation will follow by logbook, viva and attendance.

# 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

**CO-PO Mapping Table:**

**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।

| 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 experiential learning components will be detailed in CHO

**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 ELECTIVE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| 22CC102044 | CONGENITAL HEART DISEASES -II | 3 | - | 2 | - | 4 |

**Pre-Requisite** 22CC101017 Congenital Heart Disease -I

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** Acquire knowledge about types of cyanotic congenital diseases. Understand the morphology, pathophysiology and clinical presentation of all cyanotic congenital heart diseases. Understand the importance of ECG, chest X ray, Echo and Cardiac Catheterization in making the diagnosis. Acquire knowledge about management plan of cyanotic congenital heart diseases.

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

**CO1.** Understand embryology, anatomic classification, pathophysiology, clinical presentation, diagnosis and management of decreased pulmonary blood flow lesions.

**CO2.** Understand embryology, anatomic classification, pathophysiology, clinical presentation, diagnosis and management of increased pulmonary blood flow lesions.

**CO3.** Understand embryology, anatomic classification, pathophysiology, clinical presentation, diagnosis and management of univentricular defects.

**CO4.** Understand embryology, anatomic classification, pathophysiology, clinical presentation, diagnosis and management of coronary anomalies, RSOV, arteriovenous fistula and other miscellaneous conditions.

**CO5.** Understand embryology, anatomic classification, pathophysiology, clinical presentation, diagnosis and management of acquired heart diseases.

**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 | - | 1 | - | - | - | - | - | - |
| CO3 | 3 | 1 | - | 1 | - | - | - | - | - | - |
| CO4 | 3 | 1 | - | 1 | - | - | - | - | - | - |
| CO5 | 3 | 1 | - | 1 | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **1** | **-** | **1** | **-** | **-** | **-** | **-** | **-** | **-** |

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

**COURSE CONTENT**

**Module 1: DECREASED PULMONARY BLOOD FLOW LESIONS** ***(09 periods)***

Introduction and approach to cyanotic congenital heart diseases., Tetralogy of Fallot: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management., TOF with pulmonary atresia: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management, Pulmonary atresia with intact IVS: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management

**Module 2: INCREASED PULMONARY BLOOD FLOW LESIONS** ***(09 periods)***

Transposition of great arteries: Definition, types, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Total anomalous pulmonary venous connection: Definition, types, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Truncus Arteriosus: Definition, types, morphology, prevalence, classification, pathophysiology, Diagnosis and management

**Module 3: UNIVENTRICULAR DEFECTS** ***(09 periods)***

Tricuspid atresia: Definition, types, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Double outlet right ventricle: Definition, types, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Double inlet left ventricle: Definition, types, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Hypoplastic left heart syndrome: Definition, types, morphology, prevalence, classification, pathophysiology, Diagnosis and management.

**Module 4: MISCELLANEOUS CONGENITAL CARDIAC CONDITIONS** ***(09 periods)***

Congenital coronary anomalies: Definition, morphology, prevalence, classification, pathophysiology, Diagnosis and management., Aneurysm of Sinus of Valsalva, Arteriovenous fistula: Coronary, Pulmonary and Systemic., Double chambered right ventricle., Primary pulmonary hypertension., Scimitar syndrome.

**Module 5: PRIMARY MYOCARDIAL DISEASE AND CARDIOVASCULAR INFECTIONS** ***(09 periods)***

Cardiomyopathies: Dilated cardiomyopathy, Hypertrophic cardiomyopathy, Restrictive cardiomyopathy, Non-Compaction cardiomyopathy, Right ventricular dysplasia., Cardiovascular infections: Myocarditis, Pericarditis, Constrictive Pericarditis, Kawasaki disease.

***Total 45 periods***

**EXPERIENTIAL LEARNING**

**LIST OF EXPERIMENTS:**

1. Demonstration of pediatric echo views and understanding its clinical applicaions to diagnose various cyanotic CHD's
2. Knowledge on physical examination and signs and symptoms to diagnose cyanotic CHD's
3. Demonstration of ECG and chest X ray features of various cyanotic CHD's
4. Demonstration of 2D and Doppler echocardiographic features of decreased pulmonary blood flow lesions.
5. Demonstration of 2D and Doppler echocardiographic features of increased pulmonary blood flow lesions.
6. Demonstration of 2D and Doppler echocardiographic features of univentricular and other miscellaneous condition
7. Knowledge on cardiac catheterization features to diagnose cyanotic CHD's
8. Understanding the management plan for various cyanotic CHD's

**RESOURCES**

**TEXT BOOKS:**


1. Myung K Park, Pediatric cardiology for practitioners, Mosby Elsevier, 5th edition, 2001.
2. M Satpathy, Clinical diagnosis of congenital heart diseases, Jaypee Brothers, 1st edition, 1995.
3. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine edited by Douglas P. Zipes, Elsevier – 11th edition, 2020.
4. Joseph K. Perloff, Ariane J. Marelli, Perloff's clinical recognition of congenital heart disease, Elsevier – 6th edition, 2009.
5. Grossman & Baim's – Cardiac catheterization, Angiography and Intervention, Wolters Kluwer - 8th edition, 2011.


**REFERENCE BOOKS:**


1. William F.Armstrong,Thomas Ryan - Feigenbaum's Echocardiography, Wolters Kluwer – 8th edition. 2020.
2. Jae K. Oh, James B.Seward, A.Jamil Tajik, The Echo Manual, Wolters Kluwer –3rd edition, 2011.


