B.Sc. Computer Science (Integrated)

Program Outcomes and Course Outcomes

Program Outcome(s): Students / graduates will be able to

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems.

PO2: Generate solutions by conducting experiments and applying techniques to analyze and interpret data

PO3: Design component, or processes to meet the needs within realistic constraints.

PO4: Identify, formulate, and solve problems using computational temperaments.

PO5: Comprehend professional and ethical responsibility in computing profession.

PO6: Express effective communication skills.

PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Actual hands on technology to understand it's working.

PO9: Knowledge of contemporary issues and emerging developments in computing profession.

PO10: Utilize the techniques, skills and modern tools, for actual development process

PO11: Function effectively as an individual and as a member in diverse teams and in multidisciplinary settings in actual development

PO12: Research insights and conduct research in computing environment.

Course Outcome(s):

Every individual course under this program has course objectives and course outcomes (CO).

The course objectives rationally match with program educational objectives.

B.Sc. Computer Science (Integrated) FirstYear

Sr.No.	Course Title	CSO	CO
1	Basic of Computer Science **(BCS-101)**	Through this paper Student should learn basic principles of computer. The paper is designed to aim at importing basic level of Computer.	• To learn Basic Function of Devices like I/O, HDD etc. • To Understand the Fundamental of Software and Hardware. Understand the Concept of Operating System and Network.
2	Introduction to Programming Language using C – (Part-I) **(BCS-102)**	It is general purpose and procedure oriented programming language. In which we are able to develop OS and MAC operating system, application software and programming languages. Programming Language are also used to build students logic for programming.	• To study of structure of programming languages, structure of c program. • To study different keyword for making program. • To develop programs using operators and control statement. To describe an array. Student are able to develop application software.
3	Web Technologies **(BCS-103)**	• To improve the skill to create the static web page. • To develop the ability to create the dynamic web pages. • To enhance the ability of Insert a graphic within a web page. • To improve the skills to Create, validate and publish a web page.	Design and implement dynamic websites with good aesthetic sense of designing
4	Elective: Office Automation **(BCS-104-A)**	The main objective of Office Automation is to • Enhance and upgrade the existing system by increasing its efficiency and effectiveness. • It will simplify the task and reduce the paper work means the software improves the working methods by replacing the existing manual system with the computer-based system.	Understand the computer software, hardware, made available to simplify and automate a variety of office operations such as data processing, data manipulating and data presentation with various application those are presents in Microsoft office tools packages.
5	Elective: Fundamental of Digital Electronics **(BCS-104-B)**	• To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronic circuits. • To prepare students to perform the analysis and design of various digital electronic circuits.	• Can have a thorough understanding of the fundamental concepts and techniques used in digital electronics. • To understand and examine the structure of various number systems and its applications in digital design. • The ability to understand, analyze and design various combinational and sequential circuits. • To develop skill to build and troubleshoot digital circuits

6	Open Elective: Communication skills **(BCS-105-B)**	• To make a comprehensive use of English in day-to-day life. • To help Students develop the ability to learn and contribute critically. • To develop the writing skills of the students. • To help the students to understand the basic usages of English.	• Understand and demonstrate Basic English usages for their different purposes. • Clear entrance examination and aptitude tests. • Write various letters, reports required for professional life.
7	Operating Systems **(BCS-201)**	• To introduce basic concepts and functions of modern operating systems. • To understand the concept of process and thread management. • To understand the scheduling of processes and threads. • To understand various Memory Management techniques.	• Fundamental understanding of the role of Operating Systems. • To understand the various memory management techniques • To apply the cons of process/thread scheduling • To understand the concept of a process and thread.
8	Introduction to Programming Language Using C Part – 2 (**BCS-202)**	It is general purpose and procedure oriented programming language. In which we are able to develop OS and MAC operating system, application software and programming languages. Programming Language are also used to build students logic for programming.	To describe a function, storage classes, structure, union, string and functions, Pointers, File Handling, Student are able to develop application software.
9	Database Management Systems (**BCS-203)**	To have basic understanding of database management system components	students will be able to think of ER modelling and creation of own database schema
10	Elective – Desktop Publishing (**BCS-204A)**	This course will provide students the opportunity to learn to use basic features of desktop publishing software to create all types of publications: flyers, brochures, newsletters, and advertisements. Included in the course will be basic page layout and design principles and integrating text and graphics to create attractive business publications. The course will be taught with Adobe InDesign	• Create personal documents such as business cards and resumes. • Create business documents such as flyers and advertisements. Create a newsletter with graphics and draw objects. • Create a course project illustrating Desktop Publishing techniques.
11	Elective – 8085 Microprocessor (**BCS-204B)**	• To understand basic architecture of 8-bit Microprocessor. • To understand interfacing of 8085 Microprocessor with peripherals and Memory.	• To understand CICS and RISC based Microprocessor. • To understand techniques for faster execution of instruction and increase speed of operation of 8085 Microprocessor. • Write programs to run 8085 Microprocessor based system.

