MAHATMA GANDHI UNIVERSITY of MEDICAL SCIENCES & TECHNOLOGY JAIPUR

Syllabus

M. Sc. In Hospital and Health Information Administration (M.Sc. H&HIA)

(4 Semesters P.G. Degree Program)

2023-24

Recommended by Committee of Courses in Health Informatics at its meeting held on 03/03/2023 and approved by Academic Council at its meeting held on 28/04/2023.

NOTICE

1. The university reserves the right to make changes in the syllabus /books/ guidelines, fee-structure or any other information at any time without prior notice The decision of the university shall be binding on all.

2. The jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

RULES & REGULATIONS OF
M. Sc. In Hospital and Health Information Administration (M.Sc. H&HIA)

PROGRAM CODE: - **MSC1123**

(4 SEMESTERS P.G. DEGREE PROGRAM)

1. Introduction:

1.M.Sc. in Hospital &Health information Administration is a combination of business, science, and information technology. These professionals are managers: experts in processing, analyzing and reporting information vital to the health care industry, respected staff members who interact daily with the clinical and administrative staff, all of whom depend on health information to perform their jobs.

2.A blend of business and computer expertise, health information management links health care clinicians with information technology and is the bridge between patients' health information and health insurers, state and central government, and other regulating agencies. Expectation of future postgraduates in supporting future healthcare HIM professionals do not just work in hospitals.

3.According to the department of labor, employment opportunities for Hospital & Health information Administration professionals continue to grow much faster that the average for all occupations. They may look for career choices not only in acute-care settings, but in all types of alternative care settings, as well as in education, business, and legal settings. Services provided in these areas range from technical to administrative, with emphasis being placed on the latter.

4.As a vital member of the health care team, the health information manager is responsible for managing health information systems. This professional plan and develops health information systems that meet standards of accrediting and regulatory agencies. They also design health information systems appropriate for various sizes and types of health care facilities.

Program Outcome:

* Evaluate knowledge of practice relevant to health information management.
* Use formal research as a tool to evaluate and develop practice.
* Identify his/her professional learning and developmental needs.
* Work collaboratively with other health care professionals to achieve a quality service.
* Enable health care organization for better management of patient information
* Support health care administrators in routine activities
* Apply the knowledge obtained on specialized areas effectively in the health care system.
* Use interpersonal skills to facilitate effective communication with various health care professionals
* Develop health information standards according to the health care requirements
* Apply analytical and reflective skills to evaluate and improvise professional practice.
* Uphold legal ethical standards within his/ her profession

2. TITLE OF THE PROGRAM:

M. Sc. in Hospital and Health Information Administration (M.Sc. H&HIA)

3. DURATION OF THE COURSE:

Duration of the course: 2 Years (4 Semesters)

4. MEDIUM OF INSTRUCTION:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

5. ELIGIBILITY FOR ADMISSION:

1.Any health science graduate with MBBS/ BAMS/ BHMS/BDS/B. Sc. Nursing/Allied Health Sciences or equivalent with minimum aggregate of **50%** marks for general category and **45%** marks for reserved category candidates.

OR

Pass in any undergraduate program of 3- or 4-years duration or equivalent or any post graduate program of 2- or 3-year duration or equivalent with minimum aggregate of **50%** for general category and **45%** marks for reserved category candidates marks in any science group or public health/Health administration or computer science/technology group.

2. Candidates will be required to produce evidence of their passing graduation latest by the day of personal interview.

3. Candidates with relevant work experience are encouraged to apply. Working professionals will be considered for admission only after submitting NOC from their employer.

6. PROCESS OF ADMISSION:

Admission to M. Sc. In Hospital and Health Information Administration Program shall be made on the basis of written entrance examination conducted for the purpose.

7. RESERVATION POLICY:

Reservation in admissions shall be applicable as per policy of the State Government.

8. ENROLLMENT:

Every candidate who is admitted to M.Sc. in Hospital & Health Information Administration Degree Program in Mahatma Gandhi Institute of Health Informatics shall be required to get himself/herself enrolled with the Mahatma

Gandhi University of Medical Sciences & Technology (MGUMST) after paying the prescribed eligibility and enrolment fees.

A candidate shall deposit enrolment fees along with tuition fees at the time of his/her admission to the course. Such a candidate who fails to submit, to the college Principal, duly filled enrolment form along with original documents including migration certificate required for enrolment within prescribed period then after he/she shall pay late fee applicable at that time. No student will be allowed to appear in the university examination without his/her enrollment.

9. ATTENDANCE:

Minimum 75 % attendance is required in each Semester, both for theory and practical classes separately, student with deficient attendance will not be permitted to appear in university examination.

10. WORKING DAYS:

Each semester is consist of 120 working days including examination.

11. CONDUCTION OF THE UNIVERSITY EXAMINATION:

University semester examination shall be conducted twice in a year with an interval of six months. Even Semester examination shall be conducted after 6 months of odd semester examination

12. ELIGIBILITY TO APPEAR FOR UNIVERSITY EXAMINATION

Student is required to have minimum 75% attendance (in theory and practical separately) /to make him/her eligible to Candidates failing in one or more, subject in a semester will be required to appear in their failing subject in the next examination of the same semester next year.

A candidate will have to clear all the subjects of First to Third semester before appearing at Fourth semester university examination.

13. APPOINTMENT OF EXAMINER & PAPER SETTER

     a. For setting of theory question papers and evaluation of answer sheets. There will be 02 (Two) External (Out of state) and 03 (Three) Internal (In State, outside the university) examiners. Paper setters, Theory examination answer books evaluators, External and internal Examiners.

     b. For Practical examinations there will be 01 (One) External Examiner & 01 (One) Internal Examiner.

     a. All Examiners (External/Internal) shall be appointed by President of the university and from the panel of examiners given by principal through Dean of faculty of Medicine and Surgery.

     b. Paper setter shall be the examiners who will assess answers sheets of their respective papers.

c. Professor/ Assoc. Professor /Assistant Professor/Lecturer/Allied Health Professional having PG qualification and 5 years' teaching experience after PG in respective field is eligible to act as Internal/External examiner.

14. SCHEME OF EXAMINATION

The University Examination (End of Semester Examination or EOSE) for the Course shall be conducted semester wise at the end of every semester.

i. Theory

(a) There shall be five Theory papers in each semester of the study.

(b) Each Theory paper examination shall be of 3 hours duration and of maximum 70 marks.

(c) Internal assessment (Continuous Assessment or CA) shall be of 30 marks for each Theory Paper.

(d) The Paper Setter shall set the questions within the prescribed course of study of the concerned paper. There will be a set pattern of question papers duly approved by Academic Council.

Pattern of question papers (Annexure 1)

(g) Passing Marks: A candidate will have to obtain at least 50% marks including internal assessment in each theory paper to pass.

II. Practical and Viva-Voce Examination

(a) At the end of each semester there shall be practical and viva-voce examination of 200 marks. It shall be conducted after the Theory examination is over. A candidate will have to obtain at least 50% marks in practical and viva-voce examination

(b) practical and viva-voce examination shall be of 140 marks (Practical 100 marks + viva voce 40 marks) and internal assessment of sixty marks.

(b) The pattern of practical examination shall be as follows –

Semester	Practical Marks			Total Marks	Min. Pass Marks	Practical Examiners
	EOSE (End of Semester Examination)					
	Practical	viva-voce	CA			
I to IV Each	100	40	60	200	100	One Internal & one External Examiner

III Result

1. candidate have to obtain at least 50% marks separately in each Theory paper including continuous assessment and a minimum of 50% marks in the practical examination including viva-voce for him to be declared pass.
2. A Candidate who has failed in a Paper (s) will reappear in respective paper(s) in next examination of the same semester next year.
3. Candidate who has failed in Practical examination will reappear in practical examination only in next practical examination of the same semester.

IV. Supplementary Examination.

(a)   There shall be a supplementary examination of IV semester only within two months of the declaration of the result of the main examination of IV Semester.
(b)   Continuous assessment marks obtained in the concerned failed paper(s)/practical shall be carried forward for working out the result of next Theory paper(s) and/or practical examination.
(c)   If A failing candidate, wants to improve his/her Continuous assessment marks shall be allow to do so. In case he does appear for improvement or gets lesser marks in internal assessment, his earlier marks will be considered for working out the result of the failing subject.