**Web Resources**

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5299826/
2. https://radiopaedia.org/articles/acyanotic-congenital-heart-disease
3. https://link.springer.com/article/10.1007/s12098-017-2454-6

**Video Resources**

1. www.youtube.com/@geekymedics
2. youtube.com/c/johnsonscardiologytalks
3. www.youtube.com/@TheEchoweb
4. www.youtube.com/@123sonographycom
5. www.youtube.com/@IAEecho
6. www.youtube.com/@cardiologylectures
7. https://www.youtube.com/watch?v=0Dz1xhMvlQk
8. https://www.youtube.com/watch?v=wyciwIk7Vc4
9. https://www.youtube.com/watch?v=5unzVgSV1y4
10. https://www.youtube.com/watch?v=2KCSUWpcLLw

# PROGRAM ELECTIVE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| 22CC102054 | CARDIAC CATHETERIZATION-I | 4 | - | 2 | - | 5 |

**Pre-Requisite**

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** Acquire knowledge about diagnostic approach of cardiac catheterization, Understand the fundamental principles of hemodynamic measurements and gain knowledge of various pressure measurements and apply it to diagnose various cardiac diseases. Understand standard angiographic techniques, equipments, materials used, and post procedural care of angiographic procedures.

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

**CO1.** Acquire knowledge about materials used, prerequisites and equipment used for angiographic procedures.

**CO2.** Understand the basics of cardiac hemodynamics, pressure measurements and application it in diagnosing various pathologies.

**CO3.** Acquire knowledge on standard angiographic views, hardwares used, procedural techniques and role of post procedural care of angiographic procedures.

**CO4.** Acquire knowledge about materials used, angiographic views, hardwares used, procedural techniques and role of post procedural care of aortic and peripheral vascular diseases.

**CO5.** Acquire knowledge to take measures to interpret various catheterization complications and its management techniques.

**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 | - | 1 | - | - | - | - | - | - |
| CO3 | 3 | 1 | - | 1 | - | - | - | - | - | - |
| CO4 | 3 | 1 | - | 1 | - | - | - | - | - | - |
| CO5 | 3 | 1 | - | 1 | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **1** | **-** | **1** | **-** | **-** | **-** | **-** | **-** | |

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

**COURSE CONTENT**

**Module 1: INTRODUCTION TO CARDIAC CATH PROCEDURES** ***(12 periods)***

Guidelines for diagnostic catheterization; Prerequisites for cath procedures: premedication, anaesthesia and other investigations; Catheterization equipment and diagnostic catheters; Vascular access: Introduction, Types – arterial and femoral, Indications and contraindications, materials used and complications; Contrast Media used in cathlab: Introduction, classification, indications, contraindications, uses, contrast dose for various procedures and complications.

**Module 2: CARDIAC HEMODYNAMICS AND PRESSURE MEASUREMENTS** ***(12 periods)***

Cardiac Hemodynamics: systemic vascular resistance, pulmonary vascular resistance, normal intracardiac pressures; Cardiac output measurement: equipment, materials, procedure and methods, Pressure measurements: materials used, techniques and procedure, Shunt detection and quantification; Pitfalls in calculating hemodynamic variables.

**Module 3: ANGIOGRAPHIC TECHNIQUES -I** ***(12 periods)***

Coronary Vascular System: arterial and venous anatomy., Standard Angiographic Views., Coronary angiogram: Indications, contraindications, patient preparation, materials used, procedure, complications and post procedural care., Right and Left Heart catheterization: Indications, contraindications, patient preparation, materials used, procedure, complications and post procedural care, Cardiac cath in VHD: calculation of stenotic orifice area.

**Module 4: ANGIOGRAPHIC TECHNIQUES -II** ***(12 periods)***

Pulmonary angiography: Indications, contraindications, patient preparation, materials used, procedure, complications and post procedural care., Peripheral vascular disease: Introduction, anatomy, lower extremity peripheral artery disease., Digital subtraction angiography technique., Peripheral angiogram: Indications, contraindications, patient preparation, materials used, procedure, complications and post procedural care,

***Module 5: ANGIOGRAPHY OF THE AORTA*** ***(12 Periods)***

Angiography of the Aorta: Introduction, materials and equipment used, radiographic techniques, Indications, Contraindications, procedure and complications., Thoracic aortography: Indications, contraindications, patient preparation, materials used, procedure, complications., Carotid arteriography: Indications, contraindications, patient preparation, materials used, procedure, complications and post procedural care., Renal angiography: Indications, contraindications, patient preparation, materials used, procedure, complications and post procedural care.

***60 periods***

**EXPERIENTIAL LEARNING**

**LIST OF EXPERIMENTS:**

1. Demonstration of equipments used, materials used for catheterization procedures.
2. Understanding the role of diagnostic tests as prerequisite for cath procedures
3. Knowledge of patient preparation, arrangement of materials, for various angiographic procedures.
4. Demonstration of angiographic views, techniques and its clinical importance in various angiographic procedures.
5. Understanding the basic principles of cardiac hemodynamics and its importance in diagnosing various cardiac pathologies.
6. Understanding the principles and pressure measurements of cardiac chambers by cardiac catheterization.
7. Demonstration of quantification of intracardiac shunts, and cardiac output by cardiac catheterization.
8. Demonstration how to interpretation of coronary angiogram and clinical importance in management plan.
9. Demonstration how to interpretation of peripheral and aortic angiograms and clinical importance in management plan
10. Knowledge of how to take measures to prevent complications during cath procedures and post procedural care.

