SIES College of Commerce and Economics (Autonomous), Sion (East)

Department of Information Technology

B.Sc. (IT) PROGRAM OUTCOMES

PO- 1: After completing three years Degree Course – Bachelor of Science (Information Technology) (B.Sc.-IT) program, Learners will develop foundational knowledge of computer programming.

PO- 2: Learners will acquire practical knowledge , training in professional skills and ethics to build competencies in the area of information technology.

PO- 3: Learners will develop their personalities along with commercial , communication , research , analytical and managerial skills in practical and theoretical concepts in Information Technology.

PO- 4: Learners will enhance IT skills and be able to relate to global challenges and be exposed to newer avenues in Information Technology.

PO- 5: Learners will be trained in leadership skills and social responsibilities with sensitivity towards environment and sustainability.

Program: B.Sc.(Information Technology)
Year : Third Year
Semester V
Subject: Next Generation Technologies / Next Generation Technologies Lab
Course Code: BSIT-MJS5-101 / BSIT-MJPS5-101

Course Outcomes:
After completion of the course learners will be able to,

No	Course Outcomes	PO Mapping
CO 1 (Remember)	The Learner will be able to describe the structure and components of MongoDB database, jQuery and JSON effectively.	PO-1,PO-2
CO 2 (Understanding)	The Learner will be able to explain and demonstrate the fundamental concepts required for new age technologies like big data, NoSQL etc. understand fundamental concepts in MongoDB such as architecture, election process, and storage structure.	PO-1,PO-2,PO-4
CO 3 (Applying)	The Learner will be able to apply different MongoDB techniques such as creating collections, documents, index structures, backup and restore.	PO-1,PO-2,PO-3,PO-4
CO 4 (Analyzing)	The Learner will be able to select the concepts in order to solve real world problems using MongoDB, jQuery and JSON.	PO-1,PO-2,PO-3,PO-4
CO 5 (Evaluating)	The Learner will be able to compare MongoDB with other new age technologies, old age storage with new age SSDs.	PO-1,PO-2,PO-3,PO-4
CO 6 (Creating)	The Learner will be able to design different kinds of applications using MongoDB, jQuery and JSON.	PO-1,PO-2,PO-3, PO-4,PO-5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester V
Subject: Software Engineering & Project Management / Software Engineering & Project Management Lab
Course Code: BSIT-MJS5-102 / BSIT-MJPS5-102

Course Outcomes:
After completion of the course,

No	Course Outcomes	PO Mapping
CO 1(Remember)	The Learner will be able to recall and define the fundamental concepts of software engineering including Software Development Life Cycle, software processes, project management basics, and critical system characteristics.	PO1,PO2
CO 2 (Understanding)	The Learner will be able to explain and differentiate between various software development models such as Waterfall, Prototyping, Iterative Development, RAD, Agile, and Rational Unified Process, and relate them to practical contexts.	PO1, PO2, PO3
CO 3 (Applying)	The Learner will be able to apply requirements engineering processes, create system models, and demonstrate architectural design decisions, user interface design, and verification & validation techniques in real-world scenarios.	PO2, PO3, PO4
CO 4 (Analyzing)	The Learner will be able to analyze socio-technical systems, dependability attributes of critical systems, project risks, cost estimation factors, and resource allocation methods using tools like critical path analysis.	PO2, PO3, PO4
CO 5 (Evaluating)	The Learner will be able to evaluate project planning approaches, software metrics, process improvement frameworks such as CMMI, and compare traditional versus modern project management practices for effectiveness.	PO3, PO4, PO5
CO 6 (Creating)	The Learner will be able to design and propose a comprehensive project plan by integrating software development models, estimation techniques, team structures, contract management, and closure activities to ensure project success.	PO2, PO3, PO4, PO5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester V
Subject: Linux System Administration / IT Skills Enhancement Lab
Course Code: BSIT-MJS5-103 / BSIT-SECS5-107