V. Promotion to the Next Semester

1. A candidate who has passed or failed in one or more subjects shall be promoted to respective next semester.

2. A candidate will be allowed to appear for the IV semester examination only when the backlog of all papers (theory papers and practical) of I semester to III semester exams including elective papers (if any) is cleared.

3. The student is required to clear all the End of Semester Examination within 4 years from the year of joining of the Program otherwise he/she will have to leave the course.

M. Sc. Hospital & Health Information Administration Marks Distribution of Semester – I Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			UE	IA	Total	Pass Marks
Health Informatics	MSC1123S101T	7	70	30	100	
Biostatics and Research Methodology	MSC1123S102T	7	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Clinical Sciences	MSC1123S103T	7	70	30	100	
ELECTIVE COURSES (ANY TWO)						
Medical Terminology	MSC1123S104T	6	70	30	100	
Computer Applications	MSC1123S105T	6	70	30	100	
Healthcare IT	MSC1123S106T	6	70	30	100	
PRACTICAL/ABILITY ENHANCEMENT COURSE						
Practical & Viva	MSC1123S107P	7	140	60	200	
TOTAL	**06** (05 Theory Paper 01 Practical)	**40**	**490**	**210**	**700**	

M. Sc. Hospital & Health Information Administration Marks Distribution of Semester – II Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			UE	IA	Total	Pass Marks
Hospital Information Management System	MSC1123S201T	5	70	30	100	
Database Management System	MSC1123S202T	5	70	30	100	
Professional Ethics in Health Informatics	MSC1123S203T	5	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
ELECTIVE COURSES (ANY TWO)						
Management and Organizational Behaviour	MSC1123S204T	4	70	30	100	
Data Analysis & Visualization	MSC1123S205T	4	70	30	100	
Internet Technology	MSC1123S206T	4	70	30	100	
PRACTICAL/ABILITY ENHANCEMENT COURSE						
Practical & Viva	MSC1123S207P	7	140	60	200	
TOTAL	**06** (05 Theory Paper 01 Practical)	**30**	**490**	**210**	**700**	

M. Sc. Hospital & Health Information Administration Marks Distribution of Semester – III Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			UE	IA	Total	Pass Marks
Information Governance	MSC1123S301T	5	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Healthcare Financing and TPA	MSC1123S302T	5	70	30	100	
Cyber Security	MSC1123S303T	5	70	30	100	
ELECTIVE COURSES (ANY TWO)						
Management of Diagnostic, Support & Utility Services	MSC1123S304T	4	70	30	100	
Hospital Organization and Management	MSC1123S305T	4	70	30	100	
Legal And Medical Issues In Hospitals	MSC1123S306T	4	70	30	100	
PRACTICAL/ABILITY ENHANCEMENT COURSE						
Practical & Viva	MSC1123S307P	7	140	60	200	
TOTAL	**06** **(05 Theory Paper 01 Practical)**	**30**	**490**	**210**	**700**	

M. Sc. Hospital & Health Information Administration Marks Distribution of Semester – IV Examination

Course/Paper Name	Course/Paper Code	Credits	Theory/ Practical/Viva			
CORE COURSES			UE	IA	Total	Pass Marks
Strategic Management in Healthcare	MSC1123S401T	5	70	30	100	50 % aggregate including continuous assessment marks separately in theory and practical.
Hospital Planning	MSC1123S402T	5	70	30	100	
Healthcare Policies and Standards	MSC1123S403T	5	70	30	100	
ELECTIVE COURSES (ANY TWO)						
Artificial Intelligence and Machine Learning	MSC1123S404T	4	70	30	100	
Bioinformatics Tools	MSC1123S405T	4	70	30	100	
Algorithm and Computational Biology	MSC1123S406T	4	70	30	100	
PRACTICAL/ABILITY ENHANCEMENT COURSE						
Dissertation and Viva	MSC1123S407P	7	140	60	200	
TOTAL	**06** **(05 Theory Paper 01 Practical)**	**30**	**490**	**210**	**700**	

18. LETTER GRADES AND GRADE POINTS

LETTER GRADE	GRADE	PERCENTAGE OF MARKS
O (Outstanding)	10	100 %
A+(Excellent)	9	90-99.99 %
A (Very Good)	8	80-89.99 %
B+(Good)	7	70-79.99 %
B (Above Average)	6	60-69.99 %
C(Average)	5	50-59.99 %
F(Fail)	0	0 Less than 50 %
Ab (Absent)	0	0 Absent

19. Grades Qualifying for Pass:

Theory and Practical Examination

1. Minimum 5 Grade in the university examination and **5 Grade** in internal assessment evaluated by the department are required to pass **who fails to obtain 5 Grade shall be declared failed.**

2. A student obtaining **Grade F** shall be considered **failed** and will be required to reappear in the examination.

3. Letter Grade **Ab (Absent)** will be showing the absent of the candidate in examination and will be required to reappear in the examination.

Continuous Assessment

Continuous assessments will be conducted two times in a semester. Continuous assessments will consist of departmental examinations, assignments, departmental posting, and evaluations. The objective is to allow students to have hands on experience. It would also help students to develop and formulate the data collection process and data analysis.

End of Semester Examination

a. Each theory paper examination shall be of 3 hours duration.

b. There will be Five theory papers in Each Semester as following

20. Credit Weightage Distribution (%)

Item	Credit Weight (%)
1.Internal Assessment	
Class participation/presentation, study records	10.00%
Assignment, quizzes and summer training report	10.00%
Departmental Postings, case studies, project reports	10.00%
2.University Exam	
70.00%	
Total	**100%**

21. Authority to issue transcript

The Controller of Examination of the University shall be the authority for issuing transcript after receiving the described fee from the candidate.

22. Working Hours/Days

Duration	**3 Years (6 Semesters)**
Working Days	6 Days in A Week
Working Hours	36 Hours in A Week

23. Distribution of Courses Semester-Wise

Semester	Core Course Component (CCC)	Elective Course Component (ECC)	Ability Enhance Component (AEC)/Practical	Total No. Of Courses/Papers
Semester I	3	2	1	6
Semester II	3	2	1	6
Semester III	3	2	1	6
Semester IV	3	2	1	6
Total	**12**	**08**	**04**	**24**

24. Distribution of Courses in Each Semester

Sr. No.	Type of Course	Numbers
1	Core Course	3
2	Elective Course	2
Total		05 (Five)

25. Types of Courses in M. Sc. in Hospital and Health Information Administration: -

1. Core Course-course designed under this category aim to cover the basics that a student is expected to imbibe in the discipline of M. Sc. Hospital and Health Information Administration. A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

2. Elective Course-it is a course which can be chosen from a pool of courses it is specific or specialized or advanced or supportive to the discipline of M. Sc. Hospital and Health Information Administration. Students have to **CHOOSE ANY TWO COURSE IN EACHSEMSTER** from the pool of course given to that semester.

3. **Ability Enhancement Courses (AEC) /Practical:** The Ability Enhancement (AE) Courses or practical are the courses based upon the content that leads to Knowledge enhancement. They are skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

26. Dissertation

1. All students will be required to write a dissertation involving primary research in his/her area of interest.

2. The dissertation includes a critical review of literature pertaining to the specific area of interest data analysis and analysis of the selected problem.

3. One faculty member will be assigned as a guide to each student in consonance with university/council norms.

4. Synopsis/protocol of the dissertation shall be submitted by the student within three months of admission of the Program.