**RESOURCES**

**TEXT BOOKS:**

1. Grossman & Baim's ,Cardiac Catheterization, Angiography and Intervention, Wolters Kluwer- 8th edition, 2020.
2. Morton J. Kern, The Interventional Cardiac Catheterization Hand Book, Elsevier,4th edition, 2001.

**REFERENCE BOOKS:**

1. Brian Griffin, Edited by Sanjay Kumar Chugh, Manual of Cardiovascular Medicine, Wolters Kluwer, First south Asian edition, 2022.

**Web Resources**

1. https://www.slideshare.net/
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3727500/
3. https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/cardiac-catheterization
4. https://www.nhlbi.nih.gov/health/cardiac-catheterization/preparing
5. www.dicardiology.com/content/hemodynamic-monitoring-systems
6. http://www.medicalphysics.org/

**Video Resources**

1. https://www.youtube.com/watch?v=9hfm6COMKJI
2. https://www.youtube.com/watch?v=jwgnUrHeTEA
3. https://www.youtube.com/watch?v=xMIq2MivI0g
4. https://www.youtube.com/watch?v=xj_-UM23LuM

# PROGRAM ELECTIVE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| 22CC102055 | CARDIAC EVALUATION AND THERAPIES-I | 3 | - | 2 | - | 4 |

**Pre-Requisite**

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** Acquire knowledge about concepts of morphology and understand pathophysiology and clinical presentation and hemodynamics of Ischemic, Valvular and Pericardial diseases. The students are exposed to the clinical postings and are also taught the importance of ECG, chest X ray, Echo and Cardiac Catheterization in making the diagnosis. Acquire knowledge about management plan of systemic heart diseases.

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

**CO1.** Acquire knowledge on role of 2D and Doppler echocardiographic methods, advantages and limitations to perform the chamber quantification and to assess systolic and diastolic function.

**CO2.** Understand the morphology, pathophysiology and clinical presentation of ischemic heart diseases.

**CO3.** Acquire knowledge on role of various non-invasive diagnostic tests for risk stratification and management plan for patients with ischemic heart diseases.

**CO4.** Understand the morphology, pathophysiology and clinical presentation of valvular heart diseases and pericardial diseases.

**CO5.** Acquire knowledge on role of various non-invasive diagnostic tests for risk stratification and management plan for patients with valvular heart diseases and pericardial diseases.

**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 | - | 1 | - | - | - | - | - | - |
| CO3 | 3 | 1 | - | 1 | - | - | - | - | - | - |
| CO4 | 3 | 1 | - | 1 | - | - | - | - | - | - |
| CO5 | 3 | 1 | - | 1 | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **1** | **-** | **1** | **-** | **-** | **-** | **-** | **-** | **-** |

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

**COURSE CONTENT**

**Module 1: CHAMBER QUANTIFICATION BY ECHOCARDIOGRAPHY *(09 periods)***

Echocardiographic assessment of left ventricular systolic and diastolic function; Echocardiographic assessment of left atrium; Echocardiographic assessment of right atrium and right ventricle; Normal anatomical variants.

**Module 2: CORONARY ARTERY DISEASE *(09 periods)***

Acute coronary syndrome: Definition, Unstable angina, Chronic stable angina, Pathophysiology of ACS, Diagnosis: Ischemic cascade, ECG in MI, ECHO – detection of wall motion abnormalities, wall motion score index and quantification of LV function, Complications of acute MI: Assessment by ECHO; Chronic coronary artery disease, Role of other modalities.

**Module 3: VALVULAR HEART DISEASES – STENOTIC LESIONS *(09 periods)***

Rheumatic Fever: Introduction, pathophysiology, diagnosis, management; Mitral Stenosis: Definition, etiology, pathophysiology, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management; Aortic Stenosis: Definition, etiology, pathophysiology, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management; Tricuspid Stenosis: Definition, etiology, pathophysiology, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management; Pulmonary Stenosis: Definition, etiology, pathophysiology, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management;

**Module 4: VALVULAR HEART DISEASES – REGURGITANT LESIONS *(09 periods)***

Mitral Regurgitation: Definition, etiology, pathophysiology, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management; Aortic Regurgitation: Definition, etiology, pathophysiology, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management; Tricuspid Regurgitation: Definition, etiology, pathophysiology, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management; Pulmonary Regurgitation: Definition, etiology, pathophysiology, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management;

**Module 5: MYO-PERICARDIAL DISEASES *(09 periods)***

Pericardial diseases: Introduction, normal anatomy and function, classification; Pericardial effusion: Definition, etiology, pathophysiology, types, cardiac tamponade, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management; Pericarditis: Definition, etiology, pathophysiology, types, constrictive pericarditis, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management, Differentiation between constrictive pericarditis and restrictive cardiomyopathy; Myocarditis: Definition, etiology, pathophysiology, clinical presentation, Diagnosis: Chest X ray, ECG, ECHO, Management; correlation between myocarditis and pericarditis

***Total 45 periods***

## EXPERIENTIAL LEARNING

### LIST OF EXPERIMENTS:

1. Understanding 2D and Doppler echocardiographic methods of chamber quantification.
2. Demonstration and interpretation of 2D and Doppler methods of chamber quantification.
3. Understanding the clinical applications of chamber quantification by echo to diagnose Coronary, valvular and myo-pericardial diseases.
4. Understanding general physical examination and its clinical significance to diagnose coronary artery disease valvular and myo- pericardial diseases.
5. Observing and interpretation of ECG and chest X ray findings to diagnose coronary artery disease, valvular and myo- pericardial diseases.
6. Demonstration of 2D and Doppler echocardiographic methods to assess coronary artery disease and how to diagnose complications of CAD on echocardiography.
7. Demonstration of 2D and Doppler echocardiographic methods to assess valvular heart diseases and understand the role of echo in management of valvular heart diseases.
8. Demonstration of 2D and Doppler echocardiographic methods to assess myo-pericardial heart diseases and understand the role of echo in management of valvular heart diseases.
9. Understanding the importance of cardiac catheterization in diagnosing coronary artery disease and its role in clinical decision making.
10. Understanding the importance of cardiac catheterization in diagnosing valvular and myo-pericardial diseases and its role in clinical decision making.

