MALLA REDDY VISHWAVIDYAPEETH

SCHOOL OF DIGITAL HEALTH SCIENCES AND TECHNOLOGY

Programme

Bachelor of Science (B.Sc.)

Digital Health

2026–27

MALLA REDDY VISHWAVIDYAPEETH
SCHOOL OF DIGITAL HEALTH SCIENCES AND TECHNOLOGY
BACHELOR OF DIGITAL HEALTH

VISION

1. To be a nationally recognized centre of excellence in Digital Health education, research and innovation, producing globally competent professionals who transform healthcare delivery through the ethical and effective application of digital health technologies.
2. To develop industry-ready graduates capable of designing, deploying and managing digital-health technologies that improve patient care, healthcare-system efficiency and population health outcomes.

MISSION

1. To impart a strong foundation in human biology and clinical sciences integrated with modern digital and data technologies.
2. To nurture innovation, design-thinking and entrepreneurial skills for developing affordable, scalable digital-health solutions.
3. To provide hands-on exposure to EHR, telemedicine, AI/ML, IoMT, AR/VR and robotics through state-of-the-art laboratories and clinical/industry partnerships.
4. To instill professional ethics, data-privacy consciousness, and regulatory awareness essential to responsible digital-health practice.
5. To foster lifelong learning, research aptitude and community engagement for improving healthcare access and outcomes, particularly for underserved populations.
6. Build strong foundations in anatomy, physiology, biochemistry, pathology and microbiology relevant to health-technology practice.
7. Develop competence in programming, data analytics, AI/ML, database and dashboard technologies applied to healthcare.
8. Provide practical exposure to EHR, telemedicine, IoMT, AR/VR/MR, wearable, digital twins and robotics through dedicated laboratories and internships.
9. Cultivate research, critical-thinking, project-management and entrepreneurial skills through a capstone research project and start-up pathway course.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Within a few years of graduation, graduates of the B.Sc. Digital Health programme will:

1. Apply integrated biomedical and technology knowledge to design and implement effective digital-health solutions in clinical, public-health or industry settings.
2. Pursue successful careers as health-informatics analysts, digital-health product developers, clinical-data scientists, telehealth specialists or IoMT/health-IT engineers, or progress to higher studies (M.Sc./MBA/MHA/MPH) and research.
3. Demonstrate professional, ethical and regulatory responsibility in handling sensitive health data and deploying AI-enabled decision-support tools.
4. Engage in lifelong learning, innovation and entrepreneurship to address emerging challenges in digital healthcare delivery, including in rural and under-served communities.

PROGRAMME OUTCOMES (POs)

On completion of the programme, graduates will be able to:

1. Digital Health Application Development: Design, develop and implement digital health applications (telemedicine platforms, health apps, and wearable diagnostics) to address healthcare challenges.
2. Data-Driven Healthcare Solutions: Apply advanced data analytics and visualization tools to derive insights into healthcare trends, patient outcomes and operational improvements.
3. AI/ML Integration in Healthcare: Apply AI/ML techniques for predictive healthcare analytics, diagnosis assistance and healthcare automation.
4. Designing Digital Health Solutions: Designing digital health solutions (IoMT, EHR, telemedicine) that optimize healthcare delivery, patient monitoring and remote care.
5. Ethics, Privacy and Regulatory Compliance: Apply healthcare ethics, data-privacy regulations (HIPAA/GDPR/DISHA/DPDP Act) and professional standards in digital-health practice.
6. Research and Evidence-Based Practice: Conduct literature reviews, formulate research questions, and apply biostatistics and evidence-based methods to healthcare problems.
7. Communication and Teamwork: Communicate effectively with clinicians, technologists and patients, and function effectively as members/leaders of multidisciplinary teams.
8. Project and Innovation Management: Plan, execute and manage digital-health projects and start-up ventures using modern project-management and design-thinking tools.
9. Environment, Society and Sustainability: Assess the societal, economic and environmental impact of digital-health technologies, with attention to equitable access.
10. Lifelong Learning: Recognize the need for, and engage in, independent and lifelong learning in the context of rapidly evolving health technologies.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

At the end of the programme, graduates of B.Sc. Digital Health will specifically be able to:

1. Integrate foundational biomedical sciences (anatomy, physiology, biochemistry, pathology, microbiology) with digital and computational tools to support clinical and public-health decision-making.
2. Build, deploy and evaluate digital-health technologies — EHR systems, telemedicine platforms, IoMT devices, AR/VR/MR applications, wearable, and digital twins — for real-world healthcare settings.
3. Apply statistical, machine-learning and dashboard/visualization tools (R, Python, SPSS/STATA/SAS, GIS, Power BI/Tableau) to healthcare data for predictive and decision-support analytics.
4. Formulate, execute and present an independent research project or health-technology start-up proposal, demonstrating design-thinking, project-management and entrepreneurial competence.

MALLA REDDY VISHWAVIDYAPEETH
SCHOOL OF DIGITAL HEALTH SCIENCES AND TECHNOLOGY
BACHELOR OF DIGITAL HEALTH
COURSE STRUCTURE

I year I semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1		Introduction to Human Anatomy	4	-	-	4	30	70	100
2		Introduction to Human Physiology	4	-	-	4	30	70	100
3		Introduction to Medical Biochemistry	4	-	-	4	30	70	100
4		Sociology	2	-	-	2	30	70	100
5		English & Communication Skills	2	-	-	2	30	70	100
6		Basic Computers	1	-	1	2	30	70	100
7		Practicals in Human Anatomy	-	-	2	1	30	70	100
8		Practicals in Physiology	-	-	2	1	30	70	100
TOTAL			**18**	**-**	**4**	**20**	**240**	**560**	**800**

I year II semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1		Microbiology	2	-	-	2	30	70	100
2		Pathology	2	-	-	2	30	70	100
3		Occupational Health	2	-	-	2	30	70	100
4		Languages for Coding (Python & C)	2	-	-	2	30	70	100
5		Introduction to GitHub	1	-	-	1	30	70	100
6		Essentials of Research Design & Literature Reviews	2	-	-	2	30	70	100
7		Essential Biostatistics	2	-	-	2	30	70	100
8		Digital Health Terminology	1	-	-	1	30	70	100
9	VAC	Regulations and Ethics	2	-	-	2	30	70	100
10		Practicals in Microbiology	-	-	2	1	30	70	100
11		Practicals in Pathology	-	-	2	1	30	70	100
12		Practicals in Coding	-	-	4	2	30	70	100
TOTAL			**16**	**-**	**8**	**20**	**360**	**840**	**1200**

II year III semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1		Advanced Data Analytics (R/SPSS/STATA/SAS)	3	-	-	3	30	70	100
2		Data Visualization and GIS	3	-	-	3	30	70	100
3		Evidence Based Medical Tools	2	-	-	2	30	70	100
4		Health Algorithms to Application	2	-	-	2	30	70	100
5		Mobile Apps & Web Apps	2	-	-	2	30	70	100
6		Database Features	1	-	-	1	30	70	100
7		API & Plug-in Integration	2	-	-	2	30	70	100
8		Dashboards for Healthcare	1	-	2	2	30	70	100
9		Practicals in Advanced Data Analytics	-	-	2	1	30	70	100
10		Practicals in Data Visualization	-	-	2	1	30	70	100
11		Practicals in Mobile Apps & Web Apps	-	-	2	1	30	70	100
TOTAL			**16**	**-**	**8**	**20**	**330**	**770**	**1100**

II year IV semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1		Design Thinking	2	-	-	2	30	70	100
2		UI/UX for Healthcare	2	-	-	2	30	70	100
3		Rapid Prototyping and 3D Printing	3	-	-	3	30	70	100
4		Predictive Analytics (Prediction and Forecasting)	2	-	-	2	30	70	100
5		AI/ML/Gen AI/Computer Vision	3	-	-	3	30	70	100
6		Practicals in UI/UX for Healthcare	-	-	4	2	30	70	100
7		Practicals in Rapid Prototyping and 3D Printing	-	-	4	2	30	70	100
8		Practicals in Predictive Analytics	-	-	4	2	30	70	100
9		Practicals in AI/ML/Gen AI	-	-	4	2	30	70	100
TOTAL			**12**	**-**	**16**	**20**	**270**	**630**	**900**

III year – V semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1		Electronic Health Records (EHR)	3	-	-	3	30	70	100
2		Telemedicine	2	-	-	2	30	70	100
3		AR/VR/MR for Healthcare	3	-	-	3	30	70	100
4		Internet of Medical Things (IoMT)	2	-	-	2	30	70	100
5		Market Research & Needs Assessment	2	-	-	2	30	70	100
6		Practicals in AR/VR/MR for Healthcare	-	-	4	2	30	70	100
7		Practicals in Internet of Medical Things	-	-	4	2	30	70	100
8		Internship	-	-	-	4	-	-	-
TOTAL			**12**	**-**	**8**	**20**	**210**	**490**	**700**

III year – VI semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1		Digital Twins	3	-	-	3	30	70	100
2		Digital Bedside Patient Monitoring	2	-	-	2	30	70	100
3		Digital Emergency and ICU Care	3	-	-	3	30	70	100
4		Digital Home-Based Healthcare	2	-	-	2	30	70	100
5		Digital Occupational Well-being	2	-	-	2	30	70	100
6		Digital Elderly Care	2	-	-	2	30	70	100
7		Healthcare Logistics	2	-	-	2	30	70	100
8		Healthcare E-Commerce	2	-	-	2	30	70	100
9		Finance for Healthcare Settings	2	-	-	2	30	70	100
TOTAL			**20**	**-**	**4**	**20**	**270**	**630**	**900**

IV year – VII semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1		Digital Transformation of Healthcare	3	-	-	3	30	70	100
2		Digital Health Project Management	3	-	-	3	30	70	100
3		Wearable Diagnostics	2	-	2	3	30	70	100
4		Exoskeletons & Humanoid Robots for Healthcare	2	-	-	2	30	70	100
5		Drones & UAVs in Healthcare	2	-	-	2	30	70	100
6		Social Media in Healthcare	1	-	-	1	30	70	100
7		Cyber Security for Health	-	-	4	2	30	70	100
8		Research Project Design (Proposal)	-	-	-	4	-	-	-
TOTAL			**13**	**-**	**10**	**20**	**210**	**490**	**700**

IV year – VIII semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	C	Max. Marks		
							INT	EXT	TOTAL
1		Research Project / Dissertation	-	-	-	12	-	-	-
2		Review of Topics/Electives	4	-	-	4	30	70	100
3		Critical Thinking in Healthcare	2	-	-	2	30	70	100
4	VAC	Healthcare Start-up Pathway	2	-	-	2	30	70	100
TOTAL			**8**	**-**	**-**	**20**	**90**	**210**	**300**

1.1 Under Graduate Programme

Sl. No.	Course	Duration	Eligibility for admission
1	B.Sc. in Digital Health	4 years (8 semesters)	Candidate must have passed 10+2 (or equivalent) examination from a recognized Board with Physics, Chemistry, and Biology/Mathematics/Computer Science as principal subjects, along with English as a subject of study. Minimum aggregate of 60% marks (40% for SC/ST/OBC and other reserved categories as per applicable State/UGC norms) in the qualifying examination. Admission shall be based on merit in qualifying examination and/or any national/state-level entrance test as notified by the University from time to time, followed by counseling as per Malla Reddy Vishwavidyapeeth admission regulations.

1.2. Medium of Instruction:

English.

1.3. Duration of the Course

Duration: 4 years (8 semesters).

Academic Calendar: Two semesters per year, each of minimum 90 working days including internal assessment and examinations.

1.4 Examination Regulations

1.4.1 Attendance:

A minimum of 75% attendance in each course (theory and practical) is mandatory for eligibility to appear in the End-Semester Examination; condonation up to 65% may be granted by the Vice-Chancellor on genuine medical/other grounds as per University rules.

1.4.2 Internal Assessments:

Course Type	Component	Weightage	Description
Theory Courses	Continuous Internal Assessment (CIA)	30%	Two mid-term tests (best of 2 or average), assignments/quizzes, seminars, attendance.
Practical / Laboratory Courses	Continuous Internal Assessment	30%	Lab records, in-lab performance, viva-voce during the semester.