12	Open Elective: Communication skills **(BCS-205-B)**	• A comprehensive use of English in day-to-day life. • To help Students develop the ability to learn and contribute critically. • To develop the writing skills of the students. • To help the students to understand the basic usages of English.	• Understand and demonstrate Basic English usages for their different purposes. • Clear entrance examination and aptitude tests. • Write various letters, reports required for professional life.

B.Sc. Computer Science (Integrated) Second Year

Sr.No.	Course Title	CSO	CO
1	Object Oriented Programming **(BCS-301)**	• To understand how C++ improves C with object-oriented features. • To learn the syntax and semantics of the C++ programming language. • Apply the concepts of object-oriented programming • To learn how to define classes using inheritance to promote code reuse in C++. • Illustrate the process of data file manipulations using C++ • Learn syntax, features of Standard Template Library and how to utilize it.	• Ability to explain the difference between object oriented programming and procedural programming concepts. • Ability to program using object oriented features such as inheritance and polymorphism,operator overloading, dynamic memory allocation, file I/O, exception handling, etc • Ability to apply object oriented techniques to solve computing problems.
2	Computer Network **(BCS-302)**	• Introduction fundamental concepts of computer networking. • Introduce students with various concepts used in network • Introduce various technologies and standards • Allow the student to gain expertise in areas of networking	• Understand basic computer network technology. • Students can identify the different types of network topologies and protocols. • Students can Identify the different types of network standards
3	Data Structures and Algorithm **(BCS2-303)**	• To teach the basic concepts of data structures and algorithms • To understand concepts about searching and sorting techniques • To understand basic concepts about stacks, queues, lists, trees and graphs • To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures	• Ability to analyze algorithms and algorithm correctness. • Ability to summarize searching and sorting techniques • Ability to describe stack, queue and linked list operation. • Ability to have knowledge of tree and graphs concepts.
4	Discrete Mathematics **(BCS-304-A)**	• Students will develop problem-solving & critical thinking skills & use these skill to solve complex computational problems	• Apply mathematical foundation to the discipline of Computer Science
5	Mathematical Technique in Computer Science (MTCS)	• Knowledge, skill & understanding develop understanding & fluency in mathematics through inquiry, exploring & connecting mathematical concept choosing & applying problem – solving	• Able to use standard mathematical techniques to solve elementary problem. • Understand the nature of mathematical proof & be able to write clear & concise proof.