## RESOURCES

### TEXT BOOKS:


1. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine edited by Douglas P. Zipes, Elsevier – 11th edition
2. William F.Armstrong, Thomas Ryan - Feigenbaum's Echocardiography, Wolters Kluwer – 8th edition
3. Catherine M. Otto – The practice of Clinical Echocardiography, Elsevier – 4th edition
4. Jae K. Oh, James B.Seward, A.Jamil Tajik, The Echo Manual, Wolters Kluwer –3rd edition
5. Leo Schamroth, An Introduction to Electrocardiography, Wiley – 8th edition
6. Grossman & Baim's – Cardiac catheterization, Angiography and Intervention, Wolters Kluwer - 8th edition


### REFERENCE BOOKS:


1. Atul Luthra - ECG made easy, Jaypee – 5th edition
2. David W. M. Muller, John Edward Boland - The Essential Guide of Cardiology and Cardiac Catheterisation, Wolters Kluwer - 5th edition
3. Atul Luthra – ECHO made easy, Jaypee – 5th edition

**Web Resources**

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5299826/
2. https://radiopaedia.org/articles/acyanotic-congenital-heart-disease
3. https://link.springer.com/article/10.1007/s12098-017-2454-6

**Video Resources**

1. https://www.youtube.com/watch?v=pZT_13noYjE
2. https://www.youtube.com/watch?v=RxsflKRxfM8
3. https://www.youtube.com/watch?v=_RK8z4BAMeQ
4. youtube.com/c/johnsonscardiologytalks
5. www.youtube.com/@TheEchoweb
6. www.youtube.com/@123sonographycom
7. www.youtube.com/@IAEecho
8. www.youtube.com/@cardiologylectures

## PROGRAM ELECTIVE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22CC102017** | **EMERGENCY MEDICINE AND CARDIAC LIFE SUPPORT- II** | 3 | - | 2 | - | 4 |

**Pre-Requisite** 22CC102012 Emergency Medicine and Cardiac Life Support- I

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course is designed to train the skills of CPR for victims of all ages, use of an automated external defibrillator and relief of choking.

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

**CO1** Promptly recognize several life- threatening emergencies, give high – quality cardiopulmonary resuscitation and delivery appropriate ventilations and early use of an AED

**CO2** Identify the arrhythmias and apply high performance team management

**CO3** demonstrate the use a defibrillator in event of a cardiac emergency

**CO4** Understand types of tachyarrhythmia and understand the principles of treatment and know how to perform.

**CO5** Apply invasive and non invasive cardiac pacing safely and effectively.

### CO-PO Mapping Table:

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

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

## COURSE CONTENT

**Module 1: PEDIATRIC BASIC AND ADVANCED LIFE SUPPORT** ***(13 Periods)***

Anthropometry, neonatal resuscitation, algorithm of treating asphyxia patients, routine care of baby, diarrhea, pathophysiology, treatment, foreign body obstruction, sudden infant death syndrome, prevention, diaphragmatic hernia, types, treatment.

**Module 2: ADVANCED TRAUMA LIFE SUPPORT** ***(10 Periods)***

Advance trauma life support algorithm, management, types of fracture, epidural hematoma, subdural hematoma, Subarachnoid Haemorrhage, cardiac tamponade, head injury.

**Module 3: PREGNANCY LIFE SUPPORT** ***(11 Periods)***

Hemorrhage in early pregnancy, abortion, threatened, inevitable, complete, incomplete, missed, septic, recurrent, medical termination of pregnancy, ectopic pregnancy, sites of ectopic pregnancy, management of ectopic pregnancy, hypertensive disorders in pregnancy , pre eclampsia , eclampsia, cord prolapsed, breech presentation.

**Module 4: SUPPORTING EQUIPMENT'S** ***(11 Periods)***

Introduction, Airway equipment and management, laryngeal mask airway, combitube, OPA, NPA, endotracheal intubation, spine board, scoop board, Kendrick extrication device.

***Total Periods: 45***

**EXPERIENTIAL LEARNING**

**LIST OF EXPERIMENTS:**

1. Understanding of pediatric emergency.
2. Demonstration of advanced trauma life support
3. Demonstration of pregnancy medical condition.
4. Demonstration of emergency equipment.