Exam pattern for internal assessment

Theory Courses (Internal Examination, 30 marks, 2 hours)

Section	Instruction	No. of Questions	Total Marks
A	Very Short Questions	5 × 2 marks	10
B	Short Questions	2 × 5 marks	10

Section	Instruction	No. of Questions	Total Marks
C	Essay Questions	1 × 10 marks	10

Practical Courses (Internal Examination, 30 marks, 2 hours)

Section	Instruction	Total Marks
A	Spotter- Lab practical evaluation	15
B	Viva voce	15
	Total	**30**

1.4.3 University Examinations (External):

Course Type	Component	Weightage	Description
Theory Courses	End-Semester University Examination (ESE)	70%	Written examination of 3 hours covering the entire syllabus (all units).
Practical / Laboratory Courses	End-Semester Practical Examination	70%	Conduct of experiment/task, output/demo, record and viva-voce by internal + external examiner.

Theory Courses (End-Semester Examination, 70 marks, 3 hours)

Section	Instruction	No. of Questions	Total Marks
A	Very Short Questions	10 × 2 marks	20
B	Short Questions	6 × 5 marks	30
C	Essay Questions	2 × 10 marks	20

Total End-Semester marks = 70 (scaled from the above, or awarded directly out of 70 as per University question-paper template); combined with 30 CIA marks to yield 100.

Practical Courses (End-Semester Examination, 0 marks)

Section	Instruction	Total Marks
A	Spotter- Lab practical evaluation	20
B	Major Practical	10
C	Internal Viva	15
D	External Viva	15
E	Record	10
	Total	**70**

A student must secure a minimum of 'P' grade (40% aggregate, with at least 40% in ESE) to pass a course. A student who fails in a course may reappear in the subsequent supplementary/arrear examination.

Promotion to the next semester is automatic; however, a student must clear all backlog courses up to Semester IV before being permitted to register for Semester VII, and must clear all UG-level backlogs before the award of degree.

Malpractice in examinations shall be dealt with as per the University's Unfair Means regulations, ranging from cancellation of the concerned examination to debarment.

The Research Project/Dissertation (Semester VIII) must be submitted with a plagiarism similarity index within University-prescribed limits (typically <=10% excluding references) prior to viva-voce.

SEMESTER-I

INTRODUCTION TO HUMAN ANATOMY

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Integumentary.
2. Apply the principles of Skeletal.
3. Analyse and evaluate Muscular.
4. Design and develop solutions using Nervous.

UNIT-I

INTEGUMENTARY

1. Lymphatic
2. Digestive
3. Respiratory
4. Urinary
5. Reproductive

UNIT-II

SKELETAL

1. Bones and connective tissues

UNIT-III

MUSCULAR

1. Skeletal
2. Smooth
3. Cardiac muscle

UNIT-IV

NERVOUS

1. Brain
2. Spinal cord
3. Nerves
4. Sensory organs and cell

UNIT-V

ENDOCRINE

1. Pituitary
2. Thyroid
3. Parathyroid
4. Adrenals glands
5. pancreas
6. ovaries

7. testes

UNIT-VI

CARDIOVASCULAR

1. Heart
2. Blood vessels
3. Blood

UNIT-VII

LYMPHATIC

1. Tonsils
2. Spleen
3. Thymus
4. Lymph nodes
5. Lymphatic vessels
6. Lymph

UNIT-VIII

DIGESTIVE

1. Mouth
2. Oesophagus
3. Stomach
4. Small and large intestines (alimentary canal),
5. Accessory organs (including salivary glands,
6. Pancreas
7. Liver
8. Gallbladder

UNIT-IX

RESPIRATORY

1. Nose and mouth
2. Pharynx
3. Larynx,
4. Trachea, bronchi, and lungs

UNIT-X

URINARY

1. Kidneys
2. Ureters
3. Bladder
4. Urethra

UNIT-XI

REPRODUCTIVE

1. Ovaries

2. Uterine tubes
3. Uterus and Vagina
4. Vulva in females
5. Testes
6. Seminal vesicles
7. Penis, Urethra
8. Prostate
9. Bulbourethral glands in males

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

INTRODUCTION TO HUMAN PHYSIOLOGY

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Circulatory System.
2. Apply the principles of Respiratory System.
3. Analyse and evaluate Digestive System.
4. Design and develop solutions using Nervous System.

UNIT-I

CIRCULATORY SYSTEM

1. Heart
2. Blood vessels
3. Blood

UNIT-II

RESPIRATORY SYSTEM

1. Lungs
2. Diaphragm

UNIT-III

DIGESTIVE SYSTEM

1. Mouth
2. Stomach and intestines
3. Liver and pancreas

UNIT-IV

NERVOUS SYSTEM

1. Brain
2. Spinal cord
3. Nerves

UNIT-V

ENDOCRINE SYSTEM

1. Pituitary gland
2. Thyroid
3. Pancreas
4. Adrenal glands

UNIT-VI

MUSCULOSKELETAL SYSTEM

1. Bones
2. Muscles
3. Joints

UNIT-VII

IMMUNE SYSTEM

1. White blood cells
2. Lymph nodes
3. Antibodies

UNIT-VIII

INTEGUMENTARY SYSTEM

1. Skin
2. Hair and nails

UNIT-IX

EXCRETORY SYSTEM

1. Kidneys
2. Bladder
3. Sweat glands

UNIT-X

REPRODUCTIVE SYSTEM

1. Male reproductive organs
2. Female reproductive organ

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

INTRODUCTION TO MEDICAL BIOCHEMISTRY

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of a review of cell types and their structures.
2. Apply the principles of the role of carbon in the study of life.
3. Analyse and evaluate Properties of amino acids.
4. Design and develop solutions using Structure levels of proteins.

UNIT-I

A REVIEW OF CELL TYPES AND THEIR STRUCTURES

1. Prokaryotic Cells
2. Eukaryotic Cells

UNIT-II

THE ROLE OF CARBON IN THE STUDY OF LIFE

1. Carbon's Bonding Ability
2. Carbon in Metabolism

UNIT-III

PROPERTIES OF AMINO ACIDS

1. Structure of Amino Acids
2. Essential vs. Non-Essential

UNIT-IV

STRUCTURE LEVELS OF PROTEINS

1. Primary Structure
2. Folding and Function

UNIT-V

THE SCOOP ON ENZYMES AND CATALYSTS

1. Enzyme Action
2. Factors Affecting Enzymes

UNIT-VI

A PRIMER ON NUCLEIC ACIDS

1. DNA vs. RNA
2. Replication and Transcription

UNIT-VII

HUNDREDS OF FIGURES THAT ILLUSTRATE BIOCHEMICAL STRUCTURES

1. Molecular Structures
2. 3D Structures

UNIT-VIII

REAL-WORLD EXAMPLES THAT CONNECT BIOCHEM CONCEPTS TO EVERYDAY LIFE

1. Nutrition and Biochemistry
2. Medicine

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

SOCIOLOGY

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction.
2. Apply the principles of Social Factors in health and disease situations.
3. Analyse and evaluate Socialization.
4. Design and develop solutions using Social Groups.

UNIT-I

INTRODUCTION

1. Meaning- Definition, Nature and Scope of Sociology
2. Methods of Sociological Investigations, Case Study, Social Survey, Questionnaire and Interview methods.
3. Importance of its study with special reference to Health Care Professionals.

UNIT-II

SOCIAL FACTORS IN HEALTH AND DISEASE SITUATIONS

1. Role of Social factors in health
2. Role of social factor in illness
3. Decision making in taking treatment

UNIT-III

SOCIALIZATION

1. Definition and Meaning of Socialization
2. Primary, Secondary and Anticipatory socialization
3. Agencies of Socialization

UNIT-IV

SOCIAL GROUPS

1. a. Definition and Features of Social Group
2. b. Primary Social Group
3. c. Secondary Social Group
4. d. The role of Primary and Secondary Groups in Hospitals.

UNIT-V

FAMILY

1. The family, meaning and definition
2. Functions of family
3. Changing family patterns
4. Influence of Family on the individuals health, the effects of sickness in the family.

UNIT-VI

COMMUNITY

1. Rural community: meaning and features- Health problems of rural community.
2. Urban community: meaning and features – Health problems in urbanities.

UNIT-VII

CULTURE AND HEALTH

1. Concept of Health
2. Concept of Culture
3. Cultural factors affecting Health and Diseases

UNIT-VIII

SOCIAL CHANGE

1. Meaning of social change
2. Factors of social change
3. Human adaptation and social change
4. Social planning and Health

UNIT-IX

SOCIAL PROBLEMS

1. Population explosion
2. Juvenile delinquency
3. Alcoholism
4. Unemployment
5. Poverty
6. Problems of women

UNIT-X

SOCIAL SECURITY

1. Social security and social legislation

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

ENGLISH & COMMUNICATION SKILLS

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Fundamentals of Communication.
2. Apply the principles of Scientific & Technical Writing in Healthcare.
3. Analyse and evaluate Grant & Proposal Writing.
4. Design and develop solutions using Communication for Healthcare Professionals.

UNIT-I

FUNDAMENTALS OF COMMUNICATION

1. Definition and importance of communication in healthcare and professional settings
2. Types of communication (verbal, non-verbal, written, digital)
3. Barriers to effective communication and overcoming them

UNIT-II

SCIENTIFIC & TECHNICAL WRITING IN HEALTHCARE

1. Structure and format of scientific documents
2. Writing research papers, abstracts, and summaries
3. Citation styles and plagiarism prevention

UNIT-III

GRANT & PROPOSAL WRITING

1. Basics of proposal writing for research and funding
2. Structure of grant proposals and common funding source
3. Effective writing techniques for securing grants

UNIT-IV

COMMUNICATION FOR HEALTHCARE PROFESSIONALS

1. Effective patient communication and empathy in healthcare
2. Medical terminology and professional interactions
3. Ethical considerations in communication

UNIT-V

PRESENTATION & PUBLIC SPEAKING SKILLS

1. Preparing and delivering impactful presentations
2. Body language, tone, and clarity in speech
3. Handling Q&A sessions confidently

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.

3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

BASIC COMPUTERS

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Definition of Computer.
2. Apply the principles of typing text in MS Word.
3. Analyse and evaluate Creating.
4. Design and develop solutions using Introduction.

UNIT-I

DEFINITION OF COMPUTER

1. Characteristics of computer-Components of Computer Hardware – Input & Output devices-Memories– RAM and ROM– MB, GB their conversions
2. Software - Application Software and Systems software- Data and Information –Different computer languages- Number systems- Binary and decimal conversions.

UNIT-II

TYPING TEXT IN MS WORD

1. Manipulating text formatting text–using different font sizes, bold, italic– bullets and numbering – Pictures,
2. Aligning the text and justify–choosing paper size– adjusting margins– header and footer,
3. Inserting page no's in a doc– printing a file with options– using spell check and grammar– find and replace– mail merge – insert tables in a document.

UNIT-III

CREATING

1. MS Excel-Cell editing, using formulas and functions, manipulating data with excel– using sort function to sort numbers and alphabets– drawing graphs and charts using data in excel.
2. MS PowerPoint slide transition and animation-slides with sounds– inserting clip arts– Pictures, tables and graphs.

UNIT-IV

INTRODUCTION

1. Computer Network Devices(Hubs, Switches, Routers, Gateway, Bridge, Modems
2. Wireless Access Points, Firewalls & NIC)
3. Types of computer Networks (LAN, MAN & WAN)
4. Network Topologies (Star, Ring, Mesh, Tree, Hybrid Topologies)
5. Internet-Based Applications
6. Advantages & Disadvantages of Computer Networks
7. E-Mail - Components of E-Mail, Attaching Files in E-mail, Different Search Engines

UNIT-V

AI

1. History of AI, Sub Areas of AI,

2. Applications of AI in Healthcare,
3. Benefits of AI in Health Care,
4. Challenges of AI in Healthcare,
5. Introduction to Machine Learning,
6. Applications of Machine Learning,
7. Machine Learning Algorithms,
8. Real-world Machine Learning Use Cases.