Course Outcomes:
After completion of the course learners will be able to,

No	Course Outcomes	PO Mapping
CO 1 (Remember)	The Learner will be able to identify various Linux commands, roles and responsibilities of Linux System Administrator.	PO2, PO3
CO 2 (Understanding)	The Learner will be able to explain concepts related to Packages, Network configuration, file sharing and security.	PO2
CO 3 (Applying)	The Learner will be able to illustrate the working of Mail server, DHCP, DNS, Web server, HA clusters and Installation server.	PO2
CO 4 (Analyzing)	The Learner will be able to compare different file sharing and authentication mechanisms.	PO2, PO4
CO 5 (Evaluating)	The Learner will be able to evaluate various cryptographic services.	PO2, PO4
CO 6 (Creating)	The Learner will be able to design firewall rules for security of internal network and write bash shell scripts.	PO1, PO2, PO4, PO5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester V
Subject: Advanced Web Programming / Advanced Web Programming Lab
Course Code: BSIT-MJELS5-104 / BSIT-MJELPS5-104

Course Outcomes:
After completion of the course,

No	Course Outcomes	PO Mapping
CO 1 (Remember)	The learner will be able to describe the working of .NET framework.	PO-1,PO-2,PO-4
CO 2 (Understanding)	The learner will be able to explain and demonstrate how to create dynamic Web pages using web forms and code behind file.	PO-1,PO-2,PO-4
CO 3 (Applying)	The learner will be able to use advanced controls such as validation controls, navigation controls, master pages, styles, themes,	PO-1,PO-2,PO-4
CO 4 (Analyzing)	The learner will be able to connect the web applications using SqlDataSource with GridView, DetailsView and FormView controls.	PO-1,PO-2,PO-4
CO 5 (Evaluating)	The learner will be able to compare different mechanisms and controls and choose a concept that fits the problem description.	PO-1,PO-2,PO-4
CO 6 (Creating)	The learner will be able to develop web applications using a combination of client-side and server-side technologies.	PO-1, PO-2, PO-3, PO-4, PO-5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester V
Subject: Enterprise Java / Enterprise Java Lab
Course Code: BSIT-MJELS5-105 / BSIT-MJELPS5-105

Course Outcomes:

After completion of the course learners will be able to,

No	Course Outcomes	PO Mapping
CO 1 (Remember)	The Learner will be able to **recall** and **explain** the fundamental concepts of Enterprise Java technologies.	PO1, PO2
CO 2 (Understanding)	The Learner will be able to **illustrate** the architecture of multi-tier enterprise applications and **describe** the role of different components in solving business problems.	PO2, PO3
CO 3 (Applying)	The Learner will be able to **apply** Enterprise Java technologies to develop interactive, database-driven web applications.	PO2, PO4
CO 4 (Analyzing)	The Learner will be able to **analyze** and **compare** enterprise application frameworks to determine suitable solutions for given requirements.	PO3, PO4
CO 5 (Evaluating)	The Learner will be able to **evaluate** the performance, scalability, and security of enterprise applications using appropriate tools and practices.	PO3, PO5
CO 6 (Creating)	The Learner will be able to **design** and **develop** enterprise-level applications integrating front-end, business logic, and persistence layers.	PO2, PO5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester V
Subject: Internet of Things / Internet of Things Lab
Course Code: BSIT-MNS5-106 / BSIT-MNPS5-106

Course Outcomes:
After completion of the course learners will be able to,

No	Course outcomes	PO mapping
CO 1 (Remember)	The Learner will be able to explain the fundamental concepts, design principles, and architecture of IoT including key protocols and standards.	PO1, PO2
CO 2 (Understanding)	The Learner will be able to identify and describe various IoT components such as sensors, actuators, microcontrollers, and embedded platforms.	PO1, PO2
CO 3 (Applying)	The Learner will be able to develop embedded system prototypes using platforms like Arduino, incorporating sensor data acquisition and control functions.	PO2, PO3, PO4
CO 4 (Analyzing)	The Learner will be able to design and implement secure IoT solutions by integrating APIs, cloud services, and communication protocols.	PO2, PO3, PO4
CO 5 (Evaluating)	The Learner will be able to analyze embedded code for performance and memory optimization, and debug IoT applications effectively.	PO2, PO3
CO 6 (Create)	The Learner will be able to evaluate IoT business models, manufacturing processes, and ethical issues related to privacy, security, and environmental impact to recommend sustainable solutions.	PO3, PO4, PO5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester VI
Subject: Business Intelligence / Business Intelligence Lab
Course Code: BSIT-MJS6-101/ BSIT-MJPS6-101