5. Dissertation duly completed and signed by guide shall be submitted at least one month before the final Semester exam.

Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade PointAverage (SGPA) and Cumulative Grade Point Average (CGPA):

i.   The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

SGPA (Si) = $\sum(C_i \times G_i) / \sum C_i$

where C_i is the number of credits of the ith course and G_i is the grade point scored by the student in the ith course.

ii.   The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

CGPA = $\sum$(Ci x Si) / $\sum$ Ci

where Si is the SGPA of the semester and Ci is the total number of credits in that semester.

iii.   The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration of Computation of SGPA and CGPA and Format for Transcripts

i.   Computation of SGPA and CGPA
     Illustration for **SGPA**

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade
Course 1	3	A	8	3 X 8 = 24
Course 2	4	B+	7	4 X 7 = 28
Course 3	3	B	6	3 X 6 = 18
Course 4	3	O	10	3 X 10 = 30
Course 5	3	C	5	3 X 5 = 15
Course 6	4	B	6	4 X 6 = 24
	20			139

Thus, **SGPA =139/20 =6.95**

Illustration for **CGPA**

Semester 1	Semester 2	Semester 3	Semester 4
Credit : 20 SGPA:6.9	Credit : 22 SGPA:7.8	Credit : 25 SGPA: 5.6	Credit : 26 SGPA:6.0

Semester 5	Semester 6		
Credit : 26 SGPA:6.3	Credit : 25 SGPA: 8.0		

Thus, **CGPA =** 20 x 6.9 + 22 x 7.8 + 25 x 5.6 + 26 x 6.0 + 26 x 6.3 + 25 x 8.0

$\underline{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}$ **= 6.73**

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Course Content

SEMESTER I

Placement Semester	Semester I
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Health Informatics
Course Code	MSC1123S101T
Course Type	Core
Credits	7
Hours per Semester	75

Introduction to health informatics: Definition, Domain, Sub-domain, Tools, Focus, Application, subject area, Aspects, & Functions Roles and responsibilities (CIO, Director, Manager, Supervisor, Operator, Telecommunication technician, Telecommunication Operator, System Analyst, Programmer, Consultant), Technology infrastructure (Computers, Networks, Peripherals) Standards in Health Informatics, eHealth, mHealth,

Strategic management and planning, change management, leadership in e-health environment, project management including planning, scheduling, monitoring and reporting, process modeling in digital transformation.

Electronic health record, health information systems, repositories and data bases, enterprise-wide systems, laboratory, radiology (PACs) systems, voice recognition, physician order entry, telemedicine, decision support systems.

Overview of historical, current, and emerging health information systems; concepts and knowledge involved in making strategic use of information technology (IT) in health care organizations and linkages to business, planning, and governance;

Overview of multiple systems, vendors, processes and organizations; methodology for evaluation of health information systems. Includes system design methodologies including systems analysis and design; systems selection and evaluation; workflow analysis and project management.

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Placement Semester	Semester I
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Biostatistics and Research Methodology
Course Code	MSC1123S102T
Course Type	Core
Credits	7
Hours per Semester	75

Conceptualizing a research study, Introduction to health research, formulating research question, hypothesis and objectives, Literature review, Descriptive study designs, Analytical study designs, Experimental study designs: Clinical trials, Ethical framework for health research, Conducting clinical trials, Manuscript writing,

Biostatistics: - Use of calculators and electronic spread sheets for understanding of: (1) Elements of data collection and presentation of data (2) Measures of central tendency and dispersion (3) Non parametric tests (4) Parametric tests (including ANOVA) (5) Correlation and regression (6) Sampling techniques, randomization, sample size estimation. (7) Scales of measurement, data display, and measures of central tendency (mean, median, mode). (8) Dispersion of data (variance, standard deviation). (9) Selection of tests (of significance) and their applicability. (10) Correlation and regression analysis. (11) Statistical software.

Placement Semester	Semester I
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Clinical Sciences
Course Code	MSC1123S103T
Course Type	Core
Credits	7
Hours per Semester	75

Anatomy: Anatomical terminology, Anatomical planes, Anatomical positions, Clinical positions, Terms related to movements, Musculoskeletal system:, Bones & their classification, Morphology, ossification, blood supply Muscles: Morphology, classification, blood supply, innervations, functions, Integumentary system: Thick Skin, Thin skin, layers of dermis & epidermis, Skin appendages, blood supply, innervations, functions, Cardiovascular system: Morphology of blood vessels, classification of blood vessels, blood capillaries, blood circulation, functions, Nervous system: Central Nervous system & Peripheral Nervous system, Gross basic, Anatomy, Cranial nerves, Spinal nerves, Functions of nerves, Autonomic nervous system, Lymphatic system: Formation of lymph, Lymphatic ducts, Thoracic duct, Lymph circulation, functions, Digestive system: Parts of digestive system, gross anatomy and functions, Excretory system: Parts of excretory system, gross anatomy of kidney, ureter, urinary bladder, and their functions, Reproductive system: Male reproduction system- gross anatomy of penis, testis, epididymis, vas-deferens, seminal vesicles and prostate. Female reproductive system- gross anatomy of ovaries, uterine tube, uterus, vagina, menstruation cycle.

Physiology: Membrane transport, Bio-membrane potentials, nerve-muscle: Neuron (structure, functions and classification) and neuroglia, Action potential, neuromuscular junction, Skeletal muscle (structure, mechanism of contraction).Smooth muscle (structure, mechanism of contraction).blood: Function and composition, Erythrocytes, Hemoglobin, Blood groups, Leucocytes, Thrombocytes, Immunity (basics).cardiovascular system: Cardiac muscle, Physiological Anatomy of heart and conduction system, Respiration: Functional Anatomy of the respiratory system, Mechanism of breathing, Gastrointestinal Tract: Functional Anatomy, salivary glands (secretion and functions of saliva, deglutition), Stomach (composition, regulation of secretion and functions of the gastric juice), Liver and its functions. Pancreas (secretion and function), Intestinal secretion (composition and functions), movement of intestines, Hormones of GIT (Basic only). Excretory System: Functions of kidney, Formation of urine, counter current mechanism, Role of kidney in maintenance of acid base balance, AUTONOMIC Nervous System: Organization of the ANS, Neurotransmitters, Effect of Sympathetic and Parasympathetic stimulation on different organ systems. Endocrine System: Introduction, Enumerate the endocrine glands and their functions, Reproductive System: Introduction, Central Nervous System: General organization of CNS & PNS, Sensory system

Biochemistry: Cell structure and function and transport through the biological membrane. Chemistry of Biomolecules – carbohydrate, lipids, amino acids, proteins and nucleic acids. Chemistry of Blood & Haemoglobin. Enzymes – Nature and classification, concepts, Kinetic, mechanism of action. Bioenergetics and Biological oxidation. Metabolism of Carbohydrates, Proteins, Lipids and Nucleotides. Integration of metabolism. Nutrition, Vitamins & Minerals. Detoxification & Xenobiotics.

Placement Semester	Semester I
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Medical Terminology
Course Code	MSC1123S104T
Course Type	Elective
Credits	6
Hours per Semester	60

Origin of medical terms historical perspective, Various uses and application of medical terms, Purpose of learning medical terminology Stem Words/Root,Musculo-skeletal system, Respiratory system ,Cardiovascular system ,Digestive system Endocrine system ,CNS system, Urinary system, Reproductive system ,Organs of special sense, Integumentary system, Prefixes, Definition, Various Prefixes, meaning and example terms ,Pseudo Prefixes – meaning & Example terms Suffixes, Definition & Types of suffixes, Various Suffixes, meaning and example terms Surgical procedures (System wise)

concepts of body systems, components within individual systems, and relationships between systems, division of the body into body cavities and planes. Disease, disorders and dysfunctions, terminology of body systems to issues of disease, diagnostic and therapeutic tests, and procedures. Common sign and symptoms of disease conditions, Common Medical Terms, Common medical terms and meaning of those terms, Signsand Symptoms,Evolution of Death Registration, Multiple Cause-of-death Statistics Related Health.

Placement Semester	Semester I
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Computer Applications
Course Code	MSC1123S105T
Course Type	Elective
Credits	6
Hours per Semester	60

COMPUTER- 1.0 Introduction 1.1 Objectives 1.2 what is Computer? 1.2.1 Basic Applications of Computer 1.3 Components of Computer System 1.3.1 Central Processing Unit 1.3.2 Keyboard, mouse and VDU 1.3.3 Other Input devices 1.3.4 Other Output devices 1.3.5 Computer Memory 1.4 Concept of Hardware and Software 1.4.1 Hardware 1.4.2 Software 1.4.2.1 Application Software 1.4.2.2 Systems software 1.5 Concept of computing, data and information 1.6 Applications of IECT 1.6.1 e-governance 1.6.2 Entertainment 1.7 Bringing computer to life 1.7.1 Connecting keyboard, mouse, monitor and printer to CPU 1.7.2 Checking power supply.