UNIT-VI

PRACTICALS

1. Peripherals of Computer
2. MS Word
3. MS Excel
4. MS PowerPoint
5. Network Devices

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

SEMESTER-II

MICROBIOLOGY

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Microbiology.
2. Apply the principles of Microbial Groups.
3. Analyse and evaluate Microscopy and Staining Technique.
4. Design and develop solutions using Bacterial Growth and Metabolism.

UNIT-I

INTRODUCTION TO MICROBIOLOGY

1. History of Microbiology
2. Scope of Microbiology
3. Branches of Microbiology

UNIT-II

MICROBIAL GROUPS

1. Bacteria, Fungi, Protozoa, Algae, Viruses

UNIT-III

MICROSCOPY AND STAINING TECHNIQUE

1. Types of Microscopes
2. Staining Techniques

UNIT-IV

BACTERIAL GROWTH AND METABOLISM

1. Bacterial Growth
2. Bacterial reproduction
3. Bacterial Metabolism

UNIT-V

CULTURE MEDIA AND TECHNIQUE

1. Types of Culture Media
2. Agar Plate Technique
3. Incubation and Maintenance

UNIT-VI

STERILIZATION AND DISINFECTION

1. Sterilization Methods
2. Disinfection and Antiseptics

UNIT-VII

IMMUNOLOGY (BASIC CONCEPTS)

1. Immunity
2. Antigen-Antibody Interactions
3. Vaccination

UNIT-VIII

MICROBIAL PATHOGENESIS AND DISEASE

1. Pathogenic Mechanisms
2. Disease caused by Microorganism

UNIT-IX

ANTIMICROBIAL AGENTS

1. Antibiotics
2. Antiviral, Antifungal and Antibiotic Resistance
3. Antibiotic Resistance

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

PATHOLOGY

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Pathology.
2. Apply the principles of Cell Injury and Adaptation.
3. Analyse and evaluate Inflammation and Repair.
4. Design and develop solutions using Hemodynamic Disorders.

UNIT-I

INTRODUCTION TO PATHOLOGY

1. History of Pathology
2. Scope of Microbiology
3. Branches of Microbiology

UNIT-II

CELL INJURY AND ADAPTATION

1. Cell Injury
2. Types of Necrosis
3. Cellular adaptations
4. Mechanisms of Injury

UNIT-III

INFLAMMATION AND REPAIR

1. Acute Inflammation
2. Chronic Inflammation
3. Healing and Tissue Repair

UNIT-IV

HEMODYNAMIC DISORDERS

1. Edema
2. Hemorrhage
3. Thrombosis
4. Embolism
5. Shock

UNIT-V

NEOPLASIA (TUMORS AND CANCER)

1. Benign vs. Malignant tumors
2. Carcinogenesis
3. Tumor Grading and Staging, Spreading

UNIT-VI

INFECTIOUS DISEASES IN PATHOLOGY

1. Bacterial Infection
2. Viral Infection
3. Fungal Infection
4. Parasitic Infections

UNIT-VII

SYSTEMIC PATHOLOGY

1. Cardiovascular System
2. Respiratory System
3. Gastrointestinal System
4. Renal system
5. Endocrine System
6. Nervous System

UNIT-VIII

FORENSIC PATHOLOGY

1. Autopsy
2. Trauma
3. Forensic Toxicology

UNIT-IX

MOLECULAR PATHOLOGY

1. Genetic Basis of Disease
2. Molecular Techniques in Pathology

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

OCCUPATIONAL HEALTH

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Occupational Health.
2. Apply the principles of Workplace Hazards and Risk Assessment.
3. Analyse and evaluate Occupational Diseases and Injuries.
4. Design and develop solutions using Health and Safety Regulations.

UNIT-I

INTRODUCTION TO OCCUPATIONAL HEALTH

1. Covers the basics of occupational health, focusing on the relationship between work environments, health risks, and worker well-being

UNIT-II

WORKPLACE HAZARDS AND RISK ASSESSMENT

1. Teaches students how to identify and assess physical, chemical, biological, and ergonomic hazards in the workplace and their impact on health

UNIT-III

OCCUPATIONAL DISEASES AND INJURIES

1. Focuses on common occupational diseases (e.g., respiratory illnesses, musculoskeletal disorders) and how they are diagnosed, prevented, and managed

UNIT-IV

HEALTH AND SAFETY REGULATIONS

1. Explores international and national health and safety regulations, such as OSHA (Occupational Safety and Health Administration), and how they are applied in various industries.

UNIT-V

DIGITAL HEALTH IN OCCUPATIONAL SAFETY

1. Discusses how digital tools and technologies (wearable, health monitoring systems) can be applied to monitor and improve the health and safety of workers in different environments

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

LANGUAGES FOR CODING (PYTHON & C)

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Python for Healthcare.
2. Apply the principles of Data Analysis with Python.
3. Analyse and evaluate Data Visualization in Healthcare.
4. Design and develop solutions using Machine Learning for Healthcare.

UNIT-I

INTRODUCTION TO PYTHON FOR HEALTHCARE

1. Teaches basic Python programming, focusing on its applications in analyzing and processing health data.

UNIT-II

DATA ANALYSIS WITH PYTHON

1. Covers using libraries like Pandas and Numpy to clean, manipulate, and analyze healthcare datasets, including patient records and clinical data.

UNIT-III

DATA VISUALIZATION IN HEALTHCARE

1. Focuses on creating healthcare-specific visualizations using libraries like Matplotlib and Seaborne to represent trends in health outcomes and disease data

UNIT-IV

MACHINE LEARNING FOR HEALTHCARE

1. Introduces machine learning techniques with Python, using libraries like Scikit-learn to develop models for disease prediction and treatment recommendations.

UNIT-V

HEALTHCARE DATA INTEGRATION AND AUTOMATION

1. Teaches how to use Python to integrate healthcare data from different sources (e.g., EHRs, sensors) and automate workflows in health systems.

UNIT-VI

INTRODUCTION TO C PROGRAMMING FOR HEALTHCARE

1. Covers the fundamentals of C programming, including syntax, variables, and functions, with applications in healthcare systems

UNIT-VII

DATA STRUCTURES IN HEALTHCARE

1. Focuses on implementing essential data structures (e.g., arrays, linked lists, stacks) in C to handle patient data, medical records, and health-related information

UNIT-VIII

C FOR HEALTHCARE APPLICATION DEVELOPMENT

1. Teaches how to use C to develop simple healthcare applications, such as patient management systems or scheduling tools

UNIT-IX

FILE HANDLING AND DATA MANAGEMENT IN HEALTHCARE

1. Explores how to use C to manage healthcare data through file handling, including reading and writing patient data to files or databases

UNIT-X

SYSTEM INTEGRATION AND OPTIMIZATION IN HEALTHCARE

1. Focuses on integrating C programming with healthcare systems, optimizing performance, and ensuring efficient data processing in medical applications

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

INTRODUCTION TO GITHUB

L/T/P/C
1/-/-/1

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction — what are Git and GitHub?
2. Apply the principles of Installing Git.
3. Analyse and evaluate getting started on GitHub.
4. Design and develop solutions using Configuring Git.

UNIT-I

INTRODUCTION — WHAT ARE GIT AND GITHUB?

1. The problem: why version control matters
2. Centralized vs. distributed version control systems
3. What is Git? (snapshots, local operations, integrity)
4. What is GitHub? (hosting, collaboration, community)

UNIT-II

INSTALLING GIT

1. Checking if Git is already installed
2. Installing on Windows (Git for Windows, Git Bash)

UNIT-III

GETTING STARTED ON GITHUB

1. Creating a free GitHub account
2. Tour of the GitHub interface: dashboard, profile, repositories
3. Creating your first repository on GitHub (with README, .gitignore, license)

UNIT-IV

CONFIGURING GIT

1. Setting your identity: user.name and user.email (global vs. local scope)
2. Setting your default text editor (core.editor)
3. Configuring line endings (core.autocrlf) for cross-platform work
4. Creating command aliases for efficiency

UNIT-V

CREATING A GIT REPOSITORY

1. Initialising a new local repository (git init)
2. What lives inside the .git directory (the “database”)
3. Cloning an existing repository from GitHub (git clone)

UNIT-VI

CREATING AND EDITING FILES

1. Creating files from the command line (touch, echo, etc.)
2. Writing and editing files with a text editor (nano, Vim, VS Code)

3. Setting up a basic project structure (folders, source files, assets)

UNIT-VII

ADDING FILES TO YOUR GIT REPOSITORY

1. Checking the status of your working tree (git status)
2. Staging new and modified files (git add <file>, git add .)
3. Understanding the staging area (the index)

UNIT-VIII

FINDING OUT WHAT'S HAPPENING

1. Interpreting git status in detail (untracked, modified, staged)
2. Deep dive into git log: --oneline, --graph, --all, --decorate, --stat, -p
3. Comparing changes with git diff (unstaged vs. staged vs. last commit)

UNIT-IX

MAKING CHANGES AND TRACKING THEM

1. Modifying tracked files and viewing differences (git diff)
2. Staging and committing successive changes
3. Skipping the staging area with git commit -a

UNIT-X

SYNCHRONIZING YOUR LOCAL GIT REPOSITORY WITH GITHUB

1. Connecting to a remote: git remote add origin <url>
2. Listing and inspecting remotes (git remote -v, git remote show origin)

UNIT-XI

DELETING AND RENAMING FILES

1. Deleting a file and staging the removal (git rm)
2. Removing a file from Git tracking but keeping it locally (git rm --cached)

UNIT-XII

UNDOING CHANGES

1. Discarding unstaged modifications (git restore <file> / git checkout -- <file>)
2. Unstaging a file (git restore --staged <file> / git reset HEAD <file>)
3. Amending the most recent commit (git commit --amend)

UNIT-XIII

BRANCHING

1. What a branch really is (a lightweight movable pointer)
2. Listing, creating, and switching branches (git branch, git checkout, git switch)

UNIT-XIV

TAGS AND RELEASES

1. What are tags? (snapshot markers)
2. Lightweight vs. annotated tags (when to use each)
3. Creating tags: git tag v1.0 and git tag -a v1.0 -m "message"

UNIT-XV

DOWNLOADING A REPOSITORY

1. Cloning a repository from GitHub: git clone <url>
2. Choosing the right protocol: HTTPS vs. SSH vs. GitHub CLI
3. Cloning into a specific folder name (git clone <url> <folder>)
4. Shallow cloning for large repositories (--depth, --branch)

UNIT-XVI

MANAGING MULTIPLE COPIES OF A REPOSITORY

1. The need for multiple copies: contributing to open source, testing, experimentation
2. Forking a repository on GitHub (creating your own server-side copy)
3. Cloning your fork and setting up a remote for the original (upstream): git remote add upstream <url>
4. Keeping a fork in sync: fetching from upstream and merging into your local branch

UNIT-XVII

COMMAND SUMMARY

1. Setup and configuration: git config, git help, git version
2. Creating and cloning repositories: git init, git clone
3. Staging and committing: git add, git commit, git status, git diff

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

ESSENTIALS OF RESEARCH DESIGN & LITERATURE REVIEWS

L/T/P/C

2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of what is Research Design?
2. Apply the principles of Types of Research Designs.
3. Analyse and evaluate Key Components of Research Design.
4. Design and develop solutions using Importance of a Literature Review.

UNIT-I

WHAT IS RESEARCH DESIGN?

