Maharshi Karve Stree Shikshan Samstha's

K. B. Joshi Institute of Information Technology

(*Approved by Govt. of Maharashtra, *NAAC Accredited) (Affiliated by S.N.D.T. Women's University, Mumbai)

Faculty: Science & Technology

Program Outcome Document

Program: Bachelor of Science(Information Technology)

Dr.Swati Sayankar **Prof.Rupali Saraf**

Program : Bachelor of Science (IT)
Program Code:81

Course Objective and Outcome
BSc(IT) Semester I:

Branch: B.Sc.(IT)	Semester-I
Subject Code: 1101	Lecture: 02 Credit: 02
Course Opted	Ability Enhancement Compulsory Course-I
Subject Title	Communication Skills

Course Objectives

- To make SWOT as a tool to identify Individual's and Organization's Strengths, Weaknesses, Opportunities and Threats.
- To demonstrate the fundamental concepts and methods of communication.
- To learn positive body language for better connect.
- To enable students to build strong vocabulary for effective writing and communication.
- To promote technology driven communication through Emails, telephone and Power Point presentations.
- To facilitate fluent speaking skills in social, academic and professional situations.

Course Outcomes

- SWOT analysis will help to improve personality or business by identifying and working on it
- Positive body Language will enable students to break the barrier of unfamiliarity and helps to form a better connect with the recipients of information
- Develop interpersonal skills for effective communication by understanding methods of Communication
- Enhance verbal and non-verbal communication ability through Vocabulary Building, Body language, Presentations.
- Provide with the practical skills and knowledge necessary to express themselves clearly, with confidence and power, in a variety of speaking situations.

Branch: B.Sc.(IT)	Semester-I
Subject Code: 1102	Lecture: 04 Credit: 04
Course Opted	Core Course-1 (Theory)
Subject Title	PROBLEM SOLVING USING C

Course Objectives:

- The course is designed to provide complete knowledge of C language.
- Students will be able to develop logics which will help them to create programs, applications in C.
- Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage. Able to define data types and use.
- By learning the basic programming constructs, they can easily switch over to any other language in future.
- The students will be able to develop applications

Course Outcomes:

- Students will be able to develop logic which will help them to create programs in C.
- Demonstrate an understanding of computer programming language concepts.
- Ability to design and develop Computer programs, analyze, and interpret the concept of pointers, declarations, initialization, operations on pointers and their usage.
- Able to define data types and use.
- By learning the basic programming constructs, they can easily switch over to any other language in future.
- The students will be able to develop applications
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Branch: B.Sc(IT)	Semester-I
Subject Code: 1201	Lecture: 02 Credit: 02
Course Opted	Core Course-1 (Practical)
Subject Title	PROBLEM SOLVING USING C LAB

Course Objectives:

- To enable the students to learn a programming language.
- To learn problem solving techniques
- To teach the student to write programs in C and to solve the problems.

Course Outcomes:

The student would be able

- Read, understand and trace the execution of programs written in C language.
- Write the C code for a given algorithm.
- Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor. •
- Write programs that perform operations using derived data types.

- Implement simple file operations

Branch: B.Sc.(IT)	Semester-I
Subject Code: 1103	Lecture: 04 Credit: 04
Course Opted	Core Course-2 (Theory)
Subject Title	Introduction to IT & Operating Systems

Learning outcomes:

a) To understand basic organization of computer and different computer peripherals and interfaces,

b) To define different number systems their interconversion and binary arithmetic.

c) To understand the basics of Networking

d) To understand the main components of an operating system and their functions.

e) To describe the various CPU scheduling algorithms and remove deadlocks.

f) To understand the concepts and implementation Memory management policies and virtual memory.

g) To use disk management and disk scheduling algorithms for better utilization of external memory.

Branch: B.Sc(IT)	Semester-I
Subject Code: 1202	Lecture: 04 Credit: 04
Course Opted	Core Course 2 - Practical
Subject Title	UNIX/LINUX- Operating Systems – LAB

Branch: B.Sc.(IT)	Semester-I
Subject Code: 1104	Lecture: 04 Credit: 04
Course Opted	Core Course-3 (Theory)
Subject Title	Mathematics-I

Course Objective:

- To introduce fundamental concepts of differential and applications of discrete structures and differential equations in the field of computer science
- Work with matrices and determine if a given square matrix is invertible.
- To learn about First order differential equations
- To introduce the basics of the theory of sets and some of its applications.

