URAN EDUCATION SOCIETY'S

COLLEGE OF MANAGEMENT & TECHNOLOGY

(Affiliated to the University of Mumbai)

PROGRAMME OUTCOMES, PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

(The college is affiliated to the University of Mumbai thus, it follows the Curriculum framed by the Board of Studies, University of Mumbai)

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

PROGRAMME OUTCOMES

The Department of Information Technology (B. Sc. I.T.) is dedicated to promote learning the various subjects and technologies to students in the field of Information Technology

Bachelor of Science, (B.Sc.IT) is a Bachelor's degree awarded for an undergraduate course or program in the Information technology field of duration three years (6 semesters). The aim of B.Sc. (IT) degree is to provide basic inputs in various aspects of IT and broad understanding of other interdisciplinary interfaces for providing the needs of effective business management by bridging the gaps between managerial practices and Information Technology.

The learning outcomes of the programme is as follows:

PO-1: To acquire knowledge about multiple programming languages, paradigms and technologies.

PO-2: To imbibe professional skills in students for their future roles.

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

PO- 4: Prepare necessary knowledge base for potential research and development in Information Technology.

PO- 5: Train in leadership skills and social responsibilities with sensitivity towards environment and sustainability.

PO-6: Able to build-up a successful career in Information Technology and allied fields.

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BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

PROGRAMME SPECIFIC OUTCOMES

After completion of 3 years' degree course of B.Sc. Information Technology program, the students are expected to:

PSO1: To develop an ability to communicate effectively using written and oral presentation skills of Information Technology for a wide range of audiences.

PSO2: To utilize their designing and programming skills in various sectors.

PSO3: To develop their practical experience in real world software, using recent industry standard tools and other techniques in IT industry.

PSO4: To develop the ability to design, simulate and implement computer hardware/ software and use basic analog/digital circuits.

PSO5: To develop and analyze quality computer applications by applying knowledge of software engineering, algorithms, programming, databases and networking.

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BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY) COURSE OUTCOMES

F.Y.B.Sc.I.T

FIRST SEMESTER

Course Title	**PROGRAMMING PRINCIPLES WITH C**
Course Code	**USIT101**
Credits	**2**
Course Objectives	➢ To develop the logical ability of the student. ➢ To clear the basic concepts using various examples. ➢ To understand the different approaches towards the problems. ➢ To solve the errors and find suitable solutions for programmes. ➢ To debug the code.
Course Outcome	➢ To understand the basic concepts of C, flowcharts, pseudo code, programming languages and problem solving techniques. ➢ To develop programming skills using operators, fundamentals and basics of C++ languages, looping techniques etc. ➢ To effectively use the concepts of functions file handling and error handling concepts. ➢ To understand basics of functions, arrays, structures, pointers. ➢ To understand input and output functions using standard programming techniques and Turbo C compiler.

Course Title	**DIGITAL LOGIC AND APPLICATIONS**
Course Code	**USIT102**
Credits	**2**
Course Objectives	➢ To introduce the basic knowledge of logics in digital electronics. ➢ To interpret and assess number systems and the conversions of number systems. ➢ To analyze the boolean expressions and reduce the expression to the minimum ➢ To simply design logic circuits using tools such as Karnaugh Map, Boolean Algebra etc. ➢ To understand types of memory and flip-flops and also to create simple digital systems using counters, registers etc.
Course Outcome	➢ To understand and examine the structure of various number systems and its application in digital design using Logic Gates. ➢ To solve Boolean algebra expressions. ➢ To derive and design circuits by applying minimization in SOP and POS. ➢ To design and develop Combinational and Sequential circuits. ➢ To understand and develop digital applications.

Course Title	**FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS**
Course Code	**USIT103**
Credits	**2**
Course Objectives	➢ To introduce the fundamentals of database management system. ➢ To show how to organize, maintain and retrieve data from databases.
Course Outcome	➢ To describe the fundamental elements of relational database management system. ➢ To study and design the basic concepts of relational data model, ER-models to represent simple database application scenarios. ➢ To improve the database design by using normalization. ➢ Know the basic concepts and the applications of database systems and utilize the knowledge of basics of SQL and construct queries using SQL. ➢ To understand basic database storage structures and access techniques: file and page organizations, indexing methods and hashing.