	(BCS-304 B)	• skills.	
6	(Open Elective) Numerical Abilities **(BCS-305B)**	• To enhance the problem solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.	• Solve mathematical problems using analytical methods; • Solve mathematical problems using computational methods; • Students can develop design and analyze numerical techniques to approximate solutions to problems .
7	Programming in JAVA **(BCS-401)**	• To learn the basic concepts of java programming • To understand how to use programming in day to day applications • Knowledge of object-oriented paradigm in the Java programming language, • The use of Java in a variety of technologies and on different platforms.	• The knowledge of the structure and model of the Java programming language. • To use the Java programming language for various programming technologies • To develop software in the Java programming language.
8	Software Engineering (**BCS-402)**	• To develop software engineering skills and testing plans. • To understand system concepts and its application in Software development. • To enhance skills of designing and testing software. • To learn technical skills to assure production of quality software.	• Ability to learn various methods of software development • Ability to apply various software testing techniques
9	Relational Database Management Systems(**BCS-403)**	• To understand the features of Relational database. • To describe data models and schemas in DBMS. • To use SQL- the standard language of relational databases for database operations. • To understand the functional dependencies and design of the databases.	• To study the basic concepts of relational databases • Learn and practice data modeling using the entity-relationship and developing database designs. • Understand the use of Structured Query Language (SQL) and learn SQL syntax for writing queries. • Apply normalization techniques to normalize the databases.
10	(Elective) Principle of Compiler Design **(BCS-404A)**	• To understand overall design of compiler with their types and phases. • To understand the basic concept of essential syntactic elements and identifying those elements.	• One can easily construct the recognizer system for language constructs as a input. • Understanding context free grammar. • Understanding various parsing techniques and intermediate code.
11	(Elective) Essentials of computer security **(BCS-404B)**	• To understand basic principles of computer security • To understand various design approach of computer security	• To develop a basic understanding of cryptography • To develop a basic understanding of security policies.

		• To understand various standards of computer security	• To develop a basic understanding of authentication and access control • To determine mechanism for protecting information
12	(Open Elective) Logical Reasoning **(BCS-405)**	• Understand and explain the importance of critical thinking • Identify the core skills associated with critical thinking • Construct a logically sound and well reasoned argument • Demonstrate the difference between deductive and inductive reasoning	• Identify logical relations among statements. • Analyse logically complex statements into their truth functional or quantificational components • This enable students to develop their ability to reason by introducing them to elements of formal reasoning

B.Sc. Computer Science (Integrated) Third Year

Sr.No.	Course Title	CSO	CO
1	Windows Programming **(BCS-501)**	• To learn and understand basic concepts of Windows Programming. • To learn basic C# programming. • To understand and work on desktop application development using C#.Net. • To expose students to current applications C#.Net	• Review the fundamental concepts of Windows Programming in C#.Net • Evaluate the logic of different programming concepts. • Evaluate the techniques of application development in windows environment. • To develop database connectivity application. • To evaluate different techniques to develop windows applications.
2	Python (**BCS-502)**	• To understand why Python is a useful scripting language for developers. • To define the structure and components of a Python program. • To understand programming constructs in Python. • To acquire Object Oriented Skills in Python • To develop the ability to write database applications in Python	• Write programs using Python programming constructs. • Design and Develop applications using Python programming. • Design object oriented programs with Python classes. • Use exception handling in Python applications for error handling. • Design and Develop applications connecting with database.
3	Data Science **(BCS-503)**	• To learn and understand fundamental concepts of Data Science • To learn basic Data Science operations. • To understand and work on different algorithms for Data Science • To expose students to current applications and opportunities in Data Science emerging • field.	• Review the fundamental concepts of Data Science • Evaluate the techniques for better Data Science understanding. • Evaluate the techniques for perfect Data Analysis • To develop applications/algorithms in the field of Data Science • To evaluate different Data Science techniques & tools
4	Software Testing **(BCS-504A)**	• To develop software testing skills and test plans execution skills. • To understand software testing techniques and its application in Software development.	• Ability to learn various methods of software development. • Ability to apply various software testing techniques.