1. Definition
2. Purpose

UNIT-II

TYPES OF RESEARCH DESIGNS

1. Quantitative Research
2. Qualitative Research

UNIT-III

KEY COMPONENTS OF RESEARCH DESIGN

1. Research question
2. Sampling
3. Data Collection Methods
4. Analysis Plan

UNIT-IV

IMPORTANCE OF A LITERATURE REVIEW

1. Definition
2. Purpose

UNIT-V

CONDUCTING A LITERATURE REVIEW

1. Searching for sources
2. Evaluating Sources
3. Synthesizing Information

UNIT-VI

STRUCTURE OF A LITERATURE REVIEW

1. Introduction
2. Body
3. Conclusion

UNIT-VII

IMPORTANCE OF A GOOD LITERATURE REVIEW IN RESEARCH DESIGN

1. Identifies Knowledge Gaps
2. Guides Research Questions
3. Establishes Framework

UNIT-VIII

COMMON CHALLENGES IN RESEARCH DESIGN & LITERATURE REVIEWS

1. Bias in Literature Selection
2. Choosing the Right Methodology
3. Access to Resources

UNIT-IX

BEST PRACTICES IN RESEARCH DESIGN & LITERATURE REVIEWS

1. Clear Research questions
2. Use of Reliable Sources
3. Comprehensive Review

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

ESSENTIAL BIOSTATISTICS

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Biostatistics.
2. Apply the principles of Probability and Distributions.
3. Analyse and evaluate Hypothesis Testing and Confidence Intervals.
4. Design and develop solutions using Correlation and Regression Analysis.

UNIT-I

INTRODUCTION TO BIOSTATISTICS

1. Foundation in basic statistical concepts, including types of data, measures of central tendency (mean, median, mode), and variability (range, variance, standard deviation).

UNIT-II

PROBABILITY AND DISTRIBUTIONS

1. Introduces probability theory and essential statistical distributions (e.g., normal, binomial), with applications in health data interpretation.

UNIT-III

HYPOTHESIS TESTING AND CONFIDENCE INTERVALS

1. Teaches methods for testing research hypotheses (e.g., t-tests, chi-square tests) and calculating confidence intervals to assess statistical significance.

UNIT-IV

CORRELATION AND REGRESSION ANALYSIS

1. Covers how to analyze relationships between variables, focusing on linear regression, correlation, and prediction models used in health outcomes.

UNIT-V

EPIDEMIOLOGY AND SURVIVAL ANALYSIS

1. Key techniques in epidemiology, including survival analysis methods (e.g., Kaplan-Meier) to study patient outcomes and disease progression over time.

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DIGITAL HEALTH TERMINOLOGY

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Digital Health Terminology.
2. Apply the principles of Health Information Systems and Standards.
3. Analyse and evaluate Clinical Informatics.
4. Design and develop solutions using Health Data and Analytics.

UNIT-I

INTRODUCTION TO DIGITAL HEALTH TERMINOLOGY

1. Covers the foundational terms and concepts used in digital health, including eHealth, mHealth, telemedicine, and telehealth.

UNIT-II

HEALTH INFORMATION SYSTEMS AND STANDARDS

1. Introduces key terminology related to health information systems (e.g., EHR, EMR) and health data standards (e.g., HL7, FHIR).

UNIT-III

CLINICAL INFORMATICS

1. Focuses on terminology related to the use of information technology in clinical settings, such as decision support systems, patient portals, and clinical workflows.

UNIT-IV

HEALTH DATA AND ANALYTICS

1. Explains terms related to health data types (e.g., structured, unstructured) and analytical methods (e.g., predictive modeling, data mining).

UNIT-V

REGULATIONS AND ETHICS IN DIGITAL HEALTH

1. Provides terminology related to data privacy laws (e.g., HIPAA, GDPR) and ethical considerations in using digital health technologies

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

REGULATIONS AND ETHICS

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Healthcare Ethics.
2. Apply the principles of Data Privacy and Security.
3. Analyse and evaluate Informed Consent and Patient Rights.
4. Design and develop solutions using Ethical Issues in AI and Digital Health.

UNIT-I

INTRODUCTION TO HEALTHCARE ETHICS

1. Covers foundational ethical principles in healthcare such as autonomy, beneficence, non-malfeasance, and justice, with a focus on their application in digital health.

UNIT-II

DATA PRIVACY AND SECURITY

1. Focuses on regulations like HIPAA (Health Insurance Portability and Accountability Act) and GDPR (General Data Protection Regulation) that govern the handling of patient data.

UNIT-III

INFORMED CONSENT AND PATIENT RIGHTS

1. Teaches the ethical principles behind obtaining informed consent, especially in digital health technologies and telemedicine.

UNIT-IV

ETHICAL ISSUES IN AI AND DIGITAL HEALTH

1. Examines ethical dilemmas related to AI, machine learning, and data analytics in healthcare, including bias, transparency, and accountability.

UNIT-V

REGULATORY FRAMEWORKS FOR DIGITAL HEALTH

1. Covers the legal and regulatory standards affecting digital health technologies, including FDA approval processes for health apps and devices.

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

SEMESTER-III

ADVANCED DATA ANALYTICS (R/SPSS/STATA/SAS)

L/T/P/C
4/-/-/4

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to R Programming.
2. Apply the principles of Data Import and Management in R.
3. Analyse and evaluate Descriptive Statistics in R.
4. Design and develop solutions using Basic Statistical Analysis with R.

UNIT-I

INTRODUCTION TO R PROGRAMMING

1. Covers the basics of R, including installation, syntax, and using the RStudio interface for data analysis

UNIT-II

DATA IMPORT AND MANAGEMENT IN R

1. Focuses on importing datasets, cleaning data, and handling missing values using R functions and packages

UNIT-III

DESCRIPTIVE STATISTICS IN R

1. Teaches how to calculate and interpret descriptive statistics such as mean, median, variance, and standard deviation using R

UNIT-IV

BASIC STATISTICAL ANALYSIS WITH R

1. Introduces inferential statistics, including t-tests, chi-square tests, and simple linear regression for analyzing healthcare data

UNIT-V

DATA VISUALIZATION IN R

1. Covers how to create visualizations like histograms, scatter plots, and box plots using R's ggplot2 package to represent healthcare data

UNIT-VI

INTRODUCTION TO STATA INTERFACE AND COMMANDS

1. Covers the basics of navigating STATA, understanding its interface, and using basic commands for data manipulation and analysis.

UNIT-VII

DATA MANAGEMENT IN STATA

1. Focuses on importing, cleaning, and managing healthcare datasets, including handling missing values and variable transformations

UNIT-VIII

DESCRIPTIVE STATISTICS IN STATA

1. Teaches students how to compute and interpret summary statistics like means, frequencies, and standard deviations for healthcare data

UNIT-IX

BASIC STATISTICAL ANALYSIS WITH STATA

1. Introduces inferential statistics such as t-tests, chi-square tests, and simple regression analysis, applying them to healthcare data

UNIT-X

DATA VISUALIZATION IN STATA

1. Teaches how to create graphs and charts in STATA to effectively present findings from healthcare research and data analysis.

UNIT-XI

INTRODUCTION TO SPSS SOFTWARE

1. Covers the basics of SPSS, including navigating the interface, data entry, and understanding data sets

UNIT-XII

DATA MANAGEMENT IN SPSS

1. Teaches how to import, clean, and organize healthcare data, including handling missing values and recoding variable

UNIT-XIII

DESCRIPTIVE STATISTICS WITH SPSS

1. Focuses on calculating and interpreting descriptive statistics, such as mean, median, standard deviation, and frequency distributions for healthcare data

UNIT-XIV

INFERENTIAL STATISTICS IN SPSS

1. Introduces basic statistical tests like t-tests, chi-square tests, and ANOVA to analyze healthcare data

UNIT-XV

DATA VISUALIZATION WITH SPSS

1. Teaches how to create charts, graphs, and tables in SPSS to effectively present healthcare data and research finding

UNIT-XVI

INTRODUCTION TO SAS PROGRAMMING

1. Covers the basics of SAS, including its interface, syntax, and data step processing, with an emphasis on healthcare data manipulation

UNIT-XVII

DATA IMPORT AND EXPORT IN SAS

1. Teaches how to import, export, and manage datasets from different formats (CSV, Excel, databases) for healthcare analysis

UNIT-XVIII

DATA CLEANING AND TRANSFORMATION

1. Focuses on using SAS to clean and preprocess healthcare data, including handling missing values, filtering, and transforming variables

UNIT-XIX

BASIC STATISTICAL ANALYSIS WITH SAS

1. Introduces key statistical procedures in SAS for analyzing healthcare data, such as descriptive statistics, t-tests, and regression analysis

UNIT-XX

DATA VISUALIZATION IN SAS

1. Teaches how to create visualizations like graphs and charts to present healthcare data insights using SAS's graphical capabilities

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DATA VISUALIZATION AND GIS

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Data Visualization in Healthcare.
2. Apply the principles of Types of Healthcare Data Visualizations.
3. Analyse and evaluate Design Principles for Effective Visualization.
4. Design and develop solutions using Tools for Data Visualization in Healthcare.

UNIT-I

INTRODUCTION TO DATA VISUALIZATION IN HEALTHCARE

1. Covers the importance of data visualization in healthcare, emphasizing how visual tools can help convey complex medical data clearly

UNIT-II

TYPES OF HEALTHCARE DATA VISUALIZATIONS

1. Teaches different types of visualizations, such as bar charts, line graphs, pie charts, and heat maps, used to represent healthcare data.

UNIT-III

DESIGN PRINCIPLES FOR EFFECTIVE VISUALIZATION

1. Focuses on principles such as simplicity, clarity, and accessibility in designing visuals that enhance decision-making in healthcare.

UNIT-IV

TOOLS FOR DATA VISUALIZATION IN HEALTHCARE

1. Introduces software and tools like Tableau, Excel, and R for creating healthcare-related visualizations.

UNIT-V

INTERPRETING HEALTHCARE VISUALIZATIONS

1. Teaches students how to read and interpret data visualizations in clinical settings to support evidence-based healthcare decisions

UNIT-VI

GEOGRAPHICAL INFORMATION SYSTEMS

1. Different GIS Functions
2. Trends in GIS applications
3. GIS and the internet

UNIT-VII

TYPES OF HEALTHCARE DATA VISUALIZATIONS

1. Field and object data
2. Types of spatial data
3. Tessellation and vector data models

4. Cartographic
5. Representation
6. Metadata

UNIT-VIII

MAPPING HEALTH INFORMATION

1. The mapping process
2. Representing Health information
3. Viewing Health information
4. Resources for geocoding &Mapping

UNIT-IX

SPATIAL CLUSTERING METHODS

1. Mapping Disease Rates
2. Spatial Clustering methods
3. Space time Clustering
4. Analyzing Data sets from India and abroad

UNIT-X

APPLICATION

1. Modelling Transmissions and diffusion of diseases
2. Detecting disease outbreaks - Locating Health Services
3. Analyzing environmental exposures and hazards
4. Mapping and studying health disparities

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

EVIDENCE BASED MEDICAL TOOLS

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Evidence-Based Medicine (EBM).
2. Apply the principles of Key Tools in EBM.
3. Analyse and evaluate Critical Appraisal of Medical Literature.
4. Design and develop solutions using Evidence-Based Guidelines and Protocols.

UNIT-I

INTRODUCTION TO EVIDENCE-BASED MEDICINE (EBM)

1. Covers the principles of EBM, emphasizing the importance of integrating clinical expertise, patient values, and the best research evidence in decision-making.

UNIT-II

KEY TOOLS IN EBM

1. Teaches students how to use tools like Pub Med, Cochrane Library, and clinical decision support systems (CDSS) to access reliable medical evidence

UNIT-III

CRITICAL APPRAISAL OF MEDICAL LITERATURE

1. Focuses on evaluating the quality, relevance, and applicability of research articles, systematic reviews, and clinical trials in healthcare settings

UNIT-IV

EVIDENCE-BASED GUIDELINES AND PROTOCOLS

1. Explores how to apply clinical guidelines and protocols based on evidence to improve patient care and outcomes.

UNIT-V

DIGITAL TOOLS FOR EVIDENCE-BASED PRACTICE

1. Introduces mobile apps, databases, and software that support evidence-based decision-making in clinical practice and healthcare management

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

HEALTH ALGORITHMS TO APPLICATION

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Health Algorithms.
2. Apply the principles of Core Components of Health Algorithms.
3. Analyse and evaluate Machine Learning in Healthcare.
4. Design and develop solutions using Introduction to Predictive Analytics in Healthcare.