Learning Outcomes:

- After the completion of the course, Students will be able to
- Find the inverse of a square matrix. Solve the matrix equation Ax = b using row operations and matrix operations. Find the determinant of a product of square matrices, of the transpose of a square matrix, and of the inverse of an invertible matrix
- Will understand First order differential equations
- Will learn the basics of the theory of sets and some of its applications

Branch: B.Sc(IT)	Semester-I
Subject Code: 1105	Lecture: 02 Credit: 02
Course Opted	Skill Enhancement Course - 1
Subject Title	PRINCIPLES & PRACTICES OF ACCOUNTS

Course objective:-

- Introduces students to the world of accounting and understanding basics concepts of accounting to final account.
- The objective of the course is to strengthen the fundamentals of accounting and provide strong foundation for other accounting courses.
- It will be demonstrated how a practical understanding and interpretation of accounting reports and other accounting tools can improve decision-making in the organization.

Course Outcomes:-

- Students will be able to learn fundamental accounting concepts, Conventions & terminologies.
- Students will be able to describe the importance, functions & objectives of books of entry, subsidiary books, bank reconciliation statement and Final accounts.
- Students will be able to prepare books of entry, subsidiary books, bank reconciliation statement and Final accounts using double entry book keeping.

BSc(IT) Semester II:

Branch: B.Sc.(IT)	Semester-II
Subject Code: 2101	Lecture: 02 Credit: 02
Course Opted	Ability Enhancement Compulsory Course-II
Subject Title	Environmental Science

Course Objectives:

- To help the students to acquire knowledge of pollution and environmental degradation.

- To help students acquire knowledge of the environment beyond the immediate environment including distant environment.
- To help students acquire a set of values for environmental protection.
- To provide students with an opportunity to be actively involved at all levels in environmental decision making.

Course Outcomes:
Students will learn to

- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.

Branch: B.Sc(IT)	Semester-II
Subject Code: 2102	Lecture: 04 Credit: 04
Course Opted	Core Course -4
Subject Title	PROGRAMMING METHODOLOGY AND C++

Course Objectives:

- To understand how C++ improves C with object-oriented features.
- To learn how to design C++ classes for code reuse.
- To learn how to implement copy constructors and class member functions.
- To understand the concept of data abstraction and encapsulation.
- To learn how to overload functions and operators in C++.
- To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
- To learn how to design and implement generic classes with C++ templates.

Course Outcomes:

- Students will be able to
- Describe the object-oriented programming approach in connection with C++
- Apply the concepts of object oriented programming
- Analyze a problem and construct a C++ program that solves it
- Discover errors in a C++ program and describe how to fix them
- Illustrate the process of data file manipulations using C++

Branch: B.Sc(IT)	Semester-II
Subject Code: 2201	Lecture: 02 Credit: 02
Course Opted	Core Course -4 Practical
Subject Title	PROGRAMMING METHODOLOGY AND C++ LAB

Course Objectives:

- Will enable students to
- Identify and practice the object-oriented programming concepts and techniques

- Practice the use of C++ classes and class libraries, arrays, vectors, inheritance and file I/O stream concepts.
- **Course Outcomes**:

Students will be able to:

- Create simple programs using classes and objects in C++.
- Implement Object Oriented Programming Concepts in C++.
- Develop applications using stream I/O and file I/O.
- Implement simple graphical user interfaces.
- Implement Object Oriented Programs using templates and exceptional handling

Branch: B.Sc.(IT)	**Semester-II**
Subject Code: 2103	**Lecture: 04** **Credit: 04**
Course Opted	**Core Course- 5(Theory)**
Subject Title	**Data Structures using 'C'**

Branch: B.Sc(IT)	**Semester-II**
Subject Code: 2202	**Lecture: 02** **Credit: 02**
Course Opted	**Core Course -5 Practical**
Subject Title	**Data Structures using 'C' LAB**

Course Objectives:

- To introduce the concepts of data structures including arrays, linked list, stack and queues.
- To design and implement various data structure algorithms.
- To introduce various techniques for representation of the data in the world.
- To create programs using data structure algorithms and also techniques of sorting and searching.

Course Outcomes:

- Select appropriate data structures as applied to specified problem definition.
- Implement operations like traversing, insertion, deletion and searching etc. on various data structures.
- Students will be able to implement linear and non - linear data structures.
- Implement appropriate sorting and searching techniques for given problems.

