



MGM SCHOOL OF BIOMEDICAL SCIENCES

(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)

(Deemed to be University u/s 3 of UGC Act 1956)

Grade “A⁺⁺” Accredited by NAAC

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CHOICE BASED CREDIT SYSTEM (CBCS)

(Academic Year 2025 - 26)

Curriculum for

M.Sc. Allied Health Sciences

M.Sc. Health Informatics

Semester I & II

DIRECTOR'S MESSAGE

Welcome Message from the Director

Dear Postgraduate Students,

Welcome to **MGM School of Biomedical Sciences (MGMSBS)**, **MGMIHS**, a premier institution dedicated to advancing allied and health sciences education. As you embark on this transformative academic journey, you are joining a community that fosters excellence in research, clinical expertise, and innovation.

MGMIHS, accredited with NAAC 'A⁺⁺' Grade (CGPA 3.55, 2022) and recognized as a **Category I Institution by UGC**, offers an ecosystem that nurtures both academic and professional growth. With **NIRF (151-200 rank band) recognition**, **NABH-accredited hospitals**, **NABL-accredited diagnostic labs**, and **JCI accreditation for MGM New Bombay Hospital**, we uphold global benchmarks in education and healthcare.

At MGMSBS, our **15 postgraduate programs** are meticulously designed to align with the National Commission for Allied and Healthcare Professionals (**NCAHP**) standards, National Education Policy (**NEP**) 2020, and the National Credit Framework (**NCrF**). We have implemented the **Choice-Based Credit System (CBCS)** to provide academic flexibility while ensuring rigorous training in clinical and technical skills. Our state-of-the-art research laboratories, digital classrooms, and the Central Research Laboratory (CRL) foster an environment that encourages innovation and evidence-based learning.

Postgraduate education at MGMSBS goes beyond theoretical learning—our curriculum integrates **hands-on clinical training, interdisciplinary collaboration, and exposure to real-world healthcare challenges**. We emphasize **research-driven education**, encouraging students to actively participate in **scientific discoveries, publications, and international collaborations**.

Beyond academics, we believe in **holistic development**, with initiatives such as the **AARAMBH Science and Wellness Club**, which promotes **mental well-being, leadership, and professional networking**.

As you step into this **next phase of academic and professional growth**, we encourage you to explore new ideas, engage in impactful research, and contribute meaningfully to the **healthcare ecosystem**. We are confident that your journey at MGMSBS will shape you into **skilled, compassionate, and visionary professionals**, ready to lead in the ever-evolving healthcare landscape.

We look forward to witnessing your achievements and contributions!

Dr. Mansee Thakur

Director, MGM School of Biomedical Sciences

MGM Institute of Health Sciences, Navi Mumbai

ABOUT MGM SCHOOL OF BIOMEDICAL SCIENCES

Mission

To improve the quality of life, both at individual and community levels by imparting quality medical education to tomorrow's doctors and medical scientists and by advancing knowledge in all fields of health sciences through meaningful and ethical research.

Vision

By the year 2020, MGM Institute of Health Sciences aims to be top-ranking Centre of Excellence in Medical Education and Research. Students graduating from the Institute will have the required skills to deliver quality health care to all sections of the society with compassion and benevolence, without prejudice or discrimination, at an affordable cost. As a research Centre, it shall focus on finding better, safer and affordable ways of diagnosing, treating and preventing diseases. In doing so, it will maintain the highest ethical standards.

About – School of Biomedical Sciences

MGM School of Biomedical Sciences is formed under the aegis of MGMIHS with the vision of offering basic Allied Science and Medical courses for students who aspire to pursue their career in the Allied Health Sciences, teaching as well as research.

School of Biomedical Sciences is dedicated to the providing the highest quality education in basic medical sciences by offering a dynamic study environment with well-equipped labs. The school encompasses 23 courses each with its own distinct, specialized body of knowledge and skill. This includes 8 UG courses and 15 PG courses. The college at its growing years started with mere 100 students has recorded exponential growth and is now a full-fledged educational and research institution with the student strength reaching approximately **800** at present.

Our consistent theme throughout is to encourage students to become engaged, be active learners and to promote medical research so that ultimately, they acquire knowledge, skills, and understanding so as to provide well qualified and trained professionals in Allied Health Sciences to improve the quality of life.