UNIT-I

INTRODUCTION TO HEALTH ALGORITHMS

1. Overview of health Algorithms
2. Types of Algorithms

UNIT-II

CORE COMPONENTS OF HEALTH ALGORITHMS

1. Data Collection and Healthcare Data Types
2. Data Preprocessing
3. Features Selection and Engineering

UNIT-III

MACHINE LEARNING IN HEALTHCARE

1. Introduction to ML
2. Building Predictive Models
3. Common Application of ML

UNIT-IV

INTRODUCTION TO PREDICTIVE ANALYTICS IN HEALTHCARE

1. Concepts of Predictive Analytics
2. Healthcare Case Studies
3. Predictive Model Evaluation

UNIT-V

CLINICAL DECISION SUPPORT SYSTEMS (CDSS)

1. Introduction to CDSS
2. Building a simple Decision Support system
3. Case studies

UNIT-VI

IMPLEMENTING HEALTH ALGORITHMS INTO CLINICAL PRACTICE

1. From Algorithms to Application
2. User Interface and Experience

UNIT-VII

ETHICAL AND LEGAL CONSIDERATIONS IN HEALTH ALGORITHMS

1. Ethics of AI in Healthcare
2. Data Privacy and Security
3. Regulatory and Legal Framework

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

MOBILE APPS & WEB APPS

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Mobile and Web Apps in Healthcare.
2. Apply the principles of Components of a Mobile App.
3. Analyse and evaluate Components of a Web App.
4. Design and develop solutions using Tools and Technologies for Development.

UNIT-I

INTRODUCTION TO MOBILE AND WEB APPS IN HEALTHCARE

1. What are Mobile Apps
2. What are Web Apps

UNIT-II

COMPONENTS OF A MOBILE APP

1. Frontend Components (UI/UX)
2. Backend Components
3. Mobile App Platforms

UNIT-III

COMPONENTS OF A WEB APP

1. Frontend Components (UI/UX)
2. Backend Components
3. Web App Deployment

UNIT-IV

TOOLS AND TECHNOLOGIES FOR DEVELOPMENT

1. Mobile App Development Tools
2. Web App Development Tools

UNIT-V

REAL-WORLD APPLICATIONS AND HANDS ON PROJECTS

1. Mobile App Project Ideas
2. Web App Project Ideas

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DATABASE FEATURES

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Mobile and Web Apps in Healthcare.
2. Apply the principles of Components of a Mobile App.
3. Analyse and evaluate Components of a Web App.
4. Design and develop solutions using Tools and Technologies for Development.

UNIT-I

INTRODUCTION TO MOBILE AND WEB APPS IN HEALTHCARE

1. What are Mobile Apps
2. What are Web Apps

UNIT-II

COMPONENTS OF A MOBILE APP

1. Frontend Components (UI/UX)
2. Backend Components
3. Mobile App Platforms

UNIT-III

COMPONENTS OF A WEB APP

1. Frontend Components (UI/UX)
2. Backend Components
3. Web App Deployment

UNIT-IV

TOOLS AND TECHNOLOGIES FOR DEVELOPMENT

1. Mobile App Development Tools
2. Web App Development Tools

UNIT-V

REAL-WORLD APPLICATIONS AND HANDS ON PROJECTS

1. Mobile App Project Ideas
2. Web App Project Ideas

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

API & PLUG-IN INTEGRATION

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Mobile and Web Apps in Healthcare.
2. Apply the principles of Components of a Mobile App.
3. Analyse and evaluate Components of a Web App.
4. Design and develop solutions using Tools and Technologies for Development.

UNIT-I

INTRODUCTION TO MOBILE AND WEB APPS IN HEALTHCARE

1. What are Mobile Apps
2. What are Web Apps

UNIT-II

COMPONENTS OF A MOBILE APP

1. Frontend Components (UI/UX)
2. Backend Components
3. Mobile App Platforms

UNIT-III

COMPONENTS OF A WEB APP

1. Frontend Components (UI/UX)
2. Backend Components
3. Web App Deployment

UNIT-IV

TOOLS AND TECHNOLOGIES FOR DEVELOPMENT

1. Mobile App Development Tools
2. Web App Development Tools

UNIT-V

REAL-WORLD APPLICATIONS AND HANDS ON PROJECTS

1. Mobile App Project Ideas
2. Web App Project Ideas

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DASHBOARDS FOR HEALTHCARE

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Healthcare Dashboards.
2. Apply the principles of Key Features of Interactive Dashboards for Healthcare.
3. Analyse and evaluate Tools for Developing Interactive Dashboards.
4. Design and develop solutions using Key Metrics for Healthcare Dashboards.

UNIT-I

INTRODUCTION TO HEALTHCARE DASHBOARDS

1. Patient Dashboards
2. Public Health Dashboards

UNIT-II

KEY FEATURES OF INTERACTIVE DASHBOARDS FOR HEALTHCARE

1. Data Visualization
2. Filters and Segmentation
3. Real-Time Updates
4. KPIs (Key Performances Indicators
5. User Interaction
6. Data Export

UNIT-III

TOOLS FOR DEVELOPING INTERACTIVE DASHBOARDS

1. Power BI/ Tableau/ Google Data Studio

UNIT-IV

KEY METRICS FOR HEALTHCARE DASHBOARDS

1. Patients data Dashboards
2. Public Health Dashboards
3. Operational Dashboards for Hospitals

UNIT-V

HANDS-ON PRACTICE

1. Case studies

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

SEMESTER-IV

DESIGN THINKING

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Design Thinking.
2. Apply the principles of Understanding Healthcare Challenges.
3. Analyse and evaluate Empathy and User-Centered Design.
4. Design and develop solutions using Prototyping and Iteration.

UNIT-I

INTRODUCTION TO DESIGN THINKING

1. Covers the core principles of Design Thinking, focusing on empathy, ideation, and prototyping to solve complex healthcare problems.

UNIT-II

UNDERSTANDING HEALTHCARE CHALLENGES

1. Teaches students to identify and understand healthcare problems from the perspective of patients, providers, and other stakeholders

UNIT-III

EMPATHY AND USER-CENTERED DESIGN

1. Focuses on the importance of empathy in the design process, ensuring healthcare solutions meet the real needs of users

UNIT-IV

PROTOTYPING AND ITERATION

1. Guides students through creating low-fidelity prototypes, testing, and iterating on healthcare solutions based on user feedback

UNIT-V

COLLABORATIVE PROBLEM SOLVING IN HEALTHCARE

1. Explores how multidisciplinary teams work together using Design Thinking to innovate and create effective healthcare solutions.

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

UI/UX FOR HEALTHCARE

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to UI/UX in Healthcare.
2. Apply the principles of Designing for Healthcare Users.
3. Analyse and evaluate User-Centered Design Process.
4. Design and develop solutions using Accessibility and Usability in Healthcare Design.

UNIT-I

INTRODUCTION TO UI/UX IN HEALTHCARE

1. Covers the principles of User Interface (UI) and User Experience (UX) design, focusing on their application in healthcare technology to improve usability and patient outcomes.

UNIT-II

DESIGNING FOR HEALTHCARE USERS

1. Teaches how to design digital healthcare tools (e.g., mobile apps, telehealth platforms) with the needs of patients, healthcare providers, and administrators in mind

UNIT-III

USER-CENTERED DESIGN PROCESS

1. Focuses on the steps of the user-centered design process, including research, prototyping, testing, and iteration to ensure user-friendly healthcare applications

UNIT-IV

ACCESSIBILITY AND USABILITY IN HEALTHCARE DESIGN

1. Explores designing accessible and inclusive digital health solutions for diverse patient populations, including elderly and disabled users

UNIT-V

EVALUATING UI/UX IN HEALTHCARE APPLICATIONS

1. Teaches methods for evaluating the effectiveness of UI/UX in healthcare apps and tools through user feedback, usability testing, and performance metrics

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

RAPID PROTOTYPING AND 3D PRINTING

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Additive Manufacturing.
2. Apply the principles of Designing for Healthcare Users.
3. Analyse and evaluate 3D Printing Materials.
4. Design and develop solutions using 3D Modelling & Design.

UNIT-I

INTRODUCTION TO ADDITIVE MANUFACTURING

1. Types of 3D Printing Technologies: Fused Deposition Modelling (FDM), Stereolithography (SLA), Selective Laser Sintering (SLS)
2. Differences between additive and subtractive manufacturing

UNIT-II

DESIGNING FOR HEALTHCARE USERS

1. Teaches how to design digital healthcare tools (e.g., mobile apps, telehealth platforms) with the needs of patients, healthcare providers, and administrators in mind

UNIT-III

3D PRINTING MATERIALS

1. Thermoplastics: PLA, ABS, PETG
2. Biocompatible Resins & Medical-Grade Polymers
3. Metal & Ceramic 3D Printing

UNIT-IV

3D MODELLING & DESIGN

1. Introduction to CAD Software (AutoCAD, SolidWorks, Fusion 360)
2. Creating STL, OBJ file formats for 3D printing
3. Optimizing designs for printability and reducing material waste

UNIT-V

PROTOTYPING & TESTING IN HEALTHCARE

1. 3D Printed Medical Applications: Prosthetic limbs, Dental implants, Orthotic devices
2. Bioprinting & Tissue Engineering: Emerging trends
3. Quality assessment and strength testing of printed models

UNIT-VI

POST-PROCESSING & FINISHING TECHNIQUES

1. Support Removal, Surface Smoothing, Sterilization Techniques
2. Coating and painting for biocompatibility
3. Sterilization processes in medical applications

UNIT-VII

INDUSTRY APPLICATIONS & FUTURE TRENDS

1. 3D Printing in Surgery & Implants
2. Use in Custom Prosthetics & Assistive Devices
3. Future of Bioprinting and Organ Printing

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

PREDICTIVE ANALYTICS (PREDICTION AND FORECASTING)

L/T/P/C

3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Predictive Analytics.
2. Apply the principles of Data Sources and Collection.
3. Analyse and evaluate Techniques for Prediction and Forecasting.
4. Design and develop solutions using Applications in Healthcare.

UNIT-I

INTRODUCTION TO PREDICTIVE ANALYTICS

1. Overview of predictive analytics in healthcare, explaining how historical data and statistical algorithms are used to predict patient outcomes, disease progression, and future healthcare needs.

UNIT-II

DATA SOURCES AND COLLECTION

1. Study of different data types used for predictive analytics, including electronic health records (EHRs), medical imaging, wearable, and patient demographic information

UNIT-III

TECHNIQUES FOR PREDICTION AND FORECASTING

1. Exploration of machine learning models, regression analysis, and time-series forecasting techniques used to make predictions about patient health, hospital resource utilization, and public health trends

UNIT-IV

APPLICATIONS IN HEALTHCARE

1. Understanding the practical uses of predictive analytics in areas like early diagnosis, personalized treatment plans, risk stratification, and resource optimization in hospitals and clinics

UNIT-V

CHALLENGES AND ETHICAL CONSIDERATIONS

1. Discussion of the challenges in implementing predictive models, including data privacy concerns, model accuracy, interpretability, and ensuring equitable access to predictive healthcare tools

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

AI/ML/GEN AI/COMPUTER VISION

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to AI and ML in Healthcare.
2. Apply the principles of Types of Machine Learning Algorithms.
3. Analyse and evaluate Generative AI in Healthcare.
4. Design and develop solutions using Data Preparation and Feature Engineering for AI/ML.

UNIT-I

INTRODUCTION TO AI AND ML IN HEALTHCARE

1. Overview of AI And ML
2. Application in Healthcare (Bedside Robotic Feeding arm)

UNIT-II

TYPES OF MACHINE LEARNING ALGORITHMS

1. Supervised Learning
2. Unsupervised Learning
3. Reinforcement learning

UNIT-III

GENERATIVE AI IN HEALTHCARE

1. Generative AI models, like GANs (Generative Adversarial Networks), can be applied in creating synthetic medical data, drug discovery, and personalized treatment plans.