Course Title	**COMPUTATIONAL LOGIC AND DISCRETE STRUCTURES**
Course Code	**USIT104**
Credits	**2**
Course Objectives	➢ To study overview of discrete mathematics. ➢ To study topics such as logic and proofs, sets and functions etc. ➢ To inculcate study of graph, trees and important concepts of counting techniques. ➢ To study probabilities
Course Outcome	➢ To use logical notations, set theory using different Venn diagrams, and relations between different sets. ➢ To perform logical proofs, study cardinality, algorithms, functions and set of probabilities using sample space. ➢ To understand the basics of Counting principles, recursion techniques. ➢ Use of graph and trees using different algorithms. ➢ To study the concepts of Binary trees, Huffman's Algorithm etc. and also Ordered Sets and Lattices using Hasse Diagrams.

Course Title	**TECHNICAL COMMUNICATION SKILLS**
Course Code	**USIT105**
Credits	**2**
Course Objectives	➢ To study the importance of various types of communication in technical set up. ➢ To understand the importance of different forms of formal communication. ➢ To learn the art of giving presentations and interviews. ➢ To learn ethics of business communication across functional areas. ➢ To analyse and interpret technical data.
Course Outcome	➢ Introduce aspects of communication essential for business communication using verbal and non-verbal techniques. ➢ Train learners in written aspects of organizational communication i.e., business messages and documents requisite for career building. ➢ To enhance learners' oral communication and prepare them for business interviews and professional group communication. ➢ To familiarize them with specific communication needs of an organization and learn the art of written communication in writing reports and proposals. ➢ To enable use of ICT and communication aids using graphs, maps and charts.

SECOND SEMESTER

Course Title	**OBJECT ORIENTED PROGRAMMING WITH C++**
Course Code	**USIT201**
Credits	**2**
Course Objectives	➢ Able to explain the difference between Object Oriented Programming and Procedural Programming. ➢ Able to program using more advanced C++ features such Polymorphism, Inheritance, Exception handling etc. ➢ To study encapsulation and design different principles. ➢ To study concepts of programmes using Turbo C.
Course Outcome	➢ To study the concepts of POP and OOP, features of C++ language. ➢ Build C++ application programs using OOP principles and proper program structuring and understand and apply various types of datatypes, operators etc. ➢ Demonstrate the concepts of classes and objects, polymorphism. ➢ Implement Inheritance and learn code reusability. ➢ Design Templates and File Handling and explore various Stream classes, I/O operations and Exception handling.

Course Title	**FUNDAMENTALS OF MICROPROCESSOR AND MICROCONTROLLERS**
Course Code	**USIT202**
Credits	**2**
Course Objectives	➢ To understand the basic concepts of microprocessor, microcomputers systems. ➢ To understand the concept of 8085 microprocessors. ➢ To write code and Assembly language programs of 8085. ➢ To study the concept of programming techniques: looping, counting, indexing, stack, routine etc. ➢ To understand the peripheral devices and interfacing to 8085 microcontroller.
Course Outcome	➢ To understand 8085 Microprocessor Architecture, external pin diagram and pin functions of 8085 and also to understand difference between microprocessor and CPU. Know testing and troubleshooting in memory interfacing circuits. ➢ To increase your proficiency in assembly language, to learn concepts associated with interfacing a microprocessor to memory and I/O devices ➢ To gain practical experience in programming, to study counters and delay programs, to understand how to control components of computer system through use of hardware and software interrupts ➢ To learn the concepts of embedded system, memory and its types, watchdog timer and programming in C. ➢ To understand 8051 Microcontroller, design and development.