UNDERSTANDING WORD PROCESSING-3.0 Introduction 3.1 Objectives 3.2 Word Processing Basics 3.2.1 Opening Word Processing Package 3.2.2 Menu Bar 3.2.3 Using The Help 3.2.4 Using The Icons Below Menu Bar 3.3 Opening and closing Documents 3.3.1 Opening Documents 3.3.2 Save and Save as 3.3.3 Page Setup 3.3.4 Print Preview 3.3.5 Printing of Documents 3.4 Text Creation and manipulation 3.4.1 Document Creation 3.4.2 Editing Text 3.4.3 Text Selection 3.4.4 Cut, Copy and Paste 3.4.5 Spell check 3.4.6 Thesaurus 3.5 Formatting the Text 3.5.1 Font and Size selection 3.5.2 Alignment of Text 3.5.3 Paragraph Indenting 3.5.4 Bullets and Numbering 3.5.5 Changing case 3.6 Table Manipulation 3.6.1 Draw Table 3.6.2 Changing cell width and height 3.6.3 Alignment of Text in cell 3.6.4 Delete / Insertion of row and column 3.6.5 Border and shading.

USING SPREAD SHEET-4.0 Introduction 4.1 Objectives 4.2 Elements of Electronic Spread Sheet 4.2.1 Opening of Spread Sheet 4.2.2 Addressing of Cells 4.2.3 Printing of Spread Sheet 4.2.4 Saving Workbooks 4.3 Manipulation of Cells 4.3.1 Entering Text, Numbers and Dates 4.3.2 Creating Text, Number and Date Series 4.3.3 Editing Worksheet Data 4.3.4 Inserting and Deleting Rows, Column 4.3.5 Changing Cell Height and Width 4.4 Formulas and Function 4.4.1 Using Formulas 4.4.2 Function

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

Placement Semester	Semester I
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Healthcare IT
Course Code	MSC1123S106T
Course Type	Elective
Credits	6
Hours per Semester	60

Introduction of Healthcare IT, Software, IT characteristics and applications, IT Processes, Methods, and Tools, A Generic View of IT Management, IT Manager role definition and KRAs, understanding evolving IT Landscape, IT and networking as applied to enterprises in public and commercial sector. Software Management, Software Lifecycle, Software Process and Project Metrics, Software Quality Management and Assurance, Software Configuration Electronic Health records EHR – definitions – contents and examples of EHR practices •Preliminary steps in implementation of EHR •Issues and challenges in implementation of EHR •Planning for the introduction of EHR •Factors to be considered when developing EHR & implementation plan, Remote patient monitoring, healthcare and telemedicine Hospital Information Systems**:** Introduction of HIS a) Analysis information requirements b) Reporting systems c) Early warning systems d) Computerized Systems, intranet, Situation before the practice, Encounters and challenges faced by the innovators,Strategy Adopted, Implementation of HMIS, Components of HIS- Appointment Management. Patient Management., Facility Management, Staff Management, Supply Management, Financial Management. Insurance Management, Laboratory Management.

Course Content

SEMESTER II

Placement Semester	Semester II
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Hospital Information Management System
Course Code	MSC1123S201T
Course Type	Core
Credits	7
Hours per Semester	105

Information System

Overview, structure of MIS specific to hospital; information and data; information for control, decision, statutory needs, feedback; hierarchy of management activity; decision making process; document preparation, data capture, POS method.

Project Life Cycle

Physical systems design, physical data base design; Programme development, procedure development; input-output design, online dialogue; design , data communication, Project life cycle, installation and operation, conversion, operation, documentation, training, maintenance, post audit system evaluation.

Approaches to HIS

Patient based, functional organization based, user department based, clinician based HIS, Medical records, nursing information system; appointments scheduling, dissemination of tests and diagnostic information, general administration, productivity. Concept of DSS and ESS.

Application of HIS in Hospitals

Backoffice & Front Office-IPD&OPD- Patient Registration, Appointment Scheduling, Admission Discharge Transfer (ADT)- Wards Management Module, Computerized Physician Order Entry (CPOE), Nursing Workbench- Clinic Specialties-Roster Management- Laboratory Information System, Radiology Information System- CSSD, Pharmacy, Blood Bank, Operation Theatre, Dietary, Pharmacy-Medical Records-Patient Billing, Insurance, and Contract Management.

Placement Semester	Semester II
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Database Management System
Course Code	MSC1123S202T
Course Type	Core
Credits	7
Hours per Semester	105

Introduction to database concepts, Data organization and management techniques. Goals of DBMS including data independence consistency, Data security and Integrity. DBMS models: Hierarchical, Network and Relational, Relational algebra, Relational calculus, Query languages. Relational database design, Functional and Multi valued dependencies & normal forms. Database query optimization, Data abstraction and Modelling, ER Model, Relational Model, Hierarchical Model, Normalization, Query Processing, Crash Recovery, Distributed database, Object Oriented database, Data Mining, Multimedia Database, Digital Libraries. The entity relation model (E/R). The relational model, relational algebra and other query languages (relational calculus, Datalog, QBE). SQL. Data constraints, functional dependencies, relational database design, canonical forms. Algorithms for database design, moving from E/R to relational model. Query evaluation. Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, optimistic methods, database recovery management. The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction

Placement Semester	Semester II
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Professional Ethics in Health Informatics
Course Code	MSC1123S203T
Course Type	Core
Credits	7
Hours per Semester	105

Fundamentals of medical ethics: Law & Ethics – Definition, Goal, Scope, Basic Principles, Code of Conduct: History and Development - Various code of ethics in medical and Health Information Management practice: Atreya Anushasana, Charaka Samhita, Sushruta Samhita, Hippocratic Oath, International Code of Medical Ethics, Code of Ethics for Biomedical Research, and Code of Conduct for Health Information Professionals Ethical Issues in professional conduct of healthcare and health information professional: Malpractice & negligence, Irrational Use of drug, Autonomy of patient Vs Paternalism, Informed Consent, Confidentiality, Sophisticated drug and Technology, Research, Clinical trial, Human Experimentation, Organ Transplantation Ethical issues at the beginning and end of life: Genetics, Right to life, Sex Pre-selection, Female feticide & Infanticide, Care of terminally ill patient, Euthanasia, Quality of life Ethical Issues in social justice and equity in health: Right to health, Health policy, Distributive justice in health care Medico-legal aspects in healthcare practice: Medico-legal case - Definition, Types, handling Medico-legal case in hospital. Regulatory framework in Indian Context: Indian Penal Code, Consumer Protection Act.

Placement Semester	Semester II
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Management and Organizational Behavior
Course Code	MSC1123S204T
Course Type	Elective
Credits	6
Hours per Semester	90

Management & Organizational Behavior

Importance of Management **-** Definition of Management **-**Characteristic features of Management **-** Roles of Management**-**Role of a Manager**-**Levels of Management and their functions**-**Process of Management**-**Managerial Skills**-**Management and Administration**-**Management – Science or an Art? **-** Management – a profession? Nature of Management principles, Need for Management principles- Early Management approaches - Scientific Management-Administrative Management-Human Relation Movement-Modern Management Approaches-Behavioral Approach-Quantitative Approach-System approach - Contingency approach

Thinking and Decision-making process

Human Information Processing -Approaches (Lens model, Cognitive approach, Process training approach)- Phases of decision making- Types of decision making- Decision cycle- Behavioral decision making- Decision rationality - Models of behavioral decision making-Use of heuristics- Thinking – process, images, language- Concepts- Problem solving- Creative thinking Perception Definition- Factors- Perceptual grouping and selectivity - Stimuli selection- Barriers - Honing perceptual skills Attitudes and values Definition, Characteristics, Functions and Formation of attitudes-Definition, types, formation of values-Values and behavior- Values and ethics- Values and attitudes Learning Definition – Components –Determinants- Theories (classical, operant, cognitive, social learning)- Principles of reinforcement- Punishment- Learning curves- Learning and behavior

Organization Behavior

Planning –Organization-Decision Objectives Introduction, Organization, Organizational Behaviour, Intuition and Systematic Study, Organization and Organization Behaviour, Disciplines and OB Historical Evolution of OB, Organizational Behaviour Models

Placement Semester	Semester II
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Data Analytics and Visualization
Course Code	MSC1123S205T
Course Type	Elective
Credits	6
Hours per Semester	90

Introduction to Data Analytics: Overview of data analytics and its applications in various industries, Understanding the data analytics process and lifecycle, Exploring different types of data (structured, unstructured, big data)

Data Collection and Preprocessing: Methods for data collection and data sources (surveys, APIs, web scraping), Data cleaning and preprocessing techniques (missing data handling, data transformation, outlier detection), Data integration and data quality assessment

Exploratory Data Analysis (EDA): Descriptive statistics and data summarization techniques, Data visualization techniques (bar charts, histograms, scatter plots, box plots), Data exploration using statistical measures (correlation, distribution analysis)

Data Mining Techniques: Introduction to data mining concepts and algorithms, Association rule mining, Clustering algorithms (k-means, hierarchical clustering), Classification algorithms (decision trees, random forests, support vector machines)

Predictive Analytics: Predictive modelling techniques, Evaluation and validation of predictive models, Time series analysis and forecasting

Data Visualization: Principles of effective data visualization, Visualization tools and libraries (Tableau, ggplot, D3.js) Interactive and dynamic visualizations, Visualizing geospatial and network data, Data visualization in Python and R.