		• To enhance skills of designing and testing software. • To learn technical skills required for quality assurance of software.	• Ability to evaluate cost of software testing. • Ability to implement different software testing according to types of software
5	(Elective)Basics of Linux **(BCS-504B)**	• This course shall build a platform for students to start their own enterprise • for Making Student Job Ready • To become familiar with open source software and user interface. • To securely handle OS without any viruses and malwares. • For easily use free software available on internet. • To understand the basic operating system command. • To understand the basic concept of Linux operating system	• Awareness of existing demanding trends in IT industry in order to get placement & research in open source market. • Understand the Linux OS architecture. • Install and use different types of distributions available in market. • Understand the different Linux basic commands.
6	(Elective) System analysis and Design **(BCS-505B)**	• System analysis helps in discovering means to design systems. • System analysis helps in discovering sub-system may have apparently conflicting objectives. • It helps in achieving inter compatibility and unity of purpose of sub-systems. • It offers a means to create understanding of the complex structures • It helps to understand writing system proposals, system development scheduling, and cost-benefits analysis etc. also dealing with quality assurance	• To learn basic things of systems, System development Life cycle, and System Analyst. • To determine specific needs of system. • Discuss approaches and tasks of system. Planning for developing system • Evaluate tools and techniques. • Use appropriate methods and techniques to design software. • Implementation of Developed System, Evaluation and Testing of system
7	Mobile Application Development **(BCS-601)**	• This course shall build a platform for students to start their own enterprise • For Making Student Job Ready • To gain an understanding of the processes that are involved in an Android developed application • To become familiar with Android development tools and user interface. • To understand Activity and Intends • To understand SQLite Database.	• Awareness of existing demanding trends in IT industry in order to get placement & research • Understand the Android OS architecture. • Install and use appropriate tools for Android development, including IDE, device emulator, and profiling tools. • Understand the Android application architecture, including the roles of the task stack, activities, & services.

		• To Understand Web view control • Ability to build Many simple apps that you can share with your friends	• Build user interfaces with fragments, views, form widgets, text input, lists, tables, and more.
8	Fundamentals of Inage Processing **(BCS-602)**	• To learn and understand fundamental concepts of digital image processing. • To learn basic image processing operations. • To understand and work on different image analysis Algorithms • To expose students to current applications of digital image processing system.	• Review the fundamental concepts of digital image processing system. • Evaluate the techniques for image enhancement. • Evaluate the techniques for Image restoration. • To develop color based image processing applications. • To evaluate different filtering method.
9		•	•
10	(Elective) Softrware Process Management **(BCS-604A)**	• To acquire knowledge on software process management • To acquire managerial skills for software project development. • To understand software economics	• Analyze software process maturity, its framework and the reference models • Understand the Capability Maturity Model and learn about conventional software management. • Understand how to manage software projects and project planning. • Analyze project tracking and control. • Understand the role of project closure analysis.
11	(Elective) Linux Administration **(BCS-604B)**	• This course shall build a platform for students to start their own enterprise • For Making Student Job Ready • To become familiar with open source software and user interface. • To securely handle OS without any viruses and malwares. • For easily use free software available on internet. • To understand the basic operating system command. • To understand the basic concept of Linux operating system administration	• Awareness of existing demanding trends in IT industry in order to get placement & research in open source market. • Understand the Linux OS architecture. • Install and use different types of distributions available in market. • Understand the different Linux administration commands.
12	(Open Elective) Network Essentials **(BCS-605)**	• To understand the basics of wireless voice and data communication technologies. • To study about the wireless communication Techniques. • To understand different routing algorithms.	• Evaluate the usability of mobile devices such as smart phones. • Select appropriate network technologies in commercial and enterprise applications.

		• To understand security and privacy issues in wireless environments.	• Assess the capabilities of next generation networks and role of network technologies.

B.Sc. Computer Science (Integrated) Third Year

Program Outcome (PO)

B.Sc. Optional Computer Science (3years) program / degree is a general B.Sc. program where students opt computer science as one of the optional subject. It builds the student on studies in computer science tools and techniques and to become competent in the current race in computer science and development. The duration of the study is of six semesters, which is normally completed in three years.