UNIT-IV

DATA PREPARATION AND FEATURE ENGINEERING FOR AI/ML

1. Healthcare data Types (e.g., EHRs, imaging, and genomic data) for AI/ML models, including cleaning, transformation, and feature selection

UNIT-V

ETHICS AND CHALLENGES IN AI/ML FOR HEALTHCARE

1. Discusses the ethical considerations, data privacy concerns, and challenges in implementing AI/ML models in healthcare, ensuring fairness and transparency in predictions

UNIT-VI

COMPUTER VISION

1. Overview of Computer vision
2. Application in Healthcare

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.

3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

SEMESTER-V

ELECTRONIC HEALTH RECORDS (EHR)

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to EHR Systems.
2. Apply the principles of EHR Data Structure and Management.
3. Analyse and evaluate Implementation and Integration of EHR Systems.
4. Design and develop solutions using EHR Privacy, Security, and Compliance.

UNIT-I

INTRODUCTION TO EHR SYSTEMS

1. What is EHR?
2. Components of EHRs (Patient demographics, medical
3. history, medications and allergies, test results, clinical notes, Immunization records

UNIT-II

EHR DATA STRUCTURE AND MANAGEMENT

1. Data Entry Methods
2. Coding
3. Storage
4. Retrieval of patient information in digital format

UNIT-III

IMPLEMENTATION AND INTEGRATION OF EHR SYSTEMS

1. Database Design for Healthcare
2. Database Management (DBMS)
3. Database Integrity and Consistency

UNIT-IV

EHR PRIVACY, SECURITY, AND COMPLIANCE

1. Data Privacy and security regulations
2. Privacy protection methods
3. Common compliance

UNIT-V

EVALUATING THE IMPACT OF EHR ON HEALTHCARE

1. Explores how EHR systems affect healthcare practices, such as reducing errors, improving communication, and
2. enhancing decision-making in clinical settings

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.

2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

TELEMEDICINE

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Telemedicine.
2. Apply the principles of Wireless telemedicine system deployment.
3. Analyse and evaluate Wireless Technologies in patient monitoring.
4. Design and develop solutions using Technologies in medical information processing.

UNIT-I

INTRODUCTION TO TELEMEDICINE

1. History
2. Evolution in healthcare

UNIT-II

WIRELESS TELEMEDICINE SYSTEM DEPLOYMENT

1. Planning and deployment considerations
2. Scalability to Support future growth
3. Integration with existing IT infrastructure
4. Evaluating IT service and solution provider
5. Quality measurement

UNIT-III

WIRELESS TECHNOLOGIES IN PATIENT MONITORING

1. Body area networks
2. Emergency and disaster monitoring
3. In hospital monitoring

UNIT-IV

TECHNOLOGIES IN MEDICAL INFORMATION PROCESSING

1. Collecting data from patients
2. Bio signal transmission and processing
3. Decision support systems

UNIT-V

TELEMEDICINE IMPACT ON HEALTH CARE DELIVERY

1. Cost of Care
2. Quality of Care
3. Access to care
4. Relationship with health care providers
5. Market for telehealth services

UNIT-VI

GUIDELINES TO BE FOLLOWED IN ELECTRONIC FLOW OF HEALTH INFORMATION AND RECORDS

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

AR/VR/MR FOR HEALTHCARE

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to AR, VR and MR.
2. Apply the principles of Applications of AR/VR/MR.
3. Analyse and evaluate Software for AR/VR/MR.
4. Design and develop solutions using Hardware for AR/VR/MR.

UNIT-I

INTRODUCTION TO AR, VR AND MR

1. AR
2. VR
3. MR

UNIT-II

APPLICATIONS OF AR/VR/MR

1. Medical Training and Education
2. Surgical Planning and Assistance
3. Pain Management and Therapy
4. Mental Health Treatment
5. Patient Engagement and Education
6. Remote Consultation and Monitoring

UNIT-III

SOFTWARE FOR AR/VR/MR

1. AR (Microsoft HoloLens Development Studio, Unity 3D)
2. VR (Oculus SDK, Engage VR)
3. MR (HoloAnatomy, Microsoft Dynamics 365 Remote Assist)

UNIT-IV

HARDWARE FOR AR/VR/MR

1. AR (Microsoft HoloLens2, Google Glass Enterprise Edition)
2. VR (Oculus Rift S/ Oculus Quest 2, HTC Vive Pro)
3. MR (Microsoft HoloLens 2, Oculus Quest 2)

UNIT-V

TYPES OF DATA SETS FOR AR/VR/MR

1. EMR Data sets
2. Sensing data sets
3. Image data sets
4. Video data set

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

INTERNET OF MEDICAL THINGS (IOMT)

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to IoMT.
2. Apply the principles of IoMT Devices and Sensors.
3. Analyse and evaluate Data Types.
4. Design and develop solutions using Security, Privacy and Regulation for IoMT.

UNIT-I

INTRODUCTION TO IOMT

1. What is IoMT
2. IoMT Architecture
3. IoMT Applications in Healthcare

UNIT-II

IOMT DEVICES AND SENSORS

1. Medical Devices in IoMT
2. Sensors and Data Acquisition
3. Cloud Platforms and Data Storage

UNIT-III

DATA TYPES

1. Real-time data
2. Historical data
3. Predictive analytics

UNIT-IV

SECURITY, PRIVACY AND REGULATION FOR IOMT

1. Data Privacy and Security
2. Regulatory standards and Compliance

UNIT-V

HANDS ON EXPERIENCE

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

MARKET RESEARCH & NEEDS ASSESSMENT

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Market Research in Healthcare.
2. Apply the principles of Needs Assessment Methodologies.
3. Analyse and evaluate Health Technology Adoption.
4. Design and develop solutions using Competitive Analysis in Healthcare.

UNIT-I

INTRODUCTION TO MARKET RESEARCH IN HEALTHCARE

1. Understanding the role of market research in identifying gaps in healthcare services, evaluating patient needs, and assessing the potential for new health technologies or
2. Services

UNIT-II

NEEDS ASSESSMENT METHODOLOGIES

1. Study of various methods for conducting needs assessments in healthcare, including surveys, interviews, focus groups, and data analysis to identify unmet healthcare needs within
2. populations or specific patient groups

UNIT-III

HEALTH TECHNOLOGY ADOPTION

1. Exploring the factors influencing the adoption of health technologies, including user preferences, market trends, regulatory considerations, and cost-effectiveness in
2. addressing healthcare challenges

UNIT-IV

COMPETITIVE ANALYSIS IN HEALTHCARE

1. Examining how to assess the competitive landscape of
2. healthcare products and services, identifying key players, and evaluating the strengths and weaknesses of existing solutions

UNIT-V

DEVELOPING STRATEGIC PLANS

1. Using market research and needs assessment findings to inform the development of strategic healthcare initiatives, including product development, service delivery models, and patient-centered care approaches

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

INTERNSHIP

L/T/P/C
-/-/-/3

This is a field-based / project-based course (Internship, Research Project, or Elective Review) evaluated through guided fieldwork, periodic review presentations, a report/dissertation, and viva-voce.

SEMESTER-VI

DIGITAL TWINS

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Digital Twins in Healthcare.
2. Apply the principles of Applications in Digital Twins in Healthcare.
3. Analyse and evaluate Enabling Technologies behind Digital Twins.
4. Design and develop solutions using Challenges and Ethical Considerations.

UNIT-I

INTRODUCTION TO DIGITAL TWINS IN HEALTHCARE

1. What is a Digital Twin?
2. Components of Digital Twins How Digital Twins Work

UNIT-II

APPLICATIONS IN DIGITAL TWINS IN HEALTHCARE

1. Personalized Medicine
2. Patient Monitoring and Management
3. Medical Simulations and Training
4. Hospital and Healthcare System Management

UNIT-III

ENABLING TECHNOLOGIES BEHIND DIGITAL TWINS

1. IoMT
2. AI and ML learning
3. Cloud Computing
4. Block chain

UNIT-IV

CHALLENGES AND ETHICAL CONSIDERATIONS

1. Discussing the challenges in implementing digital twins in
2. healthcare, including data privacy, interoperability, accuracy, and the ethical concerns of using highly sensitive personal
3. health data for simulations

UNIT-V

CASE STUDIES/APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.

3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DIGITAL BEDSIDE PATIENT MONITORING

L/T/P/C
2/-/2/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Digital Bedside Patient Monitoring.
2. Apply the principles of Key Parameters Monitored in Bedside Systems.
3. Analyse and evaluate Components of Digital Bedside Monitoring Systems.
4. Design and develop solutions using Data Management and Analytics in Patient Monitoring.

UNIT-I

INTRODUCTION TO DIGITAL BEDSIDE PATIENT MONITORING

1. Overview of Patient Monitoring Systems Roles and Benefits in Healthcare

UNIT-II

KEY PARAMETERS MONITORED IN BEDSIDE SYSTEMS

1. Vital Signs
2. Advanced Parameters
3. Specialized Monitoring
4. Patient Status Data Integration

UNIT-III

COMPONENTS OF DIGITAL BEDSIDE MONITORING SYSTEMS

1. Sensors and Wearable Devices
2. Data Collection Devices
3. Central Monitoring Systems
4. Integration with Electronic Health Records (EHR)

UNIT-IV

DATA MANAGEMENT AND ANALYTICS IN PATIENT MONITORING

1. Data Collection and Transmission
2. Data Security and Privacy
3. Predictive Analytics and Artificial Intelligence
4. Alert Systems and Decision Support

UNIT-V

CASE STUDIES/APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DIGITAL EMERGENCY AND ICU CARE

L/T/P/C
2/-/2/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Digital Emergency and ICU Care.
2. Apply the principles of Patient Monitoring in Emergency and ICU Care.
3. Analyse and evaluate Artificial Intelligence and Machine Learning in Critical Care.
4. Design and develop solutions using Telemedicine in Emergency and ICU Care.

UNIT-I

INTRODUCTION TO DIGITAL EMERGENCY AND ICU CARE

1. What is a Digital Emergency and ICU Care?
2. Digital Technologies in Emergency and ICU Care
3. Clinical Decision Support Systems (CDSS)

UNIT-II

PATIENT MONITORING IN EMERGENCY AND ICU CARE

1. Real-Time Patient Monitoring System
2. Data Integration and Interoperability
3. Telemedicine and Remote Patient Monitoring

UNIT-III

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN CRITICAL CARE

1. AI in Emergency and ICU Care
2. Machine Learning for Patient Risk Stratification
3. AI and Robotics in ICU

UNIT-IV

TELEMEDICINE IN EMERGENCY AND ICU CARE

1. Telemedicine Overview
2. Tele-ICU
3. Telemedicine in Rural and Remote Areas

UNIT-V

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DIGITAL HOME-BASED HEALTHCARE

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Digital Home-based Healthcare.
2. Apply the principles of Remote Patient Monitoring (RPM) Systems.
3. Analyse and evaluate Artificial Intelligence (AI) and Machine Learning (ML) in Home Healthcare.
4. Design and develop solutions using Telemedicine and Virtual Care for Home Healthcare.

UNIT-I

INTRODUCTION TO DIGITAL HOME-BASED HEALTHCARE

1. What is a Digital Home-based healthcare?
2. The Role of Telemedicine in Home-Based Care
3. Technological Drivers of Digital Home Healthcare

UNIT-II

REMOTE PATIENT MONITORING (RPM) SYSTEMS

1. Overview of Remote Patient Monitoring (RPM)
2. Technologies in RPM
3. Integration with Healthcare Providers

UNIT-III

ARTIFICIAL INTELLIGENCE (AI) AND MACHINE LEARNING (ML) IN HOME HEALTHCARE

1. AI and ML in Home Healthcare
2. Personalized care and Predictive Analytics
3. Centralized and Distributed Monitoring Virtual Assistants

UNIT-IV

TELEMEDICINE AND VIRTUAL CARE FOR HOME HEALTHCARE

1. Telemedicine Platforms for Home Healthcare
2. Benefits of Telemedicine in Home Healthcare
3. Challenges and Barriers to Telemedicine

UNIT-V

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DIGITAL OCCUPATIONAL WELL-BEING

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Digital Occupational Well-Being.
2. Apply the principles of Digital Health and Wellness Technologies in the Workplace.
3. Analyse and evaluate AI and Machine Learning in Occupational Well-Being.
4. Design and develop solutions using Digital Tools for Employee Engagement and Productivity.