As there is increased need to deliver high quality, timely and easily accessible patient care system the collaborative efforts among physicians, nurses and allied health providers become ever more essential for an effective patient care. Thus, the role of allied health professionals in ever-evolving medical system is very important in providing high-quality patient care.

Last but by no means least, School of Biomedical Sciences envisions to continuously grow and reform. Reforms are essential to any growing institution as it fulfills our bold aspirations of providing the best for the students, for us to serve long into the future and to get ourselves updated to changing and evolving trends in the health care systems.

Introduction

Most healthcare leaders know that trustworthy data is critical to improving business performance and patient care. But it's still a challenge to put that data to work in service of better care and more informed decision making. The ability to effectively analyse and deploy this data is critical to the successful operation of healthcare organizations.

Health Informatics is an interdisciplinary field that combines healthcare, information science, and computer technology to optimize the acquisition, storage, retrieval, and use of health-related data. It focuses on improving patient outcomes, enhancing healthcare delivery systems, and fostering innovation in the use of data and technology in medicine.

Health Information Management (HIM), on the other hand, emphasizes the management of health records, ensuring their accuracy, confidentiality, and compliance with regulatory standards. HIM professionals are responsible for organizing and safeguarding patients' medical information to ensure it is readily available for effective decision-making and quality healthcare delivery.

The integration of these fields creates a robust foundation for addressing contemporary healthcare challenges, such as the rise of electronic health records (EHRs), telemedicine, big data analytics, and health information exchange. This Master's program is designed to equip students with the knowledge and skills necessary to become leaders in this transformative domain.

AIM of the Program

The Master's in Health Informatics program aims to:

- Prepare students to effectively integrate information technology and data analytics into healthcare practices.
- Develop competencies in managing and analyzing health information to enhance clinical decision-making and operational efficiency.
- Foster a deep understanding of regulatory, ethical, and privacy issues associated with health information systems.
- Equip graduates with the skills to design, implement, and manage innovative health informatics solutions that address real-world challenges.
- Provide a strong foundation in interdisciplinary collaboration, leadership, and strategic planning for health informatics initiatives.
- Ensure proficiency in managing health information systems, focusing on data quality, security, and compliance with healthcare regulations.
- Train students in developing strategies for efficient healthcare documentation and coding, supporting better resource utilization and patient care delivery.

Job Opportunities (Traditional and Non-traditional Settings)

Graduates of this program will have diverse career opportunities in both traditional and non-traditional healthcare settings:

Traditional Settings:

- **Hospitals and Healthcare Systems:** Roles such as Health Information Managers, Clinical Informatics Specialists, Nursing informatics specialist, Clinical analyst, EHR Implementation Consultants and Informatics director.
- **Public Health Agencies:** Positions like Public Health Data Analysts and Population Health Informatics Specialists.

- **Academic and Research Institutions:** Careers as Health Informatics Educators or Clinical Data Researchers.
- **Government Organizations:** Opportunities in policy-making and health informatics standard development.
- **Healthcare Facilities:** Roles like Medical Record Managers, Medical and Health Service Managers, Coding Specialists, and Data Quality Officers to ensure accurate and compliant health records management.

Non-traditional Settings:

- **Health Technology Companies:** Positions such as Product Managers, UX Designers for health applications, and Health IT Consultants.
- **Pharmaceutical and Biotech Industries:** Roles in clinical trial informatics, drug development analytics, and regulatory compliance.
- **Insurance Companies:** Careers as Healthcare Data Analysts or Actuarial Informatics Specialists.
- **Telemedicine and Remote Health Services:** Opportunities in designing and managing virtual care platforms.
- **Entrepreneurship:** Founding or leading start-ups focused on health IT solutions, wearable health devices, or patient engagement tools.
- **Data Science and Artificial Intelligence:** Roles in developing predictive models and machine learning applications for healthcare.
- **Consultancy Services:** Providing expertise in medical record audits, compliance reviews, and health information system optimizations.

ELIGIBILITY FOR ADMISSION:

Any health science graduates with MBBS/BAMS/BHMS/BDS/Nursing/Allied Health Sciences or equivalent with minimum aggregate of 50% marks.