Course Title	**WEB APPLICATIONS DEVELOPMENT**
Course Code	**USIT203**
Credits	**2**
Course Objectives	➢ To understand the basic concepts of Internet and World Wide Web. ➢ To study different HTML elements used to develop static web pages. ➢ To study stylesheets and various CSS effects. ➢ To explore JavaScript and server-side script. ➢ To learn how PHP can be connected to a database to store and retrieve data.
Course Outcome	➢ To understand various terminologies of Internet, simple application of HTML5 and CSS. ➢ To design web pages using advanced HTML5 ➢ To design dynamic web pages using JavaScript. ➢ To develop simple, responsive web pages using PHP ➢ To build web pages using PHP & MySQL

Course Title	**NUMERICAL METHODS**
Course Code	**USIT204**
Credits	**2**
Course Objectives	➢ To enhance the problem solving skills of students using extremely powerful numerical methods.
Course Outcome	➢ To understand various Engineering problems, various types of errors which occurs in real life and representation of any function as a series of non-linear coefficients. ➢ Determine the roots of any polynomial and also estimate the future as well as intermediate value depending on the pre-requisite values (Past values) ➢ Determine the solution of multiple equations and Integrate any linear or non-linear functions within the given intervals. ➢ Prediction of the future values depending on the present as well as past values and also to optimise the given situation. ➢ Mapping of a given event into another domain and understand various types distribution to be used in probability

Course Title	**GREEN IT**
Course Code	**USIT205**
Credits	**2**
Course Objectives	➢ To understand the concept of Green Technology, Green IT and different standards. ➢ To understand the concept of minimizing power utilization in technology. ➢ To know about Green PC's, Green notebooks and servers. ➢ To know the concept of Recycling. ➢ To understand metrics of Green IT.
Course Outcome	➢ Understand the relation and impact of environmental perspectives and IT. Use and give an account of standards and certifications related to sustainable IT products ➢ Use methods and tools to measure energy consumption. ➢ Evaluate effectiveness of IT use in relation to environmental perspectives ➢ How the choice of hardware and software can facilitate a more sustainable operation? ➢ To understand the concept of Recycling and to know how information system can stay Green Information System.

S.Y.B.Sc.I.T

THIRD SEMESTER

Course Title	**PYTHON PROGRAMMING**
Course Code	**USIT301**
Credits	**2**
Course Objectives	➢ To learn the new programming style. ➢ To give the idea to the students how programming can be used for designing real-life applications by reading/writing to files, GUI programming, interfacing with database.
Course Outcome	➢ Able to develop small applications using basic concepts, values & expressions, various control & conditional statements and Looping. ➢ To use and implement built-in functions and User defined Functions along with different string methods. ➢ Able to use new datatypes such as Lists, Tuples and dictionaries, Create and handle Exceptions and how to deal with files. ➢ Can create class and objects, Implement use of regular expression and multithreaded programming, import and export modules. ➢ To develop GUI applications with database connectivity.

Course Title	**DATA STRUCTURES**
Course Code	**USIT302**
Credits	**2**
Course Objectives	➢ To understand the concepts of Data Structures and concept of programming. ➢ To provide a holistic approach to design, use and implement abstract data types. ➢ To understand concepts of sorting and searching techniques.
Course Outcome	➢ To develop basic understanding of Data Structure. ➢ To understand arrays, link list, various types of queue, stack, tree and graph. ➢ Linked List data structure can be used to store data non-linear form to effective utilization of memory. Linked list data structure can be used to solve problems like polynomial equations. ➢ To apply various sorting and searching techniques on arrays and to create various types of trees and its applications like Huffman Algorithm, binary search tree etc. ➢ Understand Hashing techniques including collision techniques and to study graphs and its different operations and its traversals.

Course Title	**COMPUTER NETWORKS**
Course Code	**USIT303**
Credits	**2**
Course Objectives	➢ To conceptualize and understand the framework and working of communication networks. ➢ To gain core knowledge of Network layer routing protocols and IP addressing.
Course Outcome	➢ To recognize the purposes and association between the OSI layers, TCP/IP protocol suite, different types of signals and its mechanism of understanding each of them. ➢ To understand types of multiplexing schemes, transmission media and functions of data link layer. ➢ Identify the network devices working at various layers, media access layer and protocols. ➢ To implement switching, routing algorithms like RIP, OSPF etc. and addressing schemes. ➢ To decide the right client server protocols to be used in the real-life scenario.