UNIT-I

INTRODUCTION TO DIGITAL OCCUPATIONAL WELL-BEING

1. What is Occupational Well-Being
2. Factors Affecting Occupational Well-Being Digital Solutions and Occupational Health

UNIT-II

DIGITAL HEALTH AND WELLNESS TECHNOLOGIES IN THE WORKPLACE

1. Wearable Devices for Occupational Health
2. Mobile Apps for Mental and Physical Well-Being
3. Employee Well-Being Platforms

UNIT-III

AI AND MACHINE LEARNING IN OCCUPATIONAL WELL-BEING

1. AI for Monitoring Employee Well-Being
2. AI in Mental Health Management
3. Predictive Analytics for Burnout Prevention

UNIT-IV

DIGITAL TOOLS FOR EMPLOYEE ENGAGEMENT AND PRODUCTIVITY

1. Digital Engagement Platform
2. Productivity Tools for Better Work-Life Balance
3. Gamification for Wellness and Engagement

UNIT-V

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DIGITAL ELDERLY CARE

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Digital Elderly Care.
2. Apply the principles of Wearable Devices and Health Monitoring for the Elderly.
3. Analyse and evaluate Telemedicine and Remote Healthcare for the Elderly.
4. Design and develop solutions using Smart Homes and Assisted Living Technologies.

UNIT-I

INTRODUCTION TO DIGITAL ELDERLY CARE

1. What is Digital Elderly Care?
2. Challenges in Elderly Care
3. Types of Digital Solutions in Elderly care

UNIT-II

WEARABLE DEVICES AND HEALTH MONITORING FOR THE ELDERLY

1. Types of wearable Devices for elderly
2. Health Monitoring and Data Collection
3. Fall Detection and Emergency response

UNIT-III

TELEMEDICINE AND REMOTE HEALTHCARE FOR THE ELDERLY

1. Telemedicine and Virtual Health Consultations
2. Benefits of Telemedicine in Elderly Care
3. Technologies Enabling Remote Care

UNIT-IV

SMART HOMES AND ASSISTED LIVING TECHNOLOGIES

1. Smart Home Technologies
2. Assistive Technologies
3. Safety and Security in Smart Homes

UNIT-V

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

HEALTHCARE LOGISTICS

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Healthcare Logistics.
2. Apply the principles of Supply Chain Management in Healthcare.
3. Analyse and evaluate Pharmaceutical Logistics.
4. Design and develop solutions using Technology in Healthcare Logistics.

UNIT-I

INTRODUCTION TO HEALTHCARE LOGISTICS

1. What is Healthcare Logistics?
2. Key Components of Healthcare Logistics Challenges in Healthcare Logistics

UNIT-II

SUPPLY CHAIN MANAGEMENT IN HEALTHCARE

1. Healthcare Supply Chain Overview
2. Inventory Management in Healthcare Procurement and Vendor Management

UNIT-III

PHARMACEUTICAL LOGISTICS

1. Pharmaceutical Supply Chain
2. Cold Chain Logistics
3. Compliance and Regulatory Issues

UNIT-IV

TECHNOLOGY IN HEALTHCARE LOGISTICS

1. Technologies for Inventory Management
2. Data Analytics and Optimization Tool
3. Telematics and Fleet Management in Healthcare

UNIT-V

TRANSPORTATION AND DISTRIBUTION IN HEALTHCARE

1. Transportation of Medical Goods
2. Transportation Challenges and Solutions
3. Regulations in Medical Transportation

UNIT-VI

HEALTHCARE LOGISTICS OPTIMIZATION AND SUSTAINABILITY

1. Logistics Optimization Strategies
2. Sustainability in Healthcare Logistics

UNIT-VII

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

HEALTHCARE E-COMMERCE

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Healthcare E-Commerce.
2. Apply the principles of E-Commerce Platforms for Healthcare Products.
3. Analyse and evaluate E-Commerce Platforms for Healthcare Products and Services.
4. Design and develop solutions using Marketing and Consumer Behaviour.

UNIT-I

INTRODUCTION TO HEALTHCARE E-COMMERCE

1. What is Healthcare E-Commerce?
2. E-Commerce Segments in Healthcare
3. Market Trends in Healthcare E-Commerce

UNIT-II

E-COMMERCE PLATFORMS FOR HEALTHCARE PRODUCTS

1. Designing E-Commerce Platforms for Healthcare Products
2. Payment Systems and Logistics in Healthcare E-Commerce Integration with Healthcare Systems

UNIT-III

E-COMMERCE PLATFORMS FOR HEALTHCARE PRODUCTS AND SERVICES

1. Healthcare products (medical devices, drugs)
2. Services (telemedicine) are sold and delivered online

UNIT-IV

MARKETING AND CONSUMER BEHAVIOUR

1. Digital marketing strategies for healthcare products
2. Understanding consumer decisions in online healthcare shopping.

UNIT-V

TECHNOLOGY AND SECURITY IN HEALTHCARE E-COMMERCE

1. Role of AI, block chain
2. Security measures in improving e-commerce platforms and safeguarding data

UNIT-VI

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

FINANCE FOR HEALTHCARE SETTINGS

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Healthcare Finance.
2. Apply the principles of Healthcare Budgeting.
3. Analyse and evaluate Revenue Cycle Management.
4. Design and develop solutions using Healthcare Financial Performance.

UNIT-I

INTRODUCTION TO HEALTHCARE FINANCE

1. Basics of financial management in healthcare, including key
2. Financial statements like balance sheets and income statements.

UNIT-II

HEALTHCARE BUDGETING

1. Understanding the process of creating and managing budgets for healthcare organizations, focusing on cost control and allocation.

UNIT-III

REVENUE CYCLE MANAGEMENT

1. How healthcare organizations handle billing, insurance claims, patient payments, and the overall revenue cycle.

UNIT-IV

HEALTHCARE FINANCIAL PERFORMANCE

1. Key metrics (e.g., profitability, liquidity) and tools (e.g., ROI, cost- benefit analysis) used to assess the financial health of healthcare
2. Institutions.

UNIT-V

FINANCING AND INVESTMENT IN HEALTHCARE

1. Sources of capital for healthcare organizations (loans, grants,
2. Equity) and evaluating investment projects, such as new technology or facility expansions.

UNIT-VI

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

SEMESTER-VII

DIGITAL TRANSFORMATION OF HEALTHCARE

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Digital Transformation of Healthcare.
2. Apply the principles of Core Technologies and Their Impact.
3. Analyse and evaluate Improving Healthcare Access and Efficiency Using Digital Tools.
4. Design and develop solutions using The Role of Data Security and Privacy in Digital Healthcare.

UNIT-I

INTRODUCTION TO DIGITAL TRANSFORMATION OF HEALTHCARE

1. Definition of Digital Transformation of Healthcare
2. Technologies (EHR, Telemedicine, AL&ML, mHealth, IoT)

UNIT-II

CORE TECHNOLOGIES AND THEIR IMPACT

1. Electronic Health Records (HER)
2. Telemedicine and Telehealth
3. AI-driven Healthcare Solutions

UNIT-III

IMPROVING HEALTHCARE ACCESS AND EFFICIENCY USING DIGITAL TOOLS

1. Improving Access to Care
2. Improving Efficiency in Healthcare Delivery

UNIT-IV

THE ROLE OF DATA SECURITY AND PRIVACY IN DIGITAL HEALTHCARE

1. Regulations
2. Data Security Challenges
3. Best Practices for Data Security

UNIT-V

FUTURE TRENDS AND INNOVATIONS IN DIGITAL HEALTHCARE

1. Personalized Medicine
2. Block chain Technology
3. 5G and Healthcare
4. Robotics in Healthcare

UNIT-VI

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.

2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DIGITAL HEALTH PROJECT MANAGEMENT

L/T/P/C
3/-/-/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Digital Health Project Management.
2. Apply the principles of Digital Health Project Planning.
3. Analyse and evaluate Agile Methodology in Digital Health Projects.
4. Design and develop solutions using Resource and Budget Management in Digital Health Projects.

UNIT-I

INTRODUCTION TO DIGITAL HEALTH PROJECT MANAGEMENT

1. What is Digital Health
2. Introduction to Project Management
3. Importance of Project Management in Digital Health

UNIT-II

DIGITAL HEALTH PROJECT PLANNING

1. Defining Project Scope and Objectives
2. Stakeholder Identification and Analysis
3. Project Charter

UNIT-III

AGILE METHODOLOGY IN DIGITAL HEALTH PROJECTS

1. Introduction to Agile Project Management
2. Scrum Framework
3. Managing Iterative Development and Stakeholder Feedback

UNIT-IV

RESOURCE AND BUDGET MANAGEMENT IN DIGITAL HEALTH PROJECTS

1. Resource Planning
2. Budget Planning and Financial Management
3. Cost and Value Analysis in Digital Health Projects

UNIT-V

RISK MANAGEMENT IN DIGITAL HEALTH PROJECTS

1. Identifying Risks
2. Risk Assessment and Mitigation Strategies

UNIT-VI

LEGAL AND REGULATORY COMPLIANCE IN DIGITAL HEALTH PROJECTS

1. Healthcare Regulations
2. Data Privacy and Security
3. Ethical Considerations

UNIT-VII

PROJECT IMPLEMENTATION AND MONITORING

1. Project Implementation Plan
2. Monitoring Project Progress
3. Post-Implementation Evaluation and Project Closure

UNIT-VIII

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

WEARABLE DIAGNOSTICS

L/T/P/C
2/-/2/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Wearable Diagnostics.
2. Apply the principles of How Wearable Diagnostic Work.
3. Analyse and evaluate Applications of Wearable Diagnostics.
4. Design and develop solutions using Benefits of Wearable Diagnostics.

UNIT-I

INTRODUCTION TO WEARABLE DIAGNOSTICS

1. Definition
2. Types of wearable devices (smart watches, fitness trackers, wearable ECG monitors, wearable blood pressure monitors, wearable ECG monitors, sleep and oxygen monitoring
3. devices)

UNIT-II

HOW WEARABLE DIAGNOSTIC WORK

1. Sensors and Data Collection
2. Data Processing and Algorithms
3. Real-Time Monitoring and Feedback
4. Integration with Healthcare Systems

UNIT-III

APPLICATIONS OF WEARABLE DIAGNOSTICS

1. Chronic Disease Management
2. Preventive Health and Early Diagnosis
3. Post-Surgical Monitoring
4. Mental Health Monitoring
5. Fitness and Wellness

UNIT-IV

BENEFITS OF WEARABLE DIAGNOSTICS

1. Empowering Patients
2. Early Detection and Prevention
3. Remote Monitoring and Telemedicine
4. Data-Driven Healthcare

UNIT-V

CHALLENGES AND LIMITATIONS

1. Accuracy and Reliability
2. User Compliance and Adoption
3. Data Privacy and Security

4. Regulatory and Ethical Issues

UNIT-VI

FUTURE TRENDS IN WEARABLE DIAGNOSTICS

1. Advancements in Sensor Technology
2. AI and Machine Learning in Wearable Diagnostics
3. Wearable for Personalized Medicine
4. Integration with Other Digital Health Tools

UNIT-VII

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

EXOSKELETONS & HUMANOID ROBOTS FOR HEALTHCARE

L/T/P/C

2/-/2/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Exoskeletons & Humanoid for Healthcare.
2. Apply the principles of Components of Exoskeletons & Humanoid Robots Sensors and Data Collection.
3. Analyse and evaluate Design and Implementation of Exoskeletons.
4. Design and develop solutions using Humanoid Robots for Healthcare.