Branch: B.Sc.(IT)	**Semester-II**
Subject Code: 2104	**Lecture: 04** **Credit: 04**
Course Opted	**Core Course- 6**
Subject Title	**Mathematics II**

Course Objective:

The subject aims to provide the student with:

- Mathematics fundamental necessary to formulate, solve and analyze computer science problems.
- An understanding of Fourier Series and Laplace Transform to solve real world problems.
- An understanding of numerical methods.
- An understanding of Complex integration.

Course Outcomes:

The student will be able to

- Analyze and solve computer science problems
- Understand the applications of Fourier Series and Laplace Transform to solve real world problems
- Apply numerical methods to find solutions of algebraic equations using different methods viz. Bisection method, Regula - Falsi, Newton Raphson's, Ramanujan's method, Matrix Inversion and Gauss Elimination
- Understand Complex Integration

Branch: B.Sc.(IT)	Semester-II
Subject Code: 2105	Lecture: 02 Credit: 02
Course Opted	Skill Enhancement Course - 2
Subject Title	Technical Writing

Course Objectives

- To emphasis need and importance of Technical Communication
- To acquaint with process of Technical Writing
- To introduce various user guides
- To introduce the concept of Translation and Localisation
- To understand the importance of working environment

Course Outcomes

- Understand the process of Technical Writing
- Understand Various User Guides
- Aware about the concepts of Translation and Localization
- Aware about the Working environment required for technical writing
- Writing Project Proposal, Software Project Documentation and Report writing

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3101	Lecture: 04 Credit: 04
Course Opted	Core Course – 7
Subject Title	DATABASE MANAGEMENT SYSTEMS

Course Objectives:

- To introduce the concept of database management systems

- Learn to organize, maintain and retrieve information efficiently and effectively from a database management system
- To present the concepts and techniques relating to query processing by SQL
- To introduce the concepts of transactions and transaction processing
- To present the issues and techniques relating to concurrency and recovery in multiuser database environments

Course Outcomes:

The student would be able to

- Understand the Concept of database approach.
- Understand database architecture and data modeling, data Normalization.
- Design and draw ER and EER diagram for real life problem.
- Understand the commands of SQL.
- Understand the concept of transaction, concurrency and recovery.

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3201	Lecture: 02 Credit: 02
Course Opted	Core Course Practical – 7
Subject Title	DATABASE MANAGEMENT SYSTEMS – LAB

Course Objectives:

- Understand, appreciate and effectively explain the underlying concepts of database technologies

Course Outcomes:

- Design and implement a database schema for a given problem-domain
- Normalize a database
- Populate and query a database using SQL DML/DDL commands.
- Programming SQL including stored procedures, stored functions, cursors, packages.

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3102	Lecture: 04 Credit: 04
Course Opted	Core Course – 8
Subject Title	JAVA PROGRAMMING

Course Objectives:

- To make students aware of various OOP concepts and their implementations.
- To enable students to install and use various versions of JAVA & some of its editors.
- To enable students to write, compile, run & debug java programs using core java language.
- Implementation of various OOP entities like classes, objects, inheritance etc. using java.
- To learn JAVA dealing with GUI & IO devices.
- Learning advanced Java features like Generics, Multi-Threading, Autoboxing etc.

Course Outcomes:

- Basic knowledge of programming in JAVA.
- Experience with developing and debugging software in Java.
- Developing software skills for developing real world applications using Java Programming language.

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3202	Lecture: 02 Credit: 02
Course Opted	Core Course Practical - 8
Subject Title	JAVA PROGRAMMING - LAB

Course Objectives:

- To make students aware of various OOP concepts and their implementations.
- To enable students to install and use various versions of JAVA & some of its editors.
- To enable students to write, compile, run & debug java programs using core java language.
- Implementation of various OOP entities like classes, objects, inheritance etc. using java.
- To learn JAVA dealing with GUI & IO devices.
- Learning advanced Java features like Generics, Multi-Threading, Autoboxing etc.

Course Outcomes:

- Basic knowledge of programming in JAVA.
- Experience with developing and debugging software in Java.
- Developing software skills for developing real world applications using Java Programming language.