Course Title	**DATABASE MANAGEMENT SYSTEM**
Course Code	**USIT304**
Credits	**2**
Course Objectives	➢ To introduce the concept of the DBMS using relational model. ➢ To understand creation, manipulation and querying of data in databases and to explore the idea behind PL/SQL.
Course Outcome	➢ To design the model of database using required data Models. ➢ To demonstrate the concepts of Normalization and Relational Algebra operations on the database. ➢ To learn constraints on the values of DB and also can apply different sub queries and triggers to get the desired result from the database. ➢ To understand the concept of Transaction management and Concurrency Control. ➢ To implement PL/SQL blocks with Exception Handling, cursors, procedures, functions and packages to create the database for their project.

Course Title	**APPLIED MATHEMATICS**
Course Code	**USIT305**
Credits	**2**
Course Objectives	➢ To understand the mathematical concepts in matrices and transformation of matrices. ➢ To solve linear differential equations ➢ To understand Beta and Gamma functions and error functions.
Course Outcome	➢ Matrices will help to calculate the various image transformations are done. ➢ Equation of First Order and second order differential Equation can describe exponential growth and decay, the population growth of species or the change in investment return over time. ➢ Implementation of Laplace Transformation will help to understand how various analog and digital signal conversions is done. ➢ Multiple Integration will help to calculate the surface area and volume of any real life objects. ➢ Error functions will help to calculate the accurate error from true and observed value.

FOURTH SEMESTER

Course Title	**CORE JAVA**
Course Code	**USIT401**
Credits	**2**
Course Objectives	➢ To teach how to use Java Components, datatypes and operators ➢ To understand the concepts of classes, inheritance, array etc. ➢ To conceptualize multithreading, streams and event handling.
Course Outcome	➢ To learn program structure and basic concepts of java ➢ To understand and apply OOP techniques to solve real world problems. ➢ To Use and create package and interfaces in a Java program. ➢ To Implement Multithreading & exception handling techniques in java ➢ To Design GUI application using Abstract Windows Toolkit

Course Title	**INTRODUCTION TO EMBEDDED SYSTEM**
Course Code	**USIT402**
Credits	**2**
Course Objectives	➢ To understand the concept and facts behind designing the embedded system using simulation.
Course Outcome	➢ Understand the basic concepts of embedded systems ➢ Familiarise with characteristics and attributes of embedded systems, to understand memory and types of memory. ➢ Demonstrate knowledge and understanding hardware software code design techniques for microcontroller based embedded systems. ➢ Program microcontrollers in C using IDE and debugging techniques. ➢ Design, Development and planning of embedded systems based projects

Course Title	**COMPUTER ORIENTED STATISTICAL TECHNIQUES**
Course Code	**USIT403**
Credits	**2**
Course Objectives	➢ To familiarize students with basics of Statistics. ➢ To use 'R' tool for solving complex programs.
Course Outcome	➢ To learn techniques to calculate the measures of central tendency and different measures of dispersion. ➢ Understand the complementary relationship of skewness with measures of central tendency and dispersion in describing a set of data. ➢ To be able to infer information about a population from samples drawn from it. And also to make decisions about populations on the basis of sample information. ➢ To determine whether the difference between the observed and expected values is statistically significant. ➢ To learn techniques to correlate the relationship between various variables.