Placement Semester	Semester II
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Internet Technology
Course Code	MSC1123S206T
Course Type	Elective
Credits	6
Hours per Semester	90

Introduction to Internet Technology, History and evolution of the Internet, Internet architecture and protocols, Internet service providers (ISPs) and their role, Internet Communication Protocols Transmission Control Protocol/Internet Protocol (TCP/IP),Hypertext Transfer Protocol (HTTP) and HTTPS, Domain Name System (DNS),Simple Mail Transfer Protocol (SMTP) and Post Office Protocol (POP),Internet Security, Introduction to cybersecurity, Secure Socket Layer (SSL) and Transport Layer Security (TLS)

E-commerce and Online Business, E-commerce fundamentals and models, Online payment systems, Digital marketing and search engine optimization (SEO),Privacy and legal considerations in online transactions, Cloud Computing and Internet Services

Internet of Things (IoT) and its applications , Social Media and Online Collaboration ,Social media platforms and their features, Online collaboration tools (e.g., project management, video conferencing),Social media marketing and analytics, Emerging Trends in Internet Technology

Course Content

SEMESTER III

Placement Semester	Semester III
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Information Governance
Course Code	MSC1123S301T
Course Type	Core
Credits	7
Hours per Semester	105

Information Governance and Management Framework: Vision for information, Principles, Obligations

Information Governance: Governance, Decision rights, Roles and responsibilities, Information Trustee, Information Leader, Information Domain Custodian, Information Stewards, Information Creators , Information Consumer , Chief Information Officer , Information Service Providers , Governance Bodies , Governance controls

Information Management: Information Lifecycle Management, Information Management Capabilities, Information planning and design Data management, Data sharing, Information protection, Enterprise content management , Records management Insights management

Data Security: What is data, Data privacy and data protection definitions, Data privacy vs data protection, Data processing, Sensitive personal data , Data controller ,Data processor ,Data protection principles, components of data protection ,Information assurance ,Data security domains ,Strategy for data protection implementation ,Integrity and Confidentiality ,Types of data security, Data security, privacy and protection solutions

Legal Issues in Health Information Technology and Systems :Examination of legal issues related to electronic-based health information; the growth of computer and communication technologies, including privacy, security, electronic data interchange and compliance related issues; policy, regulatory and related concerns; interpretation and implementation of enterprise information policy. Principles of law applied to the health field with emphasis on federal, state, and local laws affecting health information management practice, confidentiality, and security of information.

Placement Semester	Semester III
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Healthcare Financing and TPA
Course Code	MSC1123S302T
Course Type	Core
Credits	7
Hours per Semester	105

Healthcare Financing

Financial Management for Health Professionals, The Nature and purpose of Accounting, Accounting Concepts & Accounting records: ☐ What is accounting information? Who needs it? What they need or expect? What do accountants do? ☐ Single Entry Book – keeping ☐ Double Entry Book - keeping What is an Account? Making entries. Five types of Accounts (Income, Expense, Asset, Liability, Capital) Book – keeping rules accounting books/ledgers (Nominal, Purchase, Sales, Journal etc) Dealing with cash, interests system Preparation of various Financial Statements: Trial Balance ☐ Receipts and Payments ☐ Income and Expenditure Account ☐ Balance Sheet

Financial management

Fixed assets and Depreciation:

☐ What are fixed assets and why are they different? What is depreciation and why do we need it? How do we calculate depreciation? (pros and cons of different methods) Accounting entries for depreciation Costing and Pricing: Financial accounting Vs. Cost accounting Key terms: Direct/indirect, fixed/variable/semi-variable Analysing results: Standard/budgeted/actual Costing hospital services Taken action: controllable /uncontrollable Making decisions: Marginal/book/out –of pocket costs Reporting costs: Cost Centres, allocation and apportionment of costs Pricing methods and decisions. Inventory Accounting: Inventory / stocks Valuation (FIFO, LIFO, WAC etc) Optimum balance and reorder levels. Health Insurance in India Health Insurance & Third Party Administrators Insurance Regulatory Development Authority & its role Billing & Health Insurance Billing

Placement Semester	Semester III
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Cyber Security
Course Code	MSC1123S303T
Course Type	Core
Credits	7
Hours per Semester	105

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy.

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy. Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Organizational security Policies and Measures in Mobile Computing Era, Laptops.

Cyber Security: Organizational Implications: Introduction, cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

Placement Semester	Semester II
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Management of Diagnostic, Support & Utility Services
Course Code	MSC1123S304T
Course Type	Elective
Credits	6
Hours per Semester	90

Diagnostic services-Radiology & Imaging Services, Hospital Laboratory etc, Blood Bank & Transfusion Services.

Supportive services: Dietary Service, Hospital Laundry and Linen, Ambulance Services, Pharmacy, CSSD, Oxygen Manifold/ Concentrator.

Utility Services: Housekeeping, Hospital Engineering and Maintenance, Biomedical Department, Medical Records-confidentiality of records, reception, enquiry, registration and admission, central billing and accounts, Cafeteria/canteen, Mortuary.

Administrative and other services: Marketing and Public Relations, Finance, Central Stores and Purchase Department, Outsourcing services, Hospital Acquired Infection (HAI)- Committee formation and reporting, Fire safety in a hospital- classification of fire, procedure for evacuation. Telemedicine units.

Placement Semester	Semester III
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Hospital Organization and Management
Course Code	MSC1123S305T
Course Type	Elective
Credits	6
Hours per Semester	90

Definition of management; Productivity, Efficiency and Effectiveness; Managerial Skills, Evolution of management thought: Frederic W.Taylor's scientific
management,HenryFayol'sprinciplesofmanagement,conceptofbureaucracy,humanrelationsapproach, Behavioral approach, systems theory of organization, contingency theory of organization, management by objectives(MBO), **Management**

functions: Nature of management process and managerial functions –

Planning

- Types (mission, purpose, objectiveorgoals,strategies,policies,procedures,rules,programs,budgets), Steps in planning., Decision Making

Organizing- Meaning and purpose**,** Types) formal and informal**,** functional and matrix**,** line and staff)departmentation**,** Authority & Power**,** Centralization& Decentralization**,** Delegation of Authority

Behavioral concepts and theories:

- **Concept of OB.**
- **Challenges and opportunity for OB Motivational**

Theories   -

- Maslow's Need hierarchy,
- Theory X and Theory Y,
- Two factor theory
- McClell and theory of needs
- Equity Theory
- Expectancy theory

Placement Semester	Semester III
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Legal and Medical Issues in Hospitals
Course Code	MSC1123S306T
Course Type	Elective
Credits	6
Hours per Semester	90

Law and establishment of hospitals-private / public hospitals, legal requirements under medical council Acts. West Bengal Clinical establishment Act and rules2,,7(as amended till date).

Essentials of contract Act. Contractual obligations in hospital services - requisites of a valid contract - hospital as ' bailer' - sale and purchase of" goods- duties towards patients - code of ethics-violation legal consequences.

Legal aspects relating to organ transplantation, MTP Act, ,97,, Basics of Drugs and Cosmetic Acts, anesthesia. ESI Act, PNDT Act, AERB, ICMR Guideline of Scientific Research Members, clinical trials.

Legal liability of hospitals- criminal, civil and tortuous; liability for negligence, consumerprotection law, absolute liability and vicarious liability, legal remedies available to patients are medies under contract law,tort,criminallawandconsumerprotection'Act.MedicalJurisprudence.

Medical ethics – basic issues, importance, process of developing and implementing ethics andvalues in an institution –

codes of conduct: Hippocrates oath and declaration of Geneva 2,,6 –NMC regulation – professional conduct, etiquette

and ethics.