**RESOURCES**

**BOOKS**

1. A.Snthosh kumar, handbook of pediatrics, CBS publishers, Edition 1, 2017
2. Louis Solomon, David J.Warwick, Apleys system of orthopedics and fracture, Arnold publications, Edition 1, 2020

**VIDEO LECTURES:**

1. https://youtu.be/nTa1Oxv-LVw?si=j_deWPX7eUmpOTGq
2. https://youtu.be/qMR0WFByy4c?si=WuHf3gefmXF3c6rU
3. https://youtu.be/_CAv_eM2nSA?si=gDymQhTc1ptpbiSO
4. https://youtu.be/fooQi2PRSZk?si=1o1dTfCpQPv1o8nX

**Web Resources:**

1. www.samlib.com/textbooksorthopedicsSanders: Core Knowledge in Orthopaedics: Trauma, 1st ed.; 2008.
2. www. emedicine - Medscape reference

# SCHOOL CORE

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

**Pre-Requisite** Clinical Posting-III

**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:

**CO9.** Develop case sheet of the concerned patient in the hospital.

**CO10.** Handled appropriate medical devices to generate patients' data.

**CO11.** Perform various instrumental handling techniques to analyse disorders.

**CO12.** 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 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **CO2** | 3 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **CO3** | 3 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **CO4** | 3 | 1 | - | 2 | - | 1 | 3 | 1 | - | 1 |
| **Course Correlation Mapping** | **3** | **1** | **-** | **2** | **-** | **1** | **3** | **1** | **-** | **1** |

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

**Note:**

1. Students must attend to clinical postings as per scheduled.
2. The Evaluation will follow by logbook, viva and attendance.

## 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/

**PROGRAM ELECTIVE**

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22CC102047** | **CARDIAC EVALUATION AND THERAPIES - II** | 4 | - | 2 | - | 5 |

**Pre-Requisite** 22CC102055 Cardiac Evaluation and Therapies - I

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** Acquire knowledge about concepts of morphology and understand pathophysiology and clinical presentation and hemodynamics of cardiomyopathies, aortic and pulmonary diseases. The students are exposed to the practical knowledge and are also taught the importance of ECG, chest X ray, Echo and Cardiac Catheterization in making the diagnosis of these conditions. Acquire knowledge about management plan of systemic heart diseases.

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

**CO1.** Understand the etiology, clinical presentation and pathophysiology of cardiomyopathies, and aortic diseases.

**CO2.** Acquire knowledge on diagnostic features and echocardiographic approach to diagnose cardiomyopathies, aortic diseases and their management.

**CO3.** Understand the etiology, clinical presentation and pathophysiology of pulmonary diseases, cardiac masses and tumors.

**CO4.** Acquire knowledge on diagnostic features and echocardiographic approach to diagnose pulmonary diseases, cardiac masses and tumors.

**CO5.** Acquire knowledge on echocardiographic role and features in miscellaneous conditions and ICU and post operative settings.

**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 | - | 1 | - | - | - | - | - | - |
| **CO3** | 3 | 1 | - | 1 | - | - | - | - | - | - |
| **CO4** | 3 | 1 | - | 1 | - | - | - | - | - | - |
| **CO5** | 3 | 1 | - | 1 | - | - | - | - | - | - |
| **Course Correlation Mapping** | **3** | **1** | **-** | **1** | **-** | **-** | **-** | **-** | **-** | **-** |

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

**COURSE CONTENT**

**Module 1: CARDIOMYOPATHIES** ***(12 periods)***

Introduction, Classification: DCM, HCM & RCM – Etiology, Pathophysiology & Clinical Presentation, Diagnosis & Management; Infiltrative Cardiomyopathy: Cardiac Amyloidosis, Endomyocardial fibrosis, Sarcoidosis; Other variants in Cardiomyopathy: Peripartum Cardiomyopathy, LV non compaction, Arrhythmogenic RV dysplasia, Takostubo Cardiomyopathy, Chagas Myocarditis.

**Module 2: AORTIC DISEASES** ***(12 periods)***

Introduction, aortic root anatomy, classification of aortic root diseases; Aortic aneurysm: Etiology, types, clinical presentation, diagnosis – ECG, ECHO and Cath, management; Marfan's syndrome; Aortic dissection: Etiology, Standford and Debakey classification, clinical presentation, diagnosis – ECG, ECHO and Cath, management; RSOV and aortic trauma: Etiology, types, clinical presentation, diagnosis – ECG, ECHO and Cath, management; Takayasu Arteritis; Infections of aorta.

**Module 3: PULMONARY DISEASES** ***(12 periods)***

Pulmonary Hypertension: Introduction, types, etiology, clinical presentation, diagnosis – Chest X ray, ECG, ECHO & management; Pulmonary Embolism: Introduction, types, etiology, clinical presentation, diagnosis – Chest X ray, ECG, ECHO & management of acute and chronic pulmonary embolism, Chronic thromboembolic pulmonary hypertension; COPD; Cardiopulmonary diseases: Pneumonia, Cardiogenic Pulmonary Edema.

**Module 4: CARDIAC MASSES AND TUMORS** ***(12 periods)***

Normal Variants and artifacts: Role of echo in differentiating false positive sources; Infective Endocarditis: Definition, etiology, pathophysiology, clinical presentation, Diagnosis; Cardiac Masses and tumors: Introduction, Classification, primary cardiac tumors, Metastatic cardiac tumors - etiology, clinical presentation, diagnosis – ECG, ECHO & management; Intracardiac thrombi; Pseudotumor; Prosthetic Valves: Introduction, types, evaluation of prosthetic valve function by echocardiography.

**Module 5: ECHO IN MISCELLANEOUS CONDITIONS** ***(12 periods)***

Hypertension, Thyroid Disease: Hyperthyroidism and Hypothyroidism, Diabetes milletus, Chronic renal insufficiency and Obesity; Hypotension and Shock, Role of echo in ICU, Role of echo in pre procedural and post procedural care.