Branch: B.Sc.(IT)	Semester-III
Subject Code: 3103	Lecture: 04 Credit: 04
Course Opted	Core Course - 9
Subject Title	COMPUTER NETWORKS

Course Objectives:

- To study TCP/IP & OSI protocol suites
- To develop an understanding of computer networking basics
- Learn how computer network hardware and software operate
- Investigate the fundamental issues of network design
- To develop an understanding of different components of computer networks, various protocols, modern technologies and their application
- Students will be able to describe and execute network administrator duties and utilities.

Course Outcomes:

- Characterize and appreciate computer networks from the view point of components and from the view point of services
- Display good understanding of the flow of a protocol in general and a network protocol in particular
- Model a problem or situation in terms of layering concept and map it to the TCI/IP stack
- Select the most suitable Application Layer protocol (such as HTTP, FTP,

SMTP, DNS, Bit torrent) as per the requirements of the network application and work with available tools to demonstrate the working of these protocols.
- Design a Reliable Data Transfer Protocol and incrementally develop solutions for the requirements of Transport Layer.
- Recognize transport layer services and infer UDP and TCP protocols
- Classify routers, IP and Routing Algorithms in network layer
- Describe the essential principles of Network Layers and use IP addressing to create subnets for any specific requirements
- Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
- Describe Networking and Network Management
- To understand various protocols for network security to protect against the threats in the networks.

Branch: B.Sc.(IT)	**Semester-III**
Subject Code: 3104	**Lecture: 04** **Credit: 04**
Course Opted	**Core Course - 10**
Subject Title	**COMPUTER ORGANISATION AND ARCHITECTURE**

Course Objectives:

- To give a basic understanding of concepts and structure of computers.
- To understand the organization of Cache memory and memory management hardware.
- To study the working of different interrupts & Mapping Techniques.
- To study register organization.
- To understand the different addressing modes.
- To demonstrate the working of central processing unit and RISC and CISC Architecture.

Course Outcomes:

- To describe basic structure of the computer system.
- To demonstrate the arithmetic algorithms for solving ALU operations.
- To demonstrate the memory mapping techniques.
- To Identify various types of buses, interrupts and I/O operations in a computer system
- Learn the concepts of parallel processing, pipelining and inter-processor communication.
- Exemplify the I/O and memory organization.

Branch: B.Sc.(IT)	**Semester-IV**
Subject Code: 4101	**Lecture: 04** **Credit: 04**
Course Opted	**Core Course - 11**
Subject Title	**ADVANCED JAVA**

Course Objectives:

- Development of GUI programs using Swing
- Use power of advance Java for building Applications using Database connectivity

Course Outcomes:

- Developing GUI based applications
- Database Connectivity
- Advanced Java such as Servlets, JSP and Java Beans

Branch: B.Sc.(IT)	Semester-IV
Subject Code: 4201	Lecture: 02 Credit: 02
Course Opted	Core Course - 11
Subject Title	ADVANCED JAVA LAB

Course Objectives:

- To write programs using swing.
- To write programs for solving real world problems using java collection frame work.
- To write servlet and JSP programs.
- To write GUI programs using swing controls in Java.
- To impart hands on experience with java programming.

Course Outcomes:

- Able to write programs for solving real world problems using java collection frame work.
- Able to write programs using swing, JSP, JDBC and Servlet.
- Able to write GUI programs using swing controls in Java.

Branch: B.Sc.(IT)	Semester-IV
Subject Code: 4102	Lecture: 04 Credit: 04
Course Opted	Core Course - 12
Subject Title	PYTHON PROGRAMMING

Course Objectives:

- To understand the fundamentals of Python Scripting language
- Learn basic components of Python such as variables, looping and conditional flow controls
- Understand the working of list, tuples and dictionary data types
- Learn python file operations for file handling
- Learn the creating GUI form and designing of GUI applications

Course Outcomes:

- To understand importance of Python scripting language for developers and Data Scientists.
- To learn to install Python IDE, start the Python shell
- To define and implement components of a Python program.
- To learn how to use lists, tuples, and dictionaries in Python programs
- To learn how to use functions
- To implement GUI application and layout management

Branch: B.Sc.(IT)	Semester-IV
Subject Code: 4202	Lecture: 02 Credit: 02
Course Opted	Core Course - 12
Subject Title	PYTHON PROGRAMMING LAB

Course objectives:

- To learn Installation of Python interpreter
- To understand python basic syntax and data types
- To implement variable declarations in Python
- To use control structures
- To learn modules

Course Outcomes:

- Able to use the fundamental Python syntax.
- Able to handle strings and functions.
- Able to write programs using control and conditional structure
- Able to create and run Python programs by utilizing the data structures like lists,
- Able to use dictionaries, tuples and sets.