B.Sc. Computer Science (Integrated) Third Year

Sr.No.	Course Title	CSO	CO
1	Programming Logic Concepts Paper-I OCS-101	• To develop understanding of problem solving using computers • To develop understanding of basic data structures such as arrays	• Student will be able to design algorithms to solve different problems • Student will understand how to solve problems using computers
2	Designing of web pages using HTML **Paper -II OCS-102**	• Develop skills in analyzing the usability of a web site. • Understand how to plan and conduct user research related to web usability. • Learn techniques of responsive web design, including media	• Be able to use the HTML programming language • Understand the principles of creating an effective web page.
3	Introduction to Data Structure Paper-III OCS-103	• To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs and writing programs for • these solutions. • Able to write well-structured procedure-oriented programs	• To develop application using data structures. • Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching etc.
4	Programming in C language OCS-104	• The course aims to provide exposure to problem-solving through programming. • It aims to train the student to the basic concepts of the C-programming language.	• Course is designed to provide complete knowledge of *C* language to develop logics which will help them to create programs, applications in C. • Introduces the more advanced features of the *C* language.
5	Operating System Paper-VI OCS-201	• To learn fundamentals of Operating System, • To understand the structure and organization of the file System, • To learn mechanism of OS.	Students will be able to the basic components of a computer Operating System.
6	Object oriented programming using C++ Paper-VII OCS-202	• To understand how C++ improves C • To learn OOPS concepts • To learn how to design C++ classes for code reuse.	Upon compilation of this course, students will able to do programming independently and will also be able to built small applications.

7	Skill enhancement course (A) I Programming using SCILAB	To learn basic functioning in SCILAB.	Students will be able to understand the main features of the SCILAB program development environment, to implement simple mathematical functions/equations in numerical computing environment such as SCILAB.
8	Skill enhancement course (B) PC installation and Networking	The course is designed to build practical skills in Assembling & maintenance of the personal desktop computer, installation of operating system and software's as well as to setup the network.	Students would have knowledge of computer hardware and peripherals, their installation, PC assembly, trouble shooting.
9	Computer Network Paper – VIII OCS-205	Understanding basics of computer networking, connectivity techniques and related protocols. This introduces the students to computer networks and concentrate on building a firm foundation for understanding data communication.	Students would be able to chose, escalate and establish a computer network
10	Java Programming Paper-IX OCS-206	• To learn why Java is useful for the design of desktop and web applications. • To learn how to implement object-oriented designs with Java. • To identify Java language components and how they work together in applications.	• Use Java integrated development environment to write, compile, run, and test simple object-oriented Java programs. • Further, they would be able to make elementary modifications to Java programs that solve real-world problems.
11	Skill Enhancement Course II Introduction to Web Application OCS-208A	The course is designed to build practical skills of development of web applications. Learn how to setup a quick and easy website with the new free Google sites.	Knowledge of website development and design specialization
12	Skill Enhancement Course II Digital	The course is designed to build practical skills in the creation and publication of digital technologies.	Student will be able to use essential skills for digital media

	Media Concepts OCS-208B		
13	Software Engineering Paper-XII OCS-301	• Understand Software Engineering Process. • Understand Requirements and components of Software Engineering. • Understand software design and software testing fundamentals	Confidence of becoming a Software developer in order to get placement as well research activities
14	Programming in Visual Basic Paper-XIII OCS-302A	• To learn Graphical User Interface Language. • To develop an application using GUI Language. • Implement VB programs to solve simple problems.	Confidence of becoming a Software developer in order to get placement as well as in research activities.
15	Advanced JAVA programming Paper-XIII OCS-302-B	• To understand the Graphics and Applet programming • To give the knowledge on basics concepts of multithreading programming. • To understand web-based programming.	To encourage the students to develop web-based applications
16	Skill Enhancement Course III System Security OCS-303A	• The course covers fundamental issues and first principles of security and information assurance. • The course will look at the security policies, models and mechanisms related to confidentiality, integrity, authentication, identification, and availability issues related to information and information systems.	• Candidates are expected to possess in-depth knowledge of formal modelling techniques for secure computer systems • Candidates have advanced knowledge of common vulnerabilities, attack mechanisms, and methods against computer and information systems
17	Skill Enhancement Course III Data Science OCS-303B	1. The key objective of Data Science is to extract valuable information for use in strategic decision making, product development, trend analysis, and forecasting. •	• Students will develop relevant programming abilities. • Students will demonstrate proficiency with statistical analysis of data. Students will develop the ability to build and assess databased models. Students will execute statistical analyses with professional statistical software.
18	Software Testing Paper-IV OCS-304	Software testing is one of the important phases in software development. Before the software is deployed to customer, it should be testing on various aspects. So that any kind of execution, interface, security etc issue	Set the basic path to students towards becoming a Software Professional.