Course Outcomes:
After completion of the course learners will be able to,

No	Course Outcomes	PO Mapping
CO 1 (Remember)	The Learner will be able to explain the fundamentals of business intelligence, decision-support systems and the role of mathematical models in decision making.	PO1
CO 2 (Understanding)	The Learner will be able to apply data mining techniques including classification, clustering, data preparation and modelling to real-world business problems.	PO2, PO4
CO 3 (Applying)	The Learner will be able to analyse various knowledge-representation, reasoning and ethical issues in business intelligence and expert systems.	PO3, PO5
CO 4 (Analyzing)	The Learner will be able to evaluate business intelligence architectures, decision support systems, and the classes of mathematical models for their adequacy in organisational decision making.	PO2, PO4
CO 5 (Evaluating)	The Learner will be able to create solutions that integrate data preparation, mining algorithms and BI applications (marketing models, knowledge management, expert systems) and demonstrate professional communication of results.	PO3, PO5
CO 6 (Creating)	The Learner will be able to relate IT skills and global challenges by exploring newer avenues in information technology (e.g., AI & expert systems in BI) and show social/environmental responsibility in their work.	PO4, PO5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester VI
Subject: Software Testing & Quality Assurance / Software Testing & Quality Assurance Lab
Course Code: BSIT-MJS6-102 / BSIT-MJPS6-102

Course Outcomes:
After completion of the course,

No	Course Outcomes	PO Mapping
CO 1 (Remember)	The learner will be able to understand the significance of software testing in ensuring software quality and reliability.	PO1, PO2
CO 2 (Understanding)	The learner will be able to familiarize with the fundamental concepts and principles of software quality assurance and its role in the software development life cycle.	PO1, PO2, PO3
CO 3 (Applying)	The learner will be able to apply different software testing techniques and methodologies for effective test case design in practical scenarios.	PO2, PO3, PO4
CO 4 (Analyzing)	The learner will be able to analyze verification and validation processes to ensure quality and identify defects during different stages of software development.	PO2, PO3, PO4
CO 5 (Evaluating)	The learner will be able to evaluate software testing strategies, automation tools, and frameworks for effective quality assurance and process improvement.	PO3, PO4, PO5
CO 6 (Creating)	The learner will be able to design and propose a complete test plan integrating testing methodologies, automation tools, and reporting techniques to ensure overall software quality.	PO3, PO4, PO5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester VI
Subject: Geographic Information Systems
Course Code: BSIT-MJS6-103

Course Outcomes:
After completion of the course learners will be able to,

No	Course Outcomes	PO Mapping
CO 1 (Remember)	The Learner will be able to explain the fundamental concepts of GIS, its components, spatial and attribute data, and data models (vector & raster).	PO-1,PO-2,PO-4
CO 2 (Understanding)	The Learner will be able to apply data collection, input, transformation, and georeferencing techniques for effective GIS data management.	PO-1,PO-2,PO-4
CO 3 (Applying)	The Learner will be able to Perform vector and raster data analysis and execute GIS-based queries to extract meaningful insights.	PO-2,PO-3
CO 4 (Analyzing)	The Learner will be able to apply cartographic principles such as color, symbols, and map design to create effective thematic maps.	PO-1,PO-2,PO-3,PO-4
CO 5 (Evaluating)	The Learner will be able to Identify and evaluate GIS applications in real-world domains along with emerging trends in the field.	PO-2,PO-3,PO-4, PO-5
CO 6 (Creating)	The Learner will be able to analyze GIS outputs to support decision-making with awareness of ethical, environmental, and societal implications.	PO-2, PO-3, PO-5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester VI
Subject: Security in Computing / Security in Computing Lab
Course Code: BSIT-MJELS6-104 / BSIT-MJELPS6-104