Branch: B.Sc.(IT)	Semester-IV
Subject Code: 4103	Lecture: 04 Credit: 04
Course Opted	Core Course - 13
Subject Title	DATA WAREHOUSING AND DATA MINING

Course Objectives:

- Understand the necessity of Data Warehousing and its continuous growth.
- Understand Planning and Management of Data Warehouse.
- Understand issues in various Architectural types of Data warehouse.

- Understand the application of various models of Data Warehouse.
- Understand the web-enabled data warehouse and role of data mining

Course Outcomes:

On completion of the course the student will be able to

- Decide the type of Data warehouse to build.
- Perform Requirement gathering and Design suitable architecture for Data warehouse project.
- Design and prepare data for Data warehouse using ETL tools
- Build web-enabled data warehouse
- Analyze and Apply Data Mining techniques on real life applications
- Demonstrate phases in data warehouse development life cycle with Data warehouse project.

Branch: B.Sc.(IT)	**Semester-IV**
Subject Code: 4104	**Lecture: 04** **Credit: 04**
Course Opted	**Core Course – 14**
Subject Title	**SOFTWARE ENGINEERING**

Course Objectives:

- To learn and understand the principles of Software Engineering
- To be acquainted with methods of capturing, specifying, visualizing and analyzing software requirements.
- To apply Design and Testing principles to S/W project development.
- To understand project management through life cycle of the project.
- To understand software quality attributes.

Course Outcomes:

- Decide on a process model for a developing a software project
- Classify software applications and identify unique features of various domains
- Design test cases of a software system.
- Understand basics of IT Project management.
- Plan, schedule and execute a project considering the risk management.
- Apply quality attributes in software development life cycle.

Branch: B.Sc.(IT)	**Semester-V**
Subject Code: 5101	**Lecture: 04** **Credit: 04**
Course Opted	**Core Course – 15 (Theory)**
Subject Title	**MOBILE APPLICATION DEVELOPMENT**

Course Objectives:

- To facilitate students to understand android SDK
- To help students to gain a basic understanding of Android application development
- To inculcate working knowledge of Android Studio development tool

Course Outcomes:

At the end of this course, students will be able to:

- Identify various concepts of mobile programming that make it unique from programming for
- other platforms,
- Critique mobile applications on their design pros and cons,
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- Program mobile applications for the Android operating system that use basic and advanced
- phone features, and
- Deploy applications to the Android marketplace for distribution.

Branch: B.Sc.(IT)	**Semester-V**
Subject Code: 5201	**Lecture: 04** **Credit: 04**
Course Opted	**Core Course – 15 (Practical)**
Subject Title	**MOBILE APPLICATION DEVELOPMENT -LAB**

Course Objectives:

- To facilitate students to understand android SDK
- To help students to gain a basic understanding of Android application development
- To inculcate working knowledge of Android Studio development tool

Course Outcomes:

At the end of this course, students will be able to:

- Identify various concepts of mobile programming that make it unique from programming for
- other platforms,
- Critique mobile applications on their design pros and cons,
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- Program mobile applications for the Android operating system that use basic and advanced
- phone features, and
- Deploy applications to the Android marketplace for distribution.

Branch: B.Sc.(IT)	**Semester-V**

Subject Code: 5102	Lecture: 02 Credit: 02
Course Opted	Core Course – 16
Subject Title	INTERNET OF THINGS

Course objectives:

- To understand general concepts of Internet of Things (IoT)
- To learn and understand the Sensing, Actuation, Networking basics, Communication Protocols
- To understand applications of Internet of Things

Course Outcomes:

After successful completion of this course, student will be able to

- Understand general concepts of Internet of Things (IoT)
- Recognize various devices, sensors and applications
- Analyze various M2M and IoT architectures (Analyze)
- Understand various IOT applications

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5103	Lecture: 04 Credit: 04
Course Opted	Core Course - 17
Subject Title	INTERNET SECURITY

Course Objectives:

- Introducing the arena of Internet security & related concepts to the students.
- To understand various concepts related to data confidentiality.
- To expertise the art of Cryptography & various related techniques.
- To learn implementation of digital signature & digital signature certificate.
- To learn various authentication mechanism.
- To learn about various internet security protocols.
- Learning about firewall, its various configurations & implementation.
- Real world case studies.