		should be generated while user works with software. Hence Software Testing Professional is a important designation in Software development Industry. 1. Understand Software Testing Process 2. Understand Various types of software testing 3. Understand how to handle testing process	
19	Relational Database Management system Paper-XV(A) OCS-305	• To teach fundamental concepts of RDBMS • To teach database management operations	• Knowledge of RDBMS • Knowledge about the Use of SQL & PL/SQL for RDBMS
20	Skill Enhancement Course IV Website Development OCS-306A	Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice. Develop skills in analysing the usability of a web site. Understand how to plan and conduct user research related to web usability. Learn the language of the web: HTML and CSS.	Simple and impressive design techniques, from basics till advanced to focus on goal oriented and user centric designs. How to and where to start research, planning for website & actually build excellent web sites. To create web elements like buttons, banners & Bars and of course complete UI designs. Forms and validations for your website. Setting up page layout, color schemes, contract, typography in the designs.
21	Skill Enhancement Course IV Image processing softwares OCS-306B	• Describe and explain basic principles of digital image processing. • Design and implement algorithms that perform basic image processing (e.g., noise removal and image enhancement) • Design and implement algorithms for advanced image analysis (e.g., image compression, image segmentation & image representation), • Aassess the performance of image processing algorithms and systems.	• Understand the need for image transforms different types of image transforms and their properties. • Develop any image processing application. • Understand the need for image compression and to learn the spatial and frequency domain techniques of image compression.

M.Sc. Computer Science (Integrated)

Program Outcomes and Course Outcomes

Program Outcome(s): Students / graduates will be able to

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems.

PO2: Generate solutions by conducting experiments and applying techniques to analyze and interpret data

PO3: Design component, or processes to meet the needs within realistic constraints.

PO4: Identify, formulate, and solve problems using computational temperaments.

PO5: Comprehend professional and ethical responsibility in computing profession.

PO6: Express effective communication skills.

PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Actual hands on technology to understand it's working.

PO9: Knowledge of contemporary issues and emerging developments in computing profession.

PO10: Utilize the techniques, skills and modern tools, for actual development process

PO11: Function effectively as an individual and as a member in diverse teams and in multidisciplinary settings in actual development

PO12: Research insights and conduct research in computing environment.

Course Outcome(s):

Every individual course under this program has course objectives and course outcomes (CO).

The course objectives rationally match with program educational objectives.