***Total Periods 60***

## EXPERIENTIAL LEARNING

### LIST OF EXPERIMENTS:

1. Observe and understand the clinical features of cardiomyopathies, aortic and pulmonary diseases.
2. Observing and acquiring knowledge of ECG and chest X ray findings to cardiomyopathies, aortic and pulmonary diseases.
3. Demonstration of 2D and Doppler echocardiographic methods to assess cardiomyopathies, aortic and pulmonary diseases.
4. Observe and understand the clinical features of cardiac masses, tumors and miscellaneous cardiac diseases.
5. Observing and acquiring knowledge of ECG and chest X ray findings of cardiac masses, tumors and miscellaneous cardiac diseases.
6. Demonstration of 2D and Doppler echocardiographic methods to assess cardiac masses, tumors and miscellaneous cardiac diseases.
7. Understanding the importance of cardiac catheterization in diagnosing cardiac masses, tumors and miscellaneous cardiac diseases and its role in clinical decision making.

### RESOURCES

### TEXT BOOKS:

1. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine by Douglas P. Zipes
2. Feigenbaum's Echocardiography – 8th edition
3. Textbook of Clinical Echocardiography by Dr Catherine Otto – 7th edition
4. Leo Schamroth Electrocardiography
5. Grossman's and Baim's book of cardiac catheterization

### REFERENCE BOOKS:

1. Echo made easy by Atul Luthra
2. Cardiology and Cardiac Catheterisation. The Essential Guide
   Edited By John Boland, John Edward Boland, David W. M. Muller, David Muller
3. The Echo Manual – 5th edition by A Jamil Tajik

### Web Resources

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5299826/
2. https://radiopaedia.org/articles/acyanotic-congenital-heart-disease
3. https://link.springer.com/article/10.1007/s12098-017-2454-6

## PROGRAM CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22CC102046** | **CARDIAC CATHETERIZATION -II** | 4 | - | 2 | - | 5 |

**Pre-Requisite** 22CC102054 Cardiac Catheterization -I

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course helps to acquire basic knowledge about different types of hardware's and devices used in various interventional procedures. Provides the fundamental knowledge cardiac and peripheral therapeutic and interventional procedures. Understand the hemodynamics and techniques and steps of procedure with the help of diagnostic modalities and the role of technologist during the procedure, complications and its management.

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

**CO1.** Understand about characteristics of commonly used catheters, stents used for interventional procedures and able to explain stent designs, properties, uses and complications.

**CO2.** Acquire knowledge about materials used, angiographic views, procedural techniques and role of post procedural care of angioplasty procedures.

**CO3.** Acquire knowledge about materials used, angiographic views, procedural techniques and role of post procedural care of device closures.

**CO4.** Acquire knowledge about materials used, angiographic views, procedural techniques and role of post procedural care of valvuloplasty procedures.

**CO5.** Acquire knowledge about materials used, angiographic views, procedural techniques and role of post procedural care of EP study and other interventional procedures.

**CO-PO Mapping Table:**

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

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

**COURSE CONTENT**

**Module 1: INTRODUCTION TO INTERVENTIONAL HARDWARES *(12 periods)***

Interventional Catheters: Design, properties, materials used, types, uses and complications; Pacing Catheters: Design, properties, materials used, types – unipolar and bipolar pacing catheters, uses and complications; PTCA Hardwares: basic components of guiding catheters, design, properties, size selection and preparation of balloon dilatation catheters; Coronary Stents: composition, stent design, types, delivery system, advantages and complications; Peripheral stents: composition, stent design, types, method of stenting, advantages and complications, IVC filter;

**Module 2: ANGIOPLASTY TECHNIQUES *(12 periods)***

Coronary Angioplasty: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management; Peripheral Angioplasty: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management, Renal & Carotid angioplasty: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management;

**Module 3: DEVICE CLOSURES *(12 periods)***

Device Closure of ASD, PFO: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management; Device closure of VSD: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management; Device closure and Coil closure of PDA: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management; RSOV Device Closure: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management; LAA Device closure: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management.

**Module 4: VALVULOPLASTIES *(12 periods)***

PTMC: Indications, contraindications, patient selection, materials used, procedure, complications & its management; Balloon Aortic Valvuloplasty: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management; Balloon Pulmonary Valvuloplasty: Indications, contraindications, materials used, procedure, techniques and angiographic views, complications and its management; Role of echocardiography during valvuloplasty procedures

***Module 5:*** **OTHER INTERVENTIONAL PROCEDURES *(12 Periods)***

PTSMA: Introduction, indications, contraindications, materials used, procedure and its complications; Electrophysiological Studies: Introduction, Radio frequency Ablation: Indications, contraindications, patient preparation, materials used, procedure, complications and its management; Pacemaker and ICD Implantation: TPI & PPI: Indications, contraindications, patient preparation, materials used, procedure, complications and post procedural care., Pericardiocentesis: Indications, materials used, procedure, complications its management.

***60 periods***

**EXPERIENTIAL LEARNING**

**LIST OF EXPERIMENTS:**

1. Demonstration of hardwares and devices used for interventional procedures.
2. Understanding the role of diagnostic tests as prerequisite for cath procedures.
3. Knowledge of patient preparation, arrangement of materials, for various interventional procedures.
4. Demonstration of angiographic views, techniques and its clinical importance in various interventional procedures.
5. Understanding the role of cath lab technologist in assisting various interventional procedures.
6. Knowledge of how to take measures to prevent complications during interventional procedures and post procedural care.