DURATION OF THE COURSE: 2 (two) academic years/4 semesters

M.Sc. Health Informatics

Program Outcomes (PO)

Program Code	Program Objective(s)
PO1	Apply foundational knowledge in health and medical sciences to develop informatics solutions
PO2	Utilize biostatistics and research methodology to drive data driven healthcare innovations and conduct research
PO3	Implement health information management practices in various healthcare settings
PO4	Harness Advanced Computing Skills to Develop and Manage Innovative Health Informatics Projects
PO5	Demonstrate effective communication skills within healthcare environments, critical thinking and ethical reasoning to address societal challenges, uphold human rights, manage crises, and apply bioethical principles in healthcare and research.
PO6	Integrate healthcare financing principles in health informatics initiatives
PO7	Employ data analytics and machine learning techniques for improved healthcare outcomes
PO8	Design and develop web and mobile applications for healthcare purposes and identify business opportunity.

Semester I

MHIMT 101 T	Basics of Health Informatics & Health Information Management	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Develop a comprehensive understanding of healthcare systems and the role of health information in improving patient care.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment
CO2	Gain proficiency in managing health records, including the legal aspects, documentation, and quality control.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment
CO3	Demonstrate mastery in the use of health informatics technologies, such as EHRs, CDSS, and HIE, and ethical, legal, and regulatory issues associated with health information and informatics.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment
CO4	Explore emerging trends in health informatics and their implications for future healthcare.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment
CO5	Apply theoretical knowledge to practical scenarios in health information management and informatics.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment
MHIMT 102 T	Hospital Administration and Healthcare Financing	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand and apply healthcare management principles and policies.	PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment
CO2	Analyze the financial management strategies and budgeting within healthcare organizations.	PO6	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment
CO3	Implement quality improvement and patient safety protocols.	PO3, PO5	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment
CO4	Navigate health economics, healthcare finance, and insurance systems.	PO6	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment
CO5	Develop skills in resource tracking, management, and financial auditing in the healthcare sector.	PO3, PO6	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar	Internal Exam, University Exam (Theory Exam), Seminar, Assignment

CC 001 T & CC 001 P	Research Methodology & Biostatistics (Core Course)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand the basic concepts of biostatistics and their application in research	PO2	Lecture, Demonstration, Practical, Assignment, Seminar	Internal Exam, University Exam (Theory Exam, Practical Exam), Assignment
CO2	Describe the appropriate statistical methods required for a particular research design	PO2	Lecture, Demonstration, Practical, Assignment, Seminar	Internal Exam, University Exam (Theory Exam, Practical Exam), Assignment
CO3	Develop an appropriate framework for research studies and Data Analysis	PO2	Lecture, Demonstration, Practical, Assignment, Seminar	Internal Exam, University Exam (Theory Exam, Practical Exam), Assignment
MHIMT 103 E	Fundamentals of Computer Application (Experiential)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand the basics of computer hardware and software, various windows accessories and the functioning of the control panel	PO4	Practical, Experiential, Assignment, Problem Based Learning, E-learning	University Exam (Experimental), Viva-Voice
CO2	Demonstrate Skill in essential Microsoft Office applications	PO4	Practical, Experiential, Assignment, Problem Based Learning, E-learning	University Exam (Experimental), Viva-Voice
CO3	Apply database management system concepts when designing the different database objects.	PO4	Practical, Experiential, Assignment, Problem Based Learning, E-learning	University Exam (Experimental), Viva-Voice
CO4	Demonstrate Skill in Using Computer Networks, network topologies and Devices.	PO4	Practical, Experiential, Assignment, Problem Based Learning, E-learning	University Exam (Experimental), Viva-Voice
CO5	Understanding about emerging computer technologies like Blockchain, Machine Learning.	PO4	Practical, Experiential, Assignment, Problem Based Learning, E-learning	University Exam (Experimental), Viva-Voice
MHIMT 104 P	Python Basics	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Develop a solid understanding of Python's syntax and semantics, including data types, variables, operators, and basic control structures.	PO4	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam, (Practical Exam), Viva-Voice
CO2	Demonstrate Competency in working with Python's core data structures, including lists, ranges, tuples, dictionaries, and sets.	PO4	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam, (Practical Exam), Viva-Voice
CO3	Handle input and output operations in Python, including reading from	PO4	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam,