M.Sc. Computer Science First Year

Sr.No.	Course Title	CSO	CO
1	Computer Architecture and Microprocessor CS-101	• To develop Understanding of Internal Architecture of Computer • To aware students about Basics of Microprocessor & Assembly Language Programming	• Students will acquire skill of Assembly Language programming using 8086 Microprocessor • Student will be familiar with Internal Processing of Computers
2	OOP Concepts using C++ CS-102	• To aware the students with the concept of Object oriented concepts • To master students in advanced programming languages faster which is useful for foundation of software development.	• Students will have the conceptual knowledge of Object Oriented programming. • This course will create foundation for student to learn other Object Oriented Programming Languages such as C++.
3	Mathematical Foundations for Computer Science CS-103	Cultivate clear thinking and creative problem solving. Thoroughly train in the construction and understanding of mathematical proofs. Exercise common mathematical arguments and proof strategies.	At the end of the course student will be able to Understand the notion of mathematical thinking, mathematical proofs and to apply them in problem solving. Ability to understand use of functions, graphs and their use in programming applications. Apply discrete structures into computing problems, formal specification, artificial intelligence, cryptography, Data Analysis.
4	Relational Database Management System CS-104A	• To understand the features of Relational database. • To describe data models and schemas in DBMS. • To use SQL- the standard language of relational databases for database operations. • To understand the functional dependencies and design of the databases.	• To study the basic concepts of relational databases • Learn and practice data modelling using the entity-relationship and developing database designs. • Understand the use of Structured Query Language (SQL) and learn SQL syntax for writing queries. • Apply normalization techniques to normalize the databases.
5	Computer Network CS-104B	To understand the basic concepts of computer network and firm foundation for understanding how data communication occurring using computer network. It is based around the OSI Reference Model which deals with the major issues and related protocol studies in the various layers (Physical, Data Link, Network, Transport, Session, Presentation and Application) of the model.	• Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies; • Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols; • Analyze,specify and design the topological and routing strategies for an IP based networking infrastructure

			• Have a working knowledge of datagram and internet socket programming
6	Lab-I : C++ CS-105	• Get hands on experience with C++ Programming. • 2. Write and execute program logic in C++	• Confidence in C++. • Students will be skilled to learn fundamentals of advanced internet programming languages
7	Lab-2 : ALP using 8086 Microprocessor CS-106	• Get hands on experience with Assembly Language Programming. • Write and debug programs in TASM/MASM/hardware kits	• Lab work will skill to apply the fundamentals of assembly level programming of microprocessors. • Students will be skilled to learn fundamentals of designing embedded systems
8	Open Elective Introduction to E-Commerce CS-107-B	• Students gets the knowledge of the currently working e commerce websites.	• Students will get the knowledge of the e commerce websites , payment systems etc.
9	Skill Enhancement Activity SK-01 PC Assembly and maintenance	• Practically understand the PC and surrounding peripherals	• The student will assemble / setup and upgrade personal computer systems; install OS and other application software, diagnose and isolate faulty components; optimize system performance and install / connect peripherals.
10	Design and analysis of algorithm CS-201	• To understand the concept of designing an algorithm. • To learn advance algorithm techniques that are related to real life problem.	• This course will aware the implementation of various advance algorithms to solve real world problem • Students will be skilled to select appropriate design techniques to solve various problems problem
11	Software Engineering CS-202	• To develop software engineering skills and testing plans. • To understand system concepts and its application in Software development	• Learn various methods of software development. • Apply various software testing techniques.
12	Programming with VB.Net CS-203	• To provide the knowledge of .Net framework along with VB.Net language • To skill the students for developing windows base applications.	• Students will able to develop simple as well as complex applications using .Net framework • Students will learn to use web applications for creating GUI based programs.
13	Advanced Operating systems CS-204A	• To learn the mechanisms of OS to handle processes and threads and their communication • To learn the advanced mechanisms involved in process , file and memory management in contemporary OS	• Students will be able to Analyze the structure of OS and basic architectural components involved in OS design • Students will be able to Conceptualize the components involved in designing a contemporary OS

14	Compiler Design CS-204B	• Describe the design of a compiler including its phases and components. • To explore the students step by step conversion of Source program into Object code	• To realize the students basics of compiler design and apply for real time applications. • Students will get knowledge about compiler generation tools and techniques
15	Open Elective Information Technology 207-A	• Introduce students to foundation of Information technology	• Understand basic concepts in IT and their use in actual working
16	Skill Based Activity SK-02 Networking Essentials	• Networking Essentials deals with knowing what is a network, how to install, configure, and troubleshoot a computer network It includes knowledge of the fundamental building blocks that form a modern network, such as various cables, switches, routers, connectors, LAN-NIC cards and network operating systems.	• It provides