Course Title	**SOFTWARE ENGINEERING**
Course Code	**USIT404**
Credits	**2**
Course Objectives	➢ To understand the concept of designing a software. ➢ To understand the Software Development Life Cycle (SDLC) Phases ➢ To aware students about the software metrics and testing.
Course Outcome	➢ To learn basic concepts related to requirement engineering, different software development models, SRS document. ➢ To understand types of critical systems and learn about system models. ➢ To design and manage the software, different software architectural styles. ➢ To Verify and validate software and to estimate the cost of software. ➢ To learn about process improvement and different types of software engineering

Course Title	**COMPUTER GRAPHICS AND ANIMATION**
Course Code	**USIT405**
Credits	**2**
Course Objectives	➢ To understand the hardware structure of Computer ➢ To understand picture representation in memory so that designing graphics object become easy. ➢ To explore the ways of animation to add the same onto the created object.
Course Outcome	➢ To provide an overview of the Computer Graphics field. To describe the important input & output graphics devices. To understand applications of Computer Graphics, different Scanning techniques. ➢ Develops theory of 2D, 3D transformation and describes various types of 2D, 3D transformation. ➢ Learning the basics of 3D Viewing & projections, basics of lights and color. ➢ Deals with different algorithm for removal of hidden lines and surfaces. It tells how to design and draws smooth curves and surfaces. ➢ Overviews of animation along with its types and techniques.

T.Y.B.Sc.I.T

FIFTH SEMESTER

Course Title	**SOFTWARE PROJECT MANAGEMENT**
Course Code	**USIT501**
Credits	**2**
Course Objectives	➢ To understand the pattern behind project life cycle. ➢ To know the variations in managing the software projects.
Course Outcome	➢ To realise Project Management life cycle. To understand the various steps in Programme Management and Project Planning, nature of software development, SCRUM. ➢ To calculate the Software Effort Estimation. ➢ To do Project Planning and Risk assessment and understand the concepts and principles of software design. ➢ To think and analyse how Monitoring and Control can be implemented for various software projects. ➢ To realize the importance of Working in Teams.

Course Title	**INTERNET OF THINGS**
Course Code	**USIT502**
Credits	**2**
Course Objectives	➢ Able to design and develop IOT devices. ➢ To make use of Embedded devices, sensors, actuators and microcontrollers. ➢ To make use of ethics in characterizing Internet of things.
Course Outcome	➢ Understand the basic concepts of designing IOT devices and Internet. ➢ Understand how prototype can be created and electronic components required for creating the prototype. ➢ Understand prototyping the physical device and program on the device using online programming components and protocols ➢ Know the various techniques for writing embedded program and different business models ➢ Understand mass production of IOT devices and learn about Ethics for IOT

Course Title	**ADVANCED WEB PROGRAMMING**
Course Code	**USIT503**
Credits	**2**
Course Objectives	➢ To understand how Microsoft framework architecture designed. ➢ To design and develop console applications. ➢ To develop interactive and responsive web applications ➢ To understand the coding of remoting Interfaces
Course Outcome	➢ Students will be able to create console applications using the basic concepts, expressions, various conditional statements and loops of C#. ➢ To use and implement ASP.NET Form Fundamentals to design webforms. ➢ Students will be able to learn and implement the concepts of exception handling & State management. ➢ Students will be able to implement database drivers, and design web applications using ADO.NET. ➢ To develop web applications using XML & AJAX.

Course Title	**ARTIFICIAL INTELLIGENCE**
Course Code	**USIT504**
Credits	**2**
Course Objectives	➢ Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents. ➢ Formulate and solve problems using Bayesian approaches. ➢ Develop algorithms for constraint satisfaction problems. ➢ To attain the capability to represent various real life problem domains using logic based techniques and us this to perform inference or planning.
Course Outcome	➢ To learn the basic concepts of AI, apply concept of Natural Language processing to problem leading to understanding of cognitive computing. ➢ Analyse and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them. ➢ Design good evaluation functions and strategies for game playing. ➢ Understand the fundamentals of knowledge representation (logic-based, framebased, semantic nets), inference and theorem proving. Know how to build simple knowledge-based systems. ➢ Describe and implement several of the major approaches to classical planning, including planning graphs, POP, and propositionalization