**RESOURCES**

**TEXT BOOKS:**

1. Textbook of interventional Cardiology – By Grossman
2. Manual of cardiovascular medicine – By Griffin

**REFERENCE BOOKS:**

1. Handbook of interventional Cardiology – Morten J kern
2. Practical handbook of advance interventional cardiology

**Web Resources**

1. https://www.slideshare.net/
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3727500/
3. https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/cardiac-catheterization
4. https://www.youtube.com/watch?app=desktop&v=LSS4zCW52kg

## PROGRAM ELECTIVE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| **22CC102048** | **ADVANCED CARDIAC CARE TECHNOLOGY** | 3 | - | 2 | - | 4 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** Acquire knowledge about the fundamental principles, techniques and advantages and disadvantages of advanced techniques in the field of cardiac care. Understand the clinical importance and the role of advanced techniques in patient care.

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

**CO1.** Acquire knowledge about materials used, prerequisites and equipment used for angiographic procedures.

**CO2.** Understand the basics of cardiac hemodynamics, pressure measurements and application it in diagnosing various pathologies.

**CO3.** Acquire knowledge on standard angiographic views, hardware's used, procedural techniques and role of post procedural care of angiographic procedures.

**CO4.** Acquire knowledge about materials used, angiographic views, hardware's used, procedural techniques and role of post procedural care of aortic and peripheral vascular diseases.

**CO5.** Acquire knowledge to take measures to interpret various catheterization complications and its management techniques.

**CO-PO Mapping Table:**

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

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

**COURSE CONTENT**

**Module 1: ADVANCED ECG -I** ***(12 periods)***

Cardiac Arrhythmias: Introduction, Genesis of cardiac arrhythmias, classification, Premature complexes – PAC, PVC, Bigeminy, Trigeminy, Couplets, Triplets, Junctional ectopics; Supraventricular tachyarrhythmias: Mechanism and ECG characteristics of Atrial tachycardia, Atrial Flutter, Atrial Fibrillation, Multifocal atrial tachycardia, AVRT and AVNRT; Ventricular tachyarrhythmias: Mechanism and ECG characteristics of Ventricular tachycardia, Ventricular Fibrillation, Torsade's de pointes, Bradyarrhythmias: SA blocks, AV blocks, Sick sinus syndrome; Asystole.

**Module 2: ADVANCED ECG -II** ***(12 periods)***

Accessory Pathways: Introduction, types and ECG characteristics; ECG in miscellaneous conditions: ECG in cardiomyopathies, myocarditis, electrolyte imbalances;
Ambulatory ECG: Introduction, indications, equipment, lead system, procedure, interpretation and analysis; Pacemaker Rhythm: ECG characteristics and interpretation of pacemaker rhythm;

**Module 3: ADVANCED TECHNIQUES IN ECHOCARDIOGRAPHY -I** ***(12 periods)***

Speckle tracking echocardiography: Introduction, Strain and strain rate: Definition, technique of recording, interpretation and significance, limitations; Contrast Echocardiography: Indications, ideal properties of contrast agent, interaction of ultrasound with contrast, clinical applications of contrast echocardiography in various cardiac diseased conditions; Myocardial contrast echocardiography; 3D echocardiography: Introduction, principles, 3D Probe: design and properties, steps involved in 3D imaging and clinical applications.

**Module 4: ADVANCED TECHNIQUES IN ECHOCARDIOGRAPHY -II** ***(12 periods)***

Transesophageal echocardiography: Introduction, indications, contraindications, materials used, Equipment – TEE probe design, types, manipulation techniques, patient preparation, procedure, TEE views, complications and post procedural care;
Pharmalogical Stress Echocardiography: Introduction, types, Dobutamine stress echocardiography: indications, contraindications, materials used, patient preparation, procedure, complications and post procedural care, Role of DSE in valvular heart diseases; Recent advances in echocardiography: Hand held probes and portable echo machines, Role of artificial intelligence.

**Module 5: ADVANCED TECHNIQUES IN INTERVENTIONAL CARDIOLOGY** ***(12 Periods)***

Fractional Flow Reserve: Introduction, indications, contraindications, equipment and technique of working principle, clinical importance; Intravascular Ultrasound: Introduction, indications, contraindications, equipment and technique of working principle, clinical applications; TAVR (Transcatheter Aortic Valve Replacement):Indications, contraindications, materials used, artificial valve structure, procedure, techniques, complications and post procedural care, role of echo in TAVR; Mitra Clip: Indications, contraindications, materials used, procedure, techniques, complications and post procedural care, role of echo.

***60 periods***

**EXPERIENTIAL LEARNING**

**LIST OF EXPERIMENTS:**

1. Demonstration, observation and interpretation of ECGs of cardiac arrhythmias
2. Knowledge of patient preparation, materials used, procedural techniques of various noninvasive procedures
3. Understanding the fundamental principles, procedural steps of various advanced echo procedures.
4. Demonstration, observation and interpretation of advanced echocardiographic procedures.
5. Understanding the fundamental principles, materials used of various advanced interventional procedures.
6. Demonstration, observation and interpretation and patient care of advanced interventional procedures.