	and writing to files, and interacting with user input in a robust manner.			(Practical Exam), Viva-Voice
CO4	Apply the principles of modular programming by defining and using functions, including the use of parameters, return values, and variable scope.	PO4	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam, (Practical Exam), Viva-Voice
CO5	Acquire the ability to implement object-oriented programming concepts in Python, such as classes, objects, inheritance, and polymorphism, to create reusable and maintainable code.	PO4	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam, (Practical Exam), Viva-Voice
CO6	Master the techniques for managing errors and exceptions in Python, ensuring that programs can handle unexpected situations gracefully and continue to operate correctly.	PO4	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam, (Practical Exam), Viva-Voice
CO7	Explore the use of regular expressions in Python for pattern matching and text processing, gaining the ability to handle complex string manipulation tasks.	PO4	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam, (Practical Exam), Viva-Voice

Semester II

MHIMT 105 T & MHIMT 109 E	Advanced Health Informatics & HI Practicum	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand the management of various advanced health informatics applications	PO1, PO3, PO5	Lecture, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study	Internal Exam, University Exam (Theory Exam, Experimental), Logbook
CO2	Interpret the application of health informatics for managing patient data and supporting healthcare professionals in making a quality decision	PO1, PO3, PO5	Lecture, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study	Internal Exam, University Exam (Theory Exam, Experimental), Logbook
CO3	Describe the content and features to be included in the informatics application to the application developer in making advance and expert informatics application	PO1, PO3, PO5	Lecture, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study	Internal Exam, University Exam (Theory Exam, Experimental), Logbook
CO4	Identify the trends and emerging technology for informatics application in healthcare settings.	PO1, PO3, PO5	Lecture, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study	Internal Exam, University Exam (Theory Exam, Experimental), Logbook
CO5	Recognize the future requirement using various approaches and prediction tools	PO1, PO3, PO5	Lecture, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study	Internal Exam, University Exam (Theory Exam, Experimental), Logbook
CO6	Develop awareness, understanding and capacity in the specific roles and responsibilities of a health information management professional	PO1, PO3, PO5	Lecture, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study	Internal Exam, University Exam (Theory Exam, Experimental), Logbook
CO7	Understand through an intensive experience the nature of hospitals and health care settings as workplaces and their associated values, routines and cultures	PO1, PO3, PO5	Lecture, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study	Internal Exam, University Exam (Theory Exam, Experimental), Logbook
CO8	Develop skill and professional capacity for managing the health information system of a health care setting	PO1, PO3, PO5	Lecture, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study	Internal Exam, University Exam (Theory Exam, Experimental), Logbook
CO9	Develop competency to plan, implement, and carry out a clinical	PO1, PO3, PO5	Lecture, Demonstration, Experiential, Group Discussion, Assignment,	Internal Exam, University Exam (Theory Exam,

	audit in the quality assurance cell		Seminar, Problem Based Learning, E-learning, Case-Study	Experimental), Logbook
CO10	Demonstrate competency to plan, implement, and carry out a claims processing in the health insurance department	PO1, PO3, PO5, PO6	Lecture, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study	Internal Exam, University Exam (Theory Exam, Experimental), Logbook
MHIMT 106 T	Clinical Workflow, Process Redesigning & Clinical Documentation Improvement (CDI)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand the concepts and importance of clinical workflow and process redesign, including the role of Clinical Documentation Improvement (CDI) programs and CDI specialists.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam) Seminar, Assignment
CO2	Identify focus areas for medical documentation improvements and the benefits of CDI programs.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam) Seminar, Assignment
CO3	Apply workflow analysis techniques to evaluate and document clinical processes, creating process maps to visualize workflows.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam) Seminar, Assignment
CO4	Identify bottlenecks, inefficiencies, and areas for improvement in clinical processes, and apply knowledge of CDI metrics to measure improvement outcomes.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam) Seminar, Assignment
CO5	Develop & Implement a plan for clinical process redesign, incorporating change management strategies to facilitate workflow optimization.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, Internal Exam, (Theory Exam) Seminar, Assignment
CO6	Apply various processes of a CDI program in both inpatient and outpatient settings, leveraging technology to enhance clinical workflow.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam) Seminar, Assignment
CO7	Evaluate the role of technology in clinical workflow enhancement and apply CDI principles to improve documentation practices and quality metrics.	PO1, PO3	Lecture, Demonstration, Group Discussion, Quiz, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam) Seminar, Assignment
MHIMT 107 T &	Medical Language & International Classification of Disease Coding (Theory +	Mapped POs	Teaching-Learning Methodologies	Assessment Tools