Course Content

SEMESTER IV

Placement Semester	Semester IV
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Strategic Management in Healthcare
Course Code	MSC1123S401T
Course Type	Core
Credits	7
Hours per Semester	105

Introduction to strategic management

Organizational mission: Philosophy, policy, Strategic Intent, vision, mission, values.
Defining Strategy, Strategic management process, Strategic objectives, Porter's value chain: concept and applications

SWOC analysis
Industry characteristics analysis: analysis, Porter's five force
Organizational analysis: Capability factors: Financial, Marketing, Operational, Personnel ,General Management

Level of strategy
Corporate Level Strategy: Grand Strategy, Portfolio analysis: BCG Matrix, Business level Strategy: Generic Business Strategy
Functional strategy analysis: Plans and policies: Financial, Marketing, Operational, Personnel, Information Technology and Integration

Strategic Evaluation: Control of strategies: strategic diagnosis, operational diagnosis.
CSR: Management and society, culture and management, management ethics, social objectives and responsibilities of management, corporate social responsibility-hospitals and social responsibility

Placement Semester	Semester IV
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Hospital Planning
Course Code	MSC1123S402T
Course Type	Core
Credits	7
Hours per Semester	105

Introduction to hospital planning Conception of idea, formation of hospital planning team, market survey, feasibility study, selection of location, Financial planning of hospitals, Macro level planning, Conception to commissioning-site development, equipment planning, facility planning (NABH), bed distribution, space allocation, interior designing and construction of building-commissioning, shake down period, documents required to established a hospital and authorities.

Planning for the outpatient services, accident and emergency services, and day care services Planning for patient care units –Inpatient services and intensive care units Planning for surgical suites. Planning for labour and delivery suites-LDRP suites

Planning for laboratory service and blood banking Planning for imagological services-x-rays, ultra-sonography, MRI, CT-scan PET scan and other advances in imagological services

Planning for advanced facilities Cardiac catheterization laboratory, various endoscopy units, Extra corporeal shock wave lithotripsy, radiotherapy unit, IVF unit, Dialysis unit

Planning for supportive services-medical gases, HVAC , housekeeping ,CSSD, Food and beverages,

Placement Semester	Semester IV
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Healthcare Policies and Standards
Course Code	MSC1123S403T
Course Type	Core
Credits	7
Hours per Semester	105

Knowledge of applicable health law, regulations, accreditations standards, and certification requirements.

☐ Ability to evaluate compliance and develop compliant organizational policy

☐ Implement compliance auditing methods and techniques

☐ Implement ICT systems in compliance with applicable laws, regulations, standards and requirements

Understand staffing levels and productivity standards

☐ Performa productivity calculations

☐ Knowledge of labor/employment laws

☐ Awareness of human resources structure and operations

☐ Principles of human resources management

☐ Able to apply techniques/practices related to recruitment, supervision, retention, counseling, disciplinary action

☐ Knowledge of employment laws, labor laws (local and national)

☐ Plan workforce education and training programs

☐ Monitor relevant labor trends and market analysis

☐ Monitor and benchmark performance standards

☐ Plan professional development for self and others

Placement Semester	Semester IV
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Artificial Intelligence and Machine Learning
Course Code	MSC1123S404T
Course Type	Elective
Credits	6
Hours per Semester	90

Introduction to Artificial Intelligence (AI)

Overview of AI and its applications, Historical development and key milestones in AI, Different branches of AI (e.g., machine learning, natural language processing, computer vision)

Foundations of Machine Learning

Introduction to machine learning and its importance, Supervised, unsupervised, and reinforcement learning, Key concepts: features, labels, training data, and models, Neural Networks and Deep Learning,

Introduction to artificial neural networks (ANN)

Deep learning architectures: feedforward, convolutional, and recurrent neural networks, Training neural networks using backpropagation and optimization algorithms, Natural Language Processing (NLP)Fundamentals of NLP and its applications, Text preprocessing techniques (e.g., tokenization, stemming, stop-word removal),Language modeling, sentiment analysis, and named entity recognitionComputer VisionBasics of computer vision and image processing,Feature extraction methods (e.g., edge detection, corner detection),Object recognition and image classification using deep learning

Ethics and Responsible AI

Ethical considerations in AI and machine learning,Fairness, transparency, and bias in machine learning models,Privacy, security, and legal implications of AI applications

Artificial Intelligence & Machine Learning in their use in Health Care

Placement Semester	Semester IV
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Bioinformatics Tools
Course Code	MSC1123S305T
Course Type	Elective
Credits	6
Hours per Semester	90

Bioinformatics Sequence Databases–Primary Databases- GenBank, EMBL, DDBJ. Composite Databases- UniProt. Secondary databases - Prosite, ProDom, Pfam, InterPro, gene ontology; sequence file formats:- GenBank, FASTA, PIR, ALN/ClustalW2. Literature Databases- Open access and open sources, PubMed, PLoS, Biomed Central, NAR databases; Bioinformatics Resources- NCBI, EBI, ExPASy.

Structure database – Primary structure databases - PDB, NDB, MMDB. Secondary databases-Structural Classification of Proteins – SCOP, Class Architecture Topology Homology –CATH. Families of Structurally Similar Proteins –FSSP. Specialized Databases – Viral genome database-ICTVdb; Microbial genome database-MBGD; Genome browsers- Ensembl, VEGA genome browser, NCBI-NCBI map viewer, KEGG, MIPS, UCSC Genome Browser; Archeal Genomics, Eukaryotic genomes with special reference to model organisms-Yeast (SGD), Drosophila (FlyBase), C.elegans (WormBase), Mouse, Human (OMIM / OMIA), plants – Arabidopsis (TAIR).

Derived Databases- Catalytic Site Atlas –CSA; Databases of molecular functions /enzymatic catalysis databases - KEGG ENZYME database; Protein-Protein interaction database - STRING; chemical structure database - Pubchem; gene expression database - GEO, SAGE. Database search engines – Text-based search engines (Entrez, DBGET /LinkDB). Sequence similarity based search engines (BLAST and FASTA). Motif-based search engines (Scan Prosite and eMOTIF). Structure similarity based search engines (combinatorial extension, VAST and DALI). Proteomics tools- ExPASy server, EMBOSS.

Placement Semester	Semester IV
Name of the Program	M.Sc. in Hospital & Health Information Administration
Program Code	MSC1123
Name of the Course	Algorithm and Computational Biology
Course Code	MSC1123S406T
Course Type	Elective
Credits	6
Hours per Semester	90

Algorithms and Data structures in Bioinformatics; Algorithms and complexity, Iterative and recursive algorithms, Fast versus slow algorithms, Big-O Notation, Algorithm design and analysis techniques, Greedy Algorithms, Randomized Algorithms, Divide-and-Conquer approach, Searching and Sorting algorithms.

Linear and non-linear data structure, Stack, Queues, Linked list, Trees-Terminologies, Binary trees, Tree traversal (Pre-order, In-order, post-order).

Brute Force, Dynamic programming: Shortest Superstring Problem, Random Walk (1D & 2D), Markov chain; Hidden markov models – Forward, Backward, Viterbi and Baum – Welch algorithm. Population dynamics algorithms; Intraspecies, Interspecies, and Pre – Predator (two species Lotka – Voltera). Fibonacci series, golden ratio. Introduction to chaos and fractals; Lorenz equation. Random sampling; Monte Carlo, Metropolis algorithms.

MODEL PAPER

M. Sc. H&HIA Semester I   **HI - I**

MSC1122S101T

M. Sc. Hospital and Health Information Administration Semester- I

Examination (Month/ year)

Paper - I

Health Informatics

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A   Discuss about the systems utilized for HIM departmental functions?

B   Describe about effective communication between patients and their healthcare providers?

C   Describe benefits of HMIS implementation in Indian public hospitals.

2. Short Essay (Attempt any Two)   **2X10 = 20**

A   Write down tools of communication through internet ?

B   What is visual basics. Explain with suitable example ?

C   Describe fundamental concept of programming ?

3.   Short notes (Any four)   **4X5 = 20**

A   Content and types of health records.

B   What is language fluency ?

C   Public healthcare application **?**

D   What is support network **?**

E   Technology used for e-hospital **?**

MODEL PAPER

M. Sc. H&HIA Semester I   BARM - II

MSC1122S102T

M. Sc. Hospital and Health Information Administration Semester- I

Examination (Month/ year)

Paper - II

Biostatistics and Research Methodology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A   Discuss about the systems utilized for HIM departmental functions?