UNIT-I

INTRODUCTION TO EXOSKELETONS & HUMANOID FOR HEALTHCARE

1. Definition
2. Applications in Healthcare

UNIT-II

COMPONENTS OF EXOSKELETONS & HUMANOID ROBOTS SENSORS AND DATA COLLECTION

1. Robotics and Actuation
2. Motion Control and AI Algorithms
3. Sensors and Feedback Systems
4. VR-Assisted Therapy Integration
5. Patient Interaction and User Interface

UNIT-III

DESIGN AND IMPLEMENTATION OF EXOSKELETONS

1. Design Considerations
2. Types of Exoskeletons
3. Steps in Development
4. Regulatory Standards and Approvals

UNIT-IV

HUMANOID ROBOTS FOR HEALTHCARE

1. Human-Robot Interaction
2. Social Care Assistance
3. Clinical Applications
4. AI and Cognitive Capabilities

UNIT-V

INTEGRATION OF EXOSKELETONS & HUMANOIDS IN HEALTHCARE SYSTEMS

1. Healthcare Facility Deployment
2. Impact on Patient Outcomes
3. Cost-Effectiveness

UNIT-VI

VR-ASSISTED THERAPY IN REHABILITATION

1. Virtual Reality for Physical Therapy
2. Integration with Exoskeletons
3. Applications in Stroke and Spinal Cord Injury Recovery
4. Ethical and Regulatory Issues

UNIT-VII

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

DRONES & UAVS IN HEALTHCARE

L/T/P/C
2/-/2/3

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Drone & UAV.
2. Apply the principles of Components of a UAV for medical use.
3. Analyse and evaluate UAV Operation in Healthcare: BVLOS & AI Navigation.
4. Design and develop solutions using Payload Integration for Medical Deliveries.

UNIT-I

INTRODUCTION TO DRONE & UAV

1. Definition
2. Applications in Healthcare

UNIT-II

COMPONENTS OF A UAV FOR MEDICAL USE

1. Frames
2. Motors & Propulsion system
3. Power system
4. Flight controller & Sensor
5. Communication system
6. Payload Accessories

UNIT-III

UAV OPERATION IN HEALTHCARE: BVLOS & AI NAVIGATION

1. BULOS Operations (Beyond Visual Line of Sight)
2. AI-Powered Navigation
3. AI- in Medical Delivery

UNIT-IV

PAYLOAD INTEGRATION FOR MEDICAL DELIVERIES

1. Designing Payload Systems for Medical Deliveries
2. Integration of Cameras and Thermal Imaging
3. Emergency Medical UAV Payloads

UNIT-V

REGULATORY AND LEGAL FRAMEWORK FOR UAV OPERATIONS

1. Regulatory Compliance in UAV Operations
2. Privacy and Data Protection
3. Safety Standards

UNIT-VI

DRONE APPLICATIONS IN DISASTER RESPONSE AND REMOTE HEALTHCARE

1. Disaster Response

2. Remote Healthcare
3. Future Trends

UNIT-VII

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

SOCIAL MEDIA IN HEALTHCARE

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Social Media in Healthcare.
2. Apply the principles of Leveraging AR/VR Technologies in Health Education.
3. Analyse and evaluate Influencer-Driven Health Awareness and Engagement.
4. Design and develop solutions using Real-Time Patient Interaction and Social Media.

UNIT-I

INTRODUCTION TO SOCIAL MEDIA IN HEALTHCARE

1. Definition and Scope
2. Role of Social Media
3. Social media as a Communication Tool in Healthcare

UNIT-II

LEVERAGING AR/VR TECHNOLOGIES IN HEALTH EDUCATION

1. Introduction to AR and VR in Healthcare
2. Applications of AR/VR in Healthcare
3. AR/VR as a Tool for Patient Engagement
4. Creating AR/VR Campaigns

UNIT-III

INFLUENCER-DRIVEN HEALTH AWARENESS AND ENGAGEMENT

1. Influencers in Healthcare
2. Building Credibility and Trust
3. Ethical Considerations

UNIT-IV

REAL-TIME PATIENT INTERACTION AND SOCIAL MEDIA

1. Social Media as a Patient Interaction Tool
2. Telemedicine Integration
3. Patient Feedback and Engagement

UNIT-V

CONTENT ANALYTICS AND MEASURING IMPACT

1. Understanding Content Analytics
2. Key Metrics
3. Evaluating Campaign Success
4. Improving Future Campaigns

UNIT-VI

SOCIAL MEDIA RISKS AND ETHICS IN HEALTHCARE

1. Ethical Considerations

2. Regulatory Compliance
3. Future Trends and Innovations in social media and Healthcare

UNIT-VII

CASE STUDIES/ APPLICATION

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

CYBER SECURITY FOR HEALTH

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Cyber Security for Health.
2. Apply the principles of Securing E-Healthcare Security.
3. Analyse and evaluate Security Challenges.
4. Design and develop solutions using Identification and E-Healthcare information.

UNIT-I

INTRODUCTION TO CYBER SECURITY FOR HEALTH

1. E-Healthcare Information Management
2. Types and Trends in E-Healthcare Information
3. Frameworks and Architectures of E-Healthcare systems
4. The Internet and WWW

UNIT-II

SECURING E-HEALTHCARE SECURITY

1. Significance of security
2. Challenges in security
3. Issues of Information Security

UNIT-III

SECURITY CHALLENGES

1. Breaches of Privacy and confidentiality
2. Information Utilization Challenge
3. Legal Protection Challenge
4. The IT Security Challenge for Security information

UNIT-IV

IDENTIFICATION AND E-HEALTHCARE INFORMATION

1. Anonymisation and Pseudonymisation
2. De-identification of Personal Information
3. Permitted Uses and Disclosures of Health Information
4. Definition of Identifiability
5. Modelling of Threat
6. Breach Notification

UNIT-V

SECURE E-HEALTHCARE INFORMATION SYSTEMS

1. The mechanisms of ensuring security
2. Assessment of security
3. Case studies-Canada, Norway, Sweden, U.K, Denmark

UNIT-VI

ETHICS, LAWS AND STANDARDS

1. Information Ethics and Principals
2. Rationale for Laws and Standards
3. Laws & Standards Relationships and Interactions
4. Legal Protection of Privacy & Confidentiality
5. International and Cultural considerations
6. Standardization Challenges

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

RESEARCH PROJECT DESIGN (PROPOSAL)

L/T/P/C
-/-/4/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Healthcare Research Projects.
2. Apply the principles of Developing Research Questions and Hypothesis.
3. Analyse and evaluate Designing Research Methodology.
4. Design and develop solutions using Statistical Methods in Healthcare Research.

UNIT-I

INTRODUCTION TO HEALTHCARE RESEARCH PROJECTS

1. Definition and Importance of Research in Healthcare
2. Understanding the basic steps involved in healthcare research
3. Types of Research Designs

UNIT-II

DEVELOPING RESEARCH QUESTIONS AND HYPOTHESIS

1. Formulating a Research Question
2. Developing Hypotheses
3. Creating a Conceptual Framework

UNIT-III

DESIGNING RESEARCH METHODOLOGY

1. Choosing the Right Research Methodology
2. Sampling Techniques
3. Data Collection Methods

UNIT-IV

STATISTICAL METHODS IN HEALTHCARE RESEARCH

1. Introduction to Statistical Concepts
2. Applying Statistical Methods
3. Software for Data Analysis

UNIT-V

DATA ANALYSIS AND INTERPRETATION

1. Organizing and Cleaning Data
2. Analyzing Data
3. Reporting and Presenting Results
4. Conclusions and Recommendations

UNIT-VI

ETHICAL CONSIDERATIONS IN HEALTHCARE RESEARCH

1. Importance of Ethics in Healthcare Research
2. Informed Consent

3. Research Ethics Committees

UNIT-VII

IMPLEMENTING A RESEARCH PROJECT

1. Managing a Healthcare Research Project
2. Challenges in Healthcare Research
3. Real-world Case Studies

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

SEMESTER-VIII

RESEARCH PROJECT / DISSERTATION

L/T/P/C
-/-/20/10

This is a field-based / project-based course (Internship, Research Project, or Elective Review) evaluated through guided fieldwork, periodic review presentations, a report/dissertation, and viva-voce.

REVIEW OF TOPICS/ELECTIVES

L/T/P/C
2/-/-/2

This is a field-based / project-based course (Internship, Research Project, or Elective Review) evaluated through guided fieldwork, periodic review presentations, a report/dissertation, and viva-voce.

CRITICAL THINKING IN HEALTHCARE

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Critical Thinking in Healthcare.
2. Apply the principles of Problem-Solving in Healthcare.
3. Analyse and evaluate Decision-Making in Healthcare.
4. Design and develop solutions using Logical and Creative Approaches to Analyzing Complex Healthcare Issues.

UNIT-I

INTRODUCTION TO CRITICAL THINKING IN HEALTHCARE

1. What is Critical Thinking?
2. Components of Critical Thinking (Analysis, Evaluation, Inference, Reasoning)
3. Why is Critical Thinking Important in Healthcare?

UNIT-II

PROBLEM-SOLVING IN HEALTHCARE

1. Defining Problem-Solving
2. Steps in Problem-Solving
3. Common Healthcare Problems
4. Creative Problem-Solving Techniques

UNIT-III

DECISION-MAKING IN HEALTHCARE

1. Understanding Decision-Making
2. Types of Decision-Making in Healthcare
3. Steps in Decision-Making

UNIT-IV

LOGICAL AND CREATIVE APPROACHES TO ANALYZING COMPLEX HEALTHCARE ISSUES

1. Logical Analysis
2. Creative Approaches
3. Combining Logic with Creativity

UNIT-V

IMPLEMENTING CRITICAL THINKING AND PROBLEM-SOLVING SKILLS IN REAL-WORLD HEALTHCARE CONTEXTS

1. Clinical Scenarios
2. Simulations
3. Collaborative Decision-Making

UNIT-VI

ETHICAL CONSIDERATIONS IN HEALTHCARE DECISION MAKING

1. Importance of Ethics in Healthcare Research
2. Informed Consent
3. Research Ethics Committees

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.

HEALTHCARE START-UP PATHWAY

L/T/P/C
2/-/-/2

Course Outcomes (COs):

On completion of this course, students will be able to:

1. Explain the fundamental concepts of Introduction to Healthcare Startups.
2. Apply the principles of Strategic Planning for a Digital Health Startup.
3. Analyse and evaluate Legal and Regulatory Considerations in Healthcare Startups.
4. Design and develop solutions using Financial Aspects of Healthcare Entrepreneurship.

UNIT-I

INTRODUCTION TO HEALTHCARE STARTUPS

1. What are Healthcare Startups
2. Why Healthcare Startups?

UNIT-II

STRATEGIC PLANNING FOR A DIGITAL HEALTH STARTUP

1. Identifying Market Opportunities
2. Defining Your Value Proposition
3. Building a Business Model
4. Developing the Product

UNIT-III

LEGAL AND REGULATORY CONSIDERATIONS IN HEALTHCARE STARTUPS

1. Navigating Healthcare Regulations (HIPAA, FDA, GDPR, Telemedicine regulation)
2. Legal Structures for Healthcare Startups
3. Compliance and Risk Management
4. Protecting Intellectual Property

UNIT-IV

FINANCIAL ASPECTS OF HEALTHCARE ENTREPRENEURSHIP

1. Creating a Financial Plan
2. Funding Your Startup
3. Revenue Models for Digital Health
4. Managing Financial Risk and Cash Flow

UNIT-V

SCALING AND GROWING A HEALTHCARE STARTUP

1. Building a Team
2. Attracting Partnerships
3. Scaling Your Startup
4. Iterative Development

UNIT-VI

MARKETING AND LAUNCHING YOUR HEALTHCARE STARTUP

1. Developing a Go-To-Market Strategy
2. Patient-Centered Marketing
3. Launching Your Product

Suggested References:

1. Latest edition standard textbook(s) prescribed by the Board of Studies for the course.
2. Relevant peer-reviewed journal articles and technical documentation (e.g., HL7/FHIR specifications, WHO/ABDM guidelines, vendor/tool documentation) as applicable to the topic.
3. Open-access datasets, MOOC modules (NPTEL/SWAYAM/Coursera) and case studies relevant to the unit content, as recommended by the course coordinator.