Course Title	**ENTERPRISE JAVA**
Course Code	**USIT505**
Credits	**2**
Course Objectives	➢ To access database through Java programs, using Java Database Connectivity (JDBC) ➢ To create dynamic web pages, using Servlets and JSP. ➢ To understand the multi-tier architecture of web-based enterprise applications using EJB and develops Stateful, Stateless and Entity Beans
Course Outcome	➢ To understand the Basics of Java Programming language to achieve concurrency and multithreading for high performance ➢ To study the concepts of Request Dispatcher, Cookies, Sessions and File I/O ➢ Able to understand the concepts of Java Server Page, Expression Language and JSP Standard Tag Library. ➢ Enterprise Java Beans and Java Naming and Directory Interface and understand the basic principles of creating Java applications with graphical user interface and achieving networking capabilities. ➢ To understand the concept of Classes, object creation, exception handling mechanisms, reusability of classes etc.

SIXTH SEMESTER

Course Title	**SOFTWARE QUALITY ASSURANCE**
Course Code	**USIT601**
Credits	**2**
Course Objectives	➢ To study the concepts of Software engineering processes, methods, activities and work items are monitored. ➢ To implement various test processes for quality improvement. ➢ To design test planning ➢ To apply the software testing techniques in commercial environment
Course Outcome	➢ To understand the importance of Software Quality ➢ To understand the fundamentals of testing ➢ To compare different types of testing ➢ To analyse Software verification and Validation and V-test model ➢ To compare different levels of testing and various special tests

Course Title	**SECURITY IN COMPUTING**
Course Code	**USIT602**
Credits	**2**
Course Objectives	➢ To understand the principles and practices of cryptographic techniques ➢ To understand, compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication. ➢ To apply the knowledge of cryptographic checksums
Course Outcome	➢ To learn the basics of ITSM, Life Cycle of ITSM and principles of Service Strategy ➢ To understand fundamentals of service design, principles, processes and challenges faced during service design ➢ Understand fundamentals of service transition, principles, processes and challenges faced during service transition ➢ To learn fundamentals of service operations, principles, processes and challenges faced during service operation ➢ To understand principles, process of Continual Service Improvement and implementation of Continual Service Improvement

Course Title	**BUSINESS INTELLIGENCE**
Course Code	**USIT603**
Credits	**2**
Course Objectives	➢ To study broad category of applications and technologies for gathering, storing and analysing, sharing and providing access to data to help enterprise users make better managerial decisions. ➢ To learn the principles and best practices for how to use data in order to support fact-based decision making.
Course Outcome	➢ To understand active forms of support for decision making based on the systematic adoption of mathematical models. ➢ To understand applications of data mining and business intelligence in the fields like relational marketing, and models like salesforce planning. ➢ To understand about knowledge management and its different activities. ➢ To create the phases of a data mining process and their objectives and the activities of data preparation. ➢ To develop models using classification and clustering methods.

Course Title	**PRINCIPLES OF GEOGRAPHIC INFORMATION SYSTEMS**
Course Code	**USIT604**
Credits	**2**
Course Objectives	➢ To describe various principles of GIS ➢ To introduce various analytical tools and explain raster data structures and concepts ➢ To understand various principles of geospatial data input
Course Outcome	➢ To study Real world and its representation using GIS ➢ Understanding and managing data and Processing Systems ➢ Analyzing Spatial Referencing and Positioning, Analyzing Spatial data ➢ Implementing Maps using various reports ➢ Constructing and analysing maps based on particular area

Course Title	**CYBER LAW**
Course Code	**USIT607**
Credits	**2**
Course Objectives	➢ To study various IT Acts ➢ To understand E-Commerce Taxation and real problem in the Virtual World ➢ To study protection from Cyber Consumers
Course Outcome	➢ To learn about Power of Arrest Without Warrant Under the IT Act, 2000, Cyber Crime and Criminal justice: Penalties, Adjudication and appeals Under the IT Act, 2000. ➢ To learn about Contracts in the Infotech World and Jurisdiction in the Cyber World. ➢ Implementation of Copyright Protection in the Cyber world. ➢ E-Commerce Taxation: Real Problems in the virtual World along with Digital ➢ Signatures, Certifying Authorities and E-Governance