B   Describe about effective communication between patients and their healthcare providers?

C   Describe benefits of HMIS implementation in Indian public hospitals.

2. **Short Essay (Attempt any Two)**   **2X10 = 20**

A   Write down tools of communication through internet ?

B   What is visual basics. Explain with suitable example ?

C   Describe fundamental concept of programming ?

3.   **Short notes (Any four)**   **4X5 = 20**

A   Content and types of health records.

B   What is language fluency ?

C   Public healthcare application **?**

D   What is support network **?**

E   Technology used for e-hospital **?**

MODEL PAPER

M. Sc. H&HIA Semester I   **CS - III**

MSC1122S103T

M. Sc. Hospital and Health Information Administration Semester- I

Examination (Month/ year)

Paper - III

Clinical Sciences

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)   **2X15 = 30**

A. Discuss about classification and general characteristics of Bacteria.

B Discuss about Cell organization of prokaryotic.

C What do you understand about General Pharmacology?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A. Describe Microbial contamination control and Sterility testing

B . Explain structure of Cell wall and Nucleus?

C. Define Pharmacokinetics.

3. Short notes (Any four)   **4X5 = 20**

A. Animal and bacterial viruses.

B lytic cycle & lysogeny

C Opioids

D. Application of sterilization

E repetitive DNA sequence.

MODEL PAPER

M. Sc. H&HIA Semester I   **MT - IV**

MSC1122S104T

M. Sc. Hospital and Health Information Administration Semester- I

Examination (Month/ year)

Paper - IV

Medical Terminology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)   **2X15 = 30**

A. Discuss about Origin of medical terms.
B Discuss about historical perspective of diagnostic and therapeutic tests.
C What do you understand about ICD.

2. Short Essay (Attempt any Two)   **2X10 = 20**

A. Common sign and symptoms of disease conditions.
B . What are the therapeutic tests, and procedures related to digestive system.
C. Issues associated With ICD Development.

3. Short notes (Any four)   **4X5 = 20**

A. Development of Medical Terminology.
B What Is Reproductive System.
C Definition & Types Of Suffixes.
D. Division Of The Body Into Body Cavities And Planes.
E Write Down Common Medical Terms And Meaning Of Those Terms..

MODEL PAPER

M. Sc. H&HIA Semester I **CA - V**

MSC1122S105T

M. Sc. Hospital and Health Information Administration Semester- I

Examination (Month/ year)

Paper - V

Computer Applications

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two) **2X15 = 30**

A. Discuss about Memory

B . Discuss about input / Output Devices.

C What do you understand about Magnetic ink character recognition (MICR).

2. Short Essay (Attempt any Two) 2X10 = 20

A. Optical mark recognition (OMR).

B . Bar code reader.

C. Computer software

3. Short notes (Any four) 4X5 = 20

A. Monitor.

B Word processing software.

C. Definition of Machine language.

D. Compiler & Interpreter

E Interpreter.

MODEL PAPER

M. Sc. H&HIA Semester I   **HCIT - VI**

MSC1122S106T

M. Sc. Hospital and Health Information Administration Semester- I

Examination (Month/ year)

Paper - VI

Healthcare IT

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)   **2X15 = 30**

A. Discuss about Healthcare IT and its uses.

B . Discuss about input / Output Devices.

C What do you understand about Magnetic ink character recognition (MICR).

2. Short Essay (Attempt any Two)   **2X10 = 20**

A IT Manager role definition

B . Implementation of EHR.

C. Computer software

3. Short notes (Any four)   **4X5 = 20**

A. Monitor.

B Remote patient monitoring,

C. Components of HIS

D. Compiler & Interpreter

E Interpreter.

MODEL PAPER

M. Sc. H&HIA Semester II   **HIMS - I**

MSC1122S201T

M. Sc. Hospital and Health Information Administration Semester- II

Examination (Month/ year)

Paper - I

Hospital Information Management System

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A   Discuss about the systems utilized for HIM departmental functions?

B   Describe about effective communication between patients and their healthcare providers?

C   Describe benefits of HMIS implementation in Indian public hospitals.

2. **Short Essay (Attempt any Two)**   **2X10 = 20**

A   Physical systems design?

B   What is visual basics. Explain with suitable example ?

C   Describe fundamental concept of Digitalization ?

3.   **Short notes (Any four)**   **4X5 = 20**

A   LIMS AND PIMS.

B   Standard's in HIMS

C   Cost effectiveness in HIMS **?**

D   HIMS Implementation **?**

E   Interoperability **?**

MODEL PAPER

M. Sc. H&HIA Semester II   **DBMS - II**

MSC1122S202T

M. Sc. Hospital and Health Information Administration Semester- II

Examination (Month/ year)

Paper - II

Database Management System

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)   **2X15 = 30**

A Discuss about DBMS

B Discuss Entity Relationship Model

C Discuss Data Base design

2. Short Essay (Attempt any Two)   **2X10 = 20**

A What is BCNF?

B Comparison between traditional file system and DBMS?

C Discuss Integrity and security of Databases

3 Short notes (Any four)   **4X5 = 20**

A Swiss Prot and PDB.

B Consistency and Concurrency control

C Functional Dependency and its types

D Temporal database

E SQL queries.

MODEL PAPER

M. Sc. H&HIA Semester II   **PEHI - III**

MSC1122S203T

M. Sc. Hospital and Health Information Administration Semester- II

Examination (Month/ year)

Paper - III

Professional Ethics in Health Informatics

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)   **2X15 = 30**

A. Discuss about Fundamentals of medical ethics.

B Discuss about Various code of ethics in medical and Health Information Management practice.

C What do you understand about International Code of Medical Ethics.

2. Short Essay (Attempt any Two)   **2X10 = 20**

A. Ethical Issues in professional conduct.

B . Malpractice & negligence.

C. Irrational Use of drug.

3. Short notes (Any four)   **4X5 = 20**

A. Autonomy of patient Vs Paternalism.

B Ethical issues at the beginning and end of life.

C Quality of life Ethical Issues in social justice

D. Consumer Protection Act.

E Human Experimentation.

MODEL PAPER

M. Sc. H&HIA Semester II   **MOB - IV**

MSC1122S204T

M. Sc. Hospital and Health Information Administration Semester- II

Examination (Month/ year)

Paper - IV

Management and Organizational Behavior

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. Long Answer (Attempt any two)   **2X15 = 30**

A. Discuss about Importance of Management.
B Discuss about Role of a Manager.
C Definition of Management -Characteristic features of Management.

2. Short Essay (Attempt any Two)   **2X10 = 20**

A. Phases of decision making.
B What is the Organizational Behaviour.
C Organizational Behaviour Models

3. Short notes (Any four)   **4X5 = 20**

A. Values and behavior.
B decision making.
C Principles of reinforcement.
D Punishment.
E Learning and behavior

MODEL PAPER

M. Sc. H&HIA Semester II   **DAV - V**

MSC1122S205T

M. Sc. Hospital and Health Information Administration Semester- II

Examination (Month/ year)

Paper - V

Data Analysis and Visualization

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Introduction to Data Analysis and Visualization?

B   Importance and applications of data analysis and visualization?

C   Introduction to popular data visualization tools?

 2.   **Short Essay (Attempt any Two)**   **2X10 = 20**

A   Data Visualization Tools and Software?

B   Data cleaning and preprocessing techniques?

C   Principles of effective data visualization?

3. Short notes (Any four)   **4X5 = 20**

A. types of data

B.   Data Analysis

C.   Python

D Graphical representations of data

E.   effective data visualization

<div align="center">**MODEL PAPER**</div>

M. Sc. H&HIA Semester II   **IT - VI**

MSC1122S206T

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M. Sc. Hospital and Health Information Administration Semester- II

Examination (Month/ year)

Paper - VI

Internet Technology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

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1. Long Answer (Attempt any two)   **2X15 = 30**

A. Discuss about Internet and its uses.

B . Discuss about web based applications.

C Discuss about servers and their uses in healthcare.

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Internet and healthcare.

B . Challenges in Internet access.

C. Computer software's

3. Short notes (Any four)   **4X5 = 20**

A. Monitor.

B Remote patient monitoring.

C. Components of HIS

D. Compiler & Interpreter

E Interpreter.

MODEL PAPER

M. Sc. H&HIA Semester III   **IG - I**

MSC1123S301T

M. Sc. Hospital and Health Information Administration Semester- III

Examination (Month/ year)

Paper - I

Information Governance

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss about the information governance and management framework?