Course Outcomes:

- Complete understanding of various threats faced by the Internet and related services.
- Protection against cyber-attacks by implementing various security protocols.
- Understanding nature of various cyber-attacks & developing defences against such attacks.

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5104	Lecture: 02 Credit: 02
Course Opted	Skill Enhancement Course - 3
Subject Title	GREEN COMPUTING

Course Objectives:

- At the end of the course, the students will be able to
- Understand concept of Green IT.
- Necessity of Go Green
- Comprehend Green IT from the perspective of hardware, software, storage, and networking

Course Outcomes:

At the end of the course, the students will be able to

- Create awareness among stakeholders and promote green initiatives in their environments leading to a green movement.
- Acquire knowledge about energy efficiency, IT assets disposal, carbon footprint
- Contribute to eco-friendly environment.

Branch: B.Sc.(IT)	**Semester-V**
Subject Code: 5105	**Lecture: 04** **Credit: 04**
Course Opted	**Discipline Specific Elective - 1**
Subject Title	**SOFTWARE TESTING**

Course objectives:

- To learn objectives of Software Testing
- To understand verification and validation
- To understand different testing methods
- To design test plan and test cases
- To understand text execution with the help of tools

Course Outcome:

After successful course completion students will able to

- Understand software testing life cycle
- Understand defects and its life cycle
- Understand various testing strategies
- Design manual test cases for software
- Execute testing using tools

Branch: B.Sc.(IT)	**Semester-V**
Subject Code: 5106	**Lecture: 04** **Credit: 04**
Course Opted	**Discipline Specific Elective - 2**
Subject Title	**DIGITAL MARKETING**

Course Objectives:

- To understand the concept of Digital Marketing.
- To familiarize students with the specific knowledge in the areas of Digital marketing.
- To understand the concept of E Commerce.
- To learn best practices, tools, and techniques of SEO.
- To understand how to use it for branding and sales.

Course Outcomes:

- Understand emerging trends in digital marketing.
- Understand the importance of conversion and working with digital relationship marketing.
- Explore different modes of Social Media marketing.
- Understand the tools of SEO and SEM.
- Become familiar with the elements of the digital marketing plan

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5107	Lecture: 04 Credit: 04
Course Opted	Discipline Specific Elective - 3
Subject Title	NETWORK PROGRAMMING

Course Objectives:

- To explore protocols that underlie the Internet, such as TCP/IP and UDP/IP
- To learn how Java's core, I/O API handles network input and output
- Discover how the InetAddress class helps Java programs interact with DNS
- To write servers and network clients, using Java's low-level socket classes
- To manage many connections at the same time with the nonblocking I/O
- To locate, identify, and download network resources with Java's URI and URL classes
- Diving deep into the HTTP protocol, including REST, HTTP headers, and cookies

Course Outcomes:

- Understanding concept of establishing client & server connections.
- Learning methods of Locating, identifying, and downloading network resources with Java's URI and URL classes
- Understanding creation of network applications using Java Programming language.

Branch: B.Sc.(IT)	Semester-VI
Subject Code: 6101	Lecture: 04 Credit: 04
Course Opted	Core Course -18
Subject Title	INTELLIGENT PROPERTY RIGHTS AND CYBER LAWS

Course Objectives:

- To make students aware of Intellectual Properties & its various components.
- To make students understand the basic exclusive rights granted by IPR and their legal acquisition.
- To elaborate the concept of Infringement & remedies against IPR infringement.
- To clear the concepts of Licensing & Assignment of IPR.
- Informing students about various International Treaties & obligations.
- Clearing the concepts about law, cyber law & cyber jurisprudence.
- To make students aware of E-commerce, digital contracts & digital signature.
- To make student aware about use of ICT in governance i.e. E-governance.

- To teach IT act 2000 & relevant laws.

Course Outcomes:

- Complete knowledge about different IPs & exclusive rights granted by them.
- Legal remedies in case of IPR infringement.
- Introducing Cyber Jurisprudence.
- Knowledge about Implementation of E-Commerce & E-Governance & relevant laws in India.
- Understanding the menace of cybercrimes & its legal remedies.
- Complete knowledge of IT Act 2000.