MHIMT 110 P	Practical)			
CO1	Describe medical terminologies and their components, including stem words/root, prefixes, and suffixes.	PO1, PO3	Lecture, Practical, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam, Practical Exam), Viva-Voice
CO2	Explain the concepts of body systems and identify the terminologies related to body systems, diseases, diagnostic, therapeutic tests, and procedures.	PO1, PO3	Lecture, Practical, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam, Practical Exam), Viva-Voice
CO3	Enumerate surgical procedures, diseases, disorders, and dysfunctions.	PO1, PO3	Lecture, Practical, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam, Practical Exam), Viva-Voice
CO4	Develop an understanding of medical abbreviations, signs and symptoms and common medical terms.	PO1, PO3	Lecture, Practical, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam, Practical Exam), Viva-Voice
CO5	Apply the principles of medical coding using various coding systems.	PO1, PO3	Lecture, Practical, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam, Practical Exam), Viva-Voice
CO6	Explain how the disease classification system integrates with health information systems and supports healthcare data management.	PO1, PO3	Lecture, Practical, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam, (Theory Exam, Practical Exam), Viva-Voice
MHIMT 108 T & MHIMT 111 P	Medical Transcribing & Editing (Theory + Practical)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand medical report formats, transcription principles, editing and proofreading rules specific to medical content.	PO1, PO3	Lecture, Practical, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study, Guest Lecture	Internal Exam, University Exam, (Theory Exam, Practical Exam), Viva-Voice
CO2	Develop skill and knowledge to accurately transcribe and edit	PO1, PO3	Lecture, Practical, Demonstration, Experiential, Group	Internal Exam, University Exam, (Theory Exam,

	health-related information		Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study, Guest Lecture	Practical Exam), Viva-Voice
CO3	Demonstrate Skill in using natural language processing and other transcription software and applications in Medical Transcribing.	PO1, PO3	Lecture, Practical, Demonstration, Experiential, Group Discussion, Assignment, Seminar, Problem Based Learning, E-learning, Case-Study, Guest Lecture	Internal Exam, University Exam, (Theory Exam, Practical Exam), Viva-Voice
DSE 001 P	Web Development Basics (Practical)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understand the fundamental concepts of web development.	PO8	Practical, Assignment, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam(Practical Exam), Viva-Voice
CO2	Demonstrate skill in front-end and back-end web development.	PO8	Practical, Assignment, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam(Practical Exam), Viva-Voice
CO3	Develop Skill to create responsive and dynamic websites.	PO8	Practical, Assignment, Problem Based Learning, E-learning, Guest Lecture	Internal Exam, University Exam(Practical Exam), Viva-Voice
DSE 002 P	Advanced Python (Practical)	Mapped POs	Teaching-Learning Methodologies	Assessment Tools
CO1	Understanding the core principles and exploring advanced features and libraries of Python	PO7	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam(Practical Exam), Viva-Voice
CO2	Develop ability to implement multithreaded programs in Python, intricacies of concurrent execution and thread management to improve application performance.	PO7	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam(Practical Exam), Viva-Voice
CO3	Demonstrate Skill in using Python for database interactions, including connecting to databases, executing queries, and managing data using libraries such as SQLite, MySQL, and Postgre SQL.	PO7	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam(Practical Exam), Viva-Voice
CO4	Utilize Python for data analysis tasks, including data manipulation, statistical analysis, and visualization using libraries such as NumPy, pandas, and Matplotlib.	PO7	Practical, Assignment, Problem Based Learning, E-learning	Internal Exam, University Exam(Practical Exam), Viva-Voice

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