B Describe about Information planning and design Data management?

C Describe benefits of enterprise content management.

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain data, Data privacy and data protection?

B What is Integrity and Confidentiality. Explain with suitable example?

C Describe Data protection principles and components of data protection?

3. Short notes (Any four)   **4X5 = 20**

A Data security.

B What is language fluency?

C Chief Information Officer**?**

D Data processor**?**

E Communication technologies**?**

MODEL PAPER

M. Sc. H&HIA Semester III   **HF&TPA - II**

MSC1123S302T

M. Sc. Hospital and Health Information Administration Semester- III

Examination (Month/ year)

Paper - II

Healthcare Financing and TPA

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss about the Financial Management for Health Professionals?

B Describe about Accounting Concepts & Accounting records?

C Describe Single Entry Book – Double Entry Book?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain Trial Balance, Receipts and Payments?

B What is Income and Expenditure Account. Explain with suitable example?

C What is depreciation and why do we need it?

3. Short notes (Any four)   **4X5 = 20**

A Inventory & stocks Valuation.

B Health Insurance in India?

C Insurance Regulatory Development Authority**?**

D How do we calculate depreciation?

E Asset & Liability**?**

MODEL PAPER

M. Sc. H&HIA Semester III   **CS - III**

MSC1123S303T

M. Sc. Hospital and Health Information Administration Semester- III

Examination (Month/ year)

Paper - III

Cyber Security

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss about Cyber Security & their Concepts?

B Describe about layers of security & vulnerability?

C Describe Internet Governance?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain Cyber Threats-Cyber Warfare?

B What is Comprehensive Cyber Security Policy?

C What Historical background of Cyber forensics?

3. Short notes (Any four)   **4X5 = 20**

A Challenges in Computer Forensics.

B Proliferation of Mobile and Wireless Devices?

C Organizational security Policies**?**

D cost of cybercrimes and IPR issues?

E social computing**?**

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MODEL PAPER

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M. Sc. H&HIA Semester III   **MDS&U - IV**

MSC1123S304T

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M. Sc. Hospital and Health Information Administration Semester- III

Examination (Month/ year)

Paper - IV

Management of Diagnostic, Support & Utility Services

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

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1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss Radiology & Imaging Services?

B Describe Blood Bank & Transfusion Services?

C Describe Manifold and Concentrator?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain Hospital Engineering and Maintenance?

B What is central billing and accounts?

C Describe registration and admission service?

3. Short notes (Any four)   **4X5 = 20**

A Central Stores and Purchase Department.

B Proliferation of Mobile and Wireless Devices?

C Hospital Acquired Infection**?**

D Fire safety in a hospital?

E Mortuary**?**

MODEL PAPER

M. Sc. H&HIA Semester III **HO&M - V**

MSC1123S305T

M. Sc. Hospital and Health Information Administration Semester- III

Examination (Month/ year)

Paper - V

Hospital Organization and Management

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)** **2X15 = 30**

A Discuss Evolution of management?

B Describe Frederic Taylor's scientific?

C Describe systems theory of organization?

2. Short Essay (Attempt any Two) **2X10 = 20**

A Explain contingency theory of organization?

B Explain decision making process?

C Describe management process and managerial functions?

3. Short notes (Any four) **4X5 = 20**

A Equity Theory.

B McClell and theory of needs?

C Expectancy theory**?**

D Theory X and Theory Y?

E Centralization & Decentralization**?**

MODEL PAPER

M. Sc. H&HIA Semester III   **L&MIH - VI**

MSC1123S306T

M. Sc. Hospital and Health Information Administration Semester- III

Examination (Month/ year)

Paper - VI

Legal and Medical Issues in Hospitals

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss about Law and establishment of hospitals?

B Describe medical council Acts?

C Describe West Bengal Clinical Establishment Act?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain organ transplantation process?

B Explain Drugs and Cosmetic Acts?

C Describe ESI Act, PNDT Act?

3. Short notes (Any four)   **4X5 = 20**

A liability for negligence.

B consumer protection law?

C Hippocrates oath**?**

D NMC regulation?

E Etiquette and ethics**?**

MODEL PAPER

M. Sc. H&HIA Semester IV   SMH - I

MSC1123S401T

M. Sc. Hospital and Health Information Administration Semester- IV

Examination (Month/ year)

Paper - I

Strategic Management in Healthcare

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss about strategic management framework?

B Describe about Porter's value chain & its Concept?

C Describe benefits of enterprise content management.

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain Porter's five force?

B What is SWOC analysis. Explain with suitable example?

C Describe Portfolio analysis?

3. Short notes (Any four)   **4X5 = 20**

A BCG Matrix.

B What is Generic Business Strategy?

C Strategic Evaluation**?**

D CSR: Management and society**?**

E Technology and Integration**?**

MODEL PAPER

M. Sc. H&HIA Semester IV   **HP - II**

MSC1123S402T

M. Sc. Hospital and Health Information Administration Semester- IV

Examination (Month/ year)

Paper - II

Hospital Planning

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss about Hospital Planning process?

B Describe about Financial planning of hospitals?

C Describe equipment planning & facility planning?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain accident and emergency services?

B Explain Planning for laboratory service. Explain with suitable example?

C Describe Inpatient services and intensive care units?

3. Short notes (Any four)   **4X5 = 20**

A ultra-sonography.

B Imagological services?

C Extra corporeal shock wave lithotripsy?

D Cardiac catheterization laboratory**?**

E NABH?

MODEL PAPER

M. Sc. H&HIA Semester IV   **HP&S - III**

MSC1123S403T

M. Sc. Hospital and Health Information Administration Semester- IV

Examination (Month/ year)

Paper - III

Healthcare Policies and Standards

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss about accreditations standards?

B Describe about certification requirements?

C Describe auditing methods and techniques?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain Implement ICT system?

B Explain Performa productivity calculations. Explain with suitable example?

C Describe human resources structure and operations?

3. Short notes (Any four)   **4X5 = 20**

A Recruitment?

B Monitor relevant labor trends?

C Market analysis?

D Counseling**?**

E labor laws?

MODEL PAPER

M. Sc. H&HIA Semester IV   **AI&ML - IV**

MSC1123S404T

M. Sc. Hospital and Health Information Administration Semester- IV

Examination (Month/ year)

Paper - IV

Artificial Intelligence and Machine Learning

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss AI and its applications?

B Describe different branches of AI?

C Describe natural language processing?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain Supervised, unsupervised, and reinforcement learning?

B Explain Deep Learning with suitable example?

C Describe recurrent neural networks?

3. Short notes (Any four)   **4X5 = 20**

A Text preprocessing technique?

B bias in machine learning?

C Edge detection?

D Artificial neural networks**?**

E legal implications of AI applications?

MODEL PAPER

M. Sc. H&HIA Semester IV   **BT - V**

MSC1123S405T

M. Sc. Hospital and Health Information Administration Semester- IV

Examination (Month/ year)

Paper - V

Bioinformatics Tools

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss Bioinformatics Sequence Databases?

B Describe Composite Databases?

C Describe Open access and open sources database?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain Architecture Topology Homology?

B Explain VEGA genome browser?

C Describe NCBI map viewer?

3. Short notes (Any four)   **4X5 = 20**

A PubMed?

B FASTA?

C BLAST?

D Motif-based search engines**?**

E STRING?

MODEL PAPER

M. Sc. H&HIA Semester IV   **A&CB - VI**

MSC1123S406T

M. Sc. Hospital and Health Information Administration Semester- IV

Examination (Month/ year)

Paper - VI

Algorithm and Computational Biology

Time: Three Hours

Maximum Marks: 70

Attempt all Questions

All the parts of one question should be answered at one place.

Only one Supplementary Copy along with one main answer book is allowed

1. **Long Answer (Attempt any two)**   **2X15 = 30**

A Discuss Data structures in Bioinformatics?

B Describe Algorithms and complexity?

C Describe Iterative and recursive algorithms?

2. Short Essay (Attempt any Two)   **2X10 = 20**

A Explain Big-O Notation?

B Explain Divide-and-Conquer approach?

C Explain Searching and Sorting algorithms?

3. Short notes (Any four)   **4X5 = 20**

A Binary tree?

B Brute Force?

C BLAST?

D Fibonacci series?

E Dynamic programming?