Branch: B.Sc.(IT)	Semester-VI
Subject Code: 6102	Lecture: 04 Credit: 04
Course Opted	Core Course -19
Subject Title	ENTERPRISE RESOURCE PLANNING

Course Objectives:

- To provide a contemporary and forward-looking on the theory and practice of Enterprise Resource Planning Technology.
- To focus on a strong emphasis upon practice of theory in Applications and Practical oriented approach.
- To develop the basic understanding of how ERP enriches the business organizations in achieving a multidimensional growth.
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Course Outcomes

- Make basic use of Enterprise software, and its role in integrating business functions
- Analyze the strategic options for ERP identification and adoption.
- Design the ERP implementation strategies.
- Create reengineered business processes for successful ERP implementation.

Branch: B.Sc.(IT)	Semester-VI
Subject Code: 6103	Lecture: 04 Credit: 04
Course Opted	Core Course -20
Subject Title	ETHICAL HACKING

Course Objectives:

- To learn system hacking methodology, steganography, steganalysis attacks, and covering tracks to discover system and network vulnerabilities.
- To learn about different types of malwares (Trojan, Virus, worms, etc.), system auditing for malware attacks, malware analysis, and countermeasures.
- Learning Packet sniffing techniques to discover network vulnerabilities and countermeasures to defend sniffing. Social engineering techniques and how to identify theft attacks to audit human level vulnerabilities and suggest social engineering countermeasures.

- To learn DoS/DDoS attack techniques and tools to audit a target and DoS/DdoS countermeasures.
- To learn Session hijacking techniques to discover network-level session management, authentication/authorization, cryptographic weaknesses, and countermeasures.
- To learn about Web server attacks and a comprehensive attack methodology to audit vulnerabilities in web server infrastructure, and countermeasures.

Course Outcomes:

- Better understanding of pitfalls in network & system security.
- Testing network security and its various entities by attacking the target network.
- Network security engineers capable of dealing with real world security threats.

Branch: B.Sc.(IT)	Semester-VI
Subject Code: 6104	Lecture: 04 Credit: 04
Course Opted	Discipline Specific Elective -4
Subject Title	MACHINE LEARNING

Course Objectives

- To introduce various statistical and machine learning concepts and methods.
- To introduce machine learning solutions to regression, classification and clustering problems.
- To evaluate and interpret the results of algorithm.

Learning Outcomes

- Perform end-to-end process of investigating data through a machine learning lens.
- Extract and identify best features of data.
- Evaluate the performance of machine learning algorithms.

Branch: B.Sc.(IT)	Semester-VI
Subject Code: 6105	Lecture: 04 Credit: 04
Course Opted	Discipline Specific Elective -5
Subject Title	BLOCK CHAIN TECHNOLOGY

Course Objectives :

- Understand how blockchain systems (mainly Bitcoin and Ethereum) works.
- To securely interact with them.
- Design, build, and deploy smart contracts and distributed applications.
- Integrate ideas from blockchain technology into their own projects.

Course Outcomes:

- Interact with a blockchain system by sending and reading transactions.
- Evaluate security, privacy, and efficiency of a given blockchain system.

- Students are able to understand design principles of Bitcoin and Ethereum.
- Learn about Bitcoin, Cryptocurrency, Ethereum
- Identify a use case for a Blockchain application

Branch: B.Sc.(IT)	Semester-VI
Subject Code: 6106	Lecture: 04 Credit: 04
Course Opted	Discipline Specific Elective -6
Subject Title	CLOUD COMPUTING

Course Objectives:

- To understand the concepts of Cloud Computing.
- To learn Taxonomy of Virtualization Techniques.
- To learn Cloud Computing Architecture.
- To acquire knowledge on Cloud Application Platform.
- To learn Industry Cloud Platforms.

Course Outcomes:

- Understand the concept of virtualization and how this has enabled the development of Cloud Computing
- Know the fundamentals of cloud, cloud Architectures and types of services in cloud.
- Understand scaling, cloud security and disaster management.
- Design Different Applications in Cloud.
- Explore some important cloud computing driven commercial systems.

Branch: B.Sc.(IT)	Semester-VI
Subject Code: 6201	Lecture: 04 Credit: 04
Course Opted	Core Course – 21
Subject Title	PROJECT

Objective:

The Project work enables students to involve themselves completely to develop their project for solving problems of software industry or any research organization. Doing this will give more exposure to students to handle real life problems of project development. The project covers study of existing system & System Requirements, Analysis, Design and Coding and presentation of result to demonstrate proficiency in the design of research