**RESOURCES**

**TEXT BOOKS:**

1. Leo Schamroth Electrocardiography
2. Feigenbaum's Echocardiography – 8th edition
3. ASE's Comprehensive Echocardiography – Roberto M.Lang, Steven A. Goldstein, 3rd edition.
4. Textbook of interventional Cardiology – By Grossman

**REFERENCE BOOKS:**

1. Handbook of interventional Cardiology – Morten J kern
2. Practical handbook of advance interventional cardiology

**Web Resources**

1. https://www.slideshare.net/
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3727500/
3. https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/cardiac-catheterization
4. https://www.youtube.com/watch?app=desktop&v=LSS4zCW52kg

## 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

1. List out the self-improvements in you on the charts and explain in detail.
2. Discuss different famous personalities and their attitudes.
3. Describe different personalities with respect to self-motivation and self-management.
4. Imagine you are a supervisor and illustrate different special communications.
5. 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

## SCHOOL CORE

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| 22CC111005 | **CLINICAL INTERNSHIP-I** | - | - | - | - | 20 |

**Pre-Requisite** -

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course provides basic knowledge on equipments used in cardiology department and provides training which deals with postings in various speciality units of the cardiology department. The students are trained to acquire skills for the actual conduct of all the clinical services entrusted to them in the specialty units of the cardiology department.

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

**CO1.** Develop skills to perform ECG and gain practical knowledge and ability to interpret ECG.

**CO2.** Able to perform TMT, Holter analysis and gain practical knowledge and ability to interpret TMT, Holter analysis.

**CO3.** Develop skills in performing echocardiography and apply knowledge to diagnose various cardiac conditions.

**CO4.** Develop skills in handling equipments and co-ordinate with operating team and assist interventional cardiologists during catheterization procedures.

**CO5.** Work individually and in teams following ethical practice.

**CO-PO Mapping Table:**

| Course Outcomes | Program Outcomes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **PO 1** | **PO2** | **PO 3** | **PO 4** | **PO5** | **PO 6** | **PO 7** | **PO 8** | **PO 9** | **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***

**INTERNSHIP-I**: The Student must be complete the internship Minimum 960 hours in a Semester (calculated based on 8 hours per day)

**Students must be undertaking the rotational postings during which students have to work under supervision of an experienced staff in the following areas:**

| S. No. | POSTING | DURATION |
|---|---|---|
| 1. | ECG | 1 Month |
| 2. | TMT | 1 Month |
| 3. | Echocardiography | 2 Months |
| 4. | Cardiac ICU | 1 Month |
| 5. | Cathlab | 1 Month |

**Evaluation:**

I. **Logbook:** During Clinical Internship, Logbook should be carried by students and in the end of the semester it must be submitted to university.

II. **Project work: As** per University Guideline's students should submit mini project. The project work must be related to public health research activity, to enable them to carry out researches and solve research related problems.

1. Search relevant scientific literature
2. Develop a research proposal
3. Employ appropriate data collection techniques and tools
4. Manage collected data

**Proposal Development:** At the ending of 4$^{th}$ year (Seventh Semester), students individually consult with designated faculties and extensive literature survey will develop research proposal during the initial 6 months period and Data Collection.

**SCHOOL CORE**

| Course Code | Course Title | L | T | P | S | C |
|---|---|---|---|---|---|---|
| 22CC111006 | **CLINICALINTERNSHIP-II** | - | - | - | - | 20 |

**Pre-Requisite** 22CC111005 Clinical Internship-I

**Anti-Requisite** -

**Co-Requisite** -

**COURSE DESCRIPTION:** This course provides basic knowledge on equipments used in cardiology department and provides training which deals with postings in various speciality units of the cardiology department. The students are trained to acquire skills for the actual conduct of all the clinical services entrusted to them in the specialty units of the cardiology department.

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

**CO1.** Develop skills to perform ECG and gain practical knowledge and ability to interpret ECG.

**CO2.** Able to perform TMT, Holter analysis and gain practical knowledge and ability to interpret TMT, Holter analysis.

**CO3.** Develop skills in performing echocardiography and advanced procedures like DSE, TEE and 3D Echo and apply knowledge to diagnose various cardiac conditions.

**CO4.** Develop skills in handling equipments and co-ordinate with operating team and assist interventional cardiologists during catheterization procedures.

**CO5.** Gain knowledge in arranging materials, handling equipments and advanced techniques and assist interventional cardiologists during catheterization procedures.

**CO6.** 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***

**INTERNSHIP-II**: The Student must be complete the internship Minimum 960 hours in a Semester (calculated based on 8 hours per day)

1. **Students have to undertake the rotational postings during which students have to work under supervision of an experienced staff in the following areas:**

| S. No. | POSTING | DURATION |
|---|---|---|
| 1. | ECG | 1 Month |
| 2. | TMT | 1 Month |
| 3. | Echocardiography | 2 Months |
| 4. | Cardiac ICU | 1 Month |
| 5. | Cath lab | 1 Month |

2. **Project work:**

Guidelines: Guidelines is designed to provide students the knowledge and practice of public health research activity, to enable them to carry out researches and solve research related problems and to help them in writing thesis and defend their work.

Upon successful completion of the course, the students shall be able to:

1. Analyse data with appropriate statistical techniques
2. Write thesis
3. Defend the findings

**Proposal Development:** At the ending of 4$^{th}$year (Eight Semester), students individually consult with designated faculties and extensive literature survey will develop research proposal during the initial 6 months period. Data Collection/ Thesis Writing: Students will carry out data collection, data management, data analysis, and thesis writing during the remaining period (Eight Semester).

## 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** 22DF102025 Research Methodology and Biostatistics

**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:**


3. S.P. Gupta, Statistical Methods, Sultan Chand & Sons, Edition 46,2023.
4. 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:**

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