Course Outcomes:
After completion of the course,

No	Course Outcomes	PO Mapping
CO 1 (Remember)	The Learner will be able to recall and define fundamental terminologies, concepts, and components of information security.	PO-1,PO-2, PO-3
CO 2 (Understanding)	The Learner will be able to explain the importance of information protection, the evolution of security, and core security principles and models.	PO-1,PO-2, PO-3, PO-4
CO 3 (Applying)	The Learner will be able to apply risk analysis techniques and secure design principles to assess and mitigate security vulnerabilities.	PO-1,PO-2, PO-3, PO-4, PO-5
CO 4 (Analyzing)	The Learner will be able to analyze authentication, authorization, encryption, and network defense mechanisms to evaluate system security..	PO-1,PO-2, PO-3, PO-4
CO 5 (Evaluating)	The Learner will be able to evaluate the effectiveness of security controls in databases, storage, networks, wireless, and cloud environments.	PO-1,PO-2, PO-3, PO-4, PO-5
CO 6 (Creating)	The Learner will be able to design comprehensive and secure architectures integrating IDS/IPS, IoT security, AI/ML-based defense, and digital forensics principles.	PO-1,PO-2, PO-3, PO-4, PO-5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester VI
Subject: Ethical Hacking / Ethical Hacking Lab
Course Code: BSIT-MJELS6-105 / BSIT-MJELPS6-105

Course Outcomes:
After completion of the course ,

No	Course Outcomes	PO Mapping
CO 1 (Remember)	Learner will be able to explain core cybersecurity concepts, including the CIA triad, types of cyber threats, risk assessment, and basic cryptography.	PO1, PO4
CO 2 (Understanding)	Learner will be able to distinguish between ethical and unethical hacking practices, understand legal regulations, and describe the stages of hacking.	PO1, PO2
CO 3 (Applying)	Learner will be able to perform passive and active information gathering using OSINT techniques and footprinting tools to identify potential vulnerabilities.	PO2, PO3
CO 4 (Analyzing)	Learner will be able to analyze social engineering tactics and evaluate countermeasures to mitigate human-based security risks.	PO1, PO2, PO4
CO 5 (Evaluating)	Learner will be able to conduct network discovery, perform port and service scanning, and assess potential vulnerabilities ethically.	PO2, PO3, PO4
CO 6 (Creating)	Learner will be able to execute ethical hacking techniques and apply appropriate security countermeasures.	PO2, PO3, PO5

Program: B.Sc.(Information Technology)
Year : Third Year
Semester VI
Subject: Artificial Intelligence / Artificial Intelligence Lab
Course Code: BSIT-MNS6-106 / BSIT-MNPS6-106

Course Outcomes:

After completion of the course learners will be able to,

No	Course outcomes	PO Mapping
CO 1 (Remember)	The Learner will be able to remember and understand foundational concepts, history and current state-of-the-art of Artificial Intelligence.	PO1
CO 2 (Understanding)	The Learner will be able to understand and apply the model of intelligent agents, environments and agent architectures in designing simple agent systems.	PO1, PO2
CO 3 (Applying)	The Learner will be able to apply search-based problem-solving: formulating problems, using uninformed and informed search strategies, and designing heuristic functions.	PO2, PO3
CO 4 (Analyzing)	The Learner will be able to analyse and create insights on current trends in AI (generative models, ethics, sustainability), relating them to global challenges and social responsibility.	PO4, PO5
CO 5 (Evaluating)	The Learner will be able to evaluate different knowledge representation schemes and reasoning under uncertainty	PO3, PO4
CO 6 (Creating)	The Learner will be able to apply professional communication, teamwork and ethical conduct by creating a project/case-study report integrating theoretical and practical AI applications.	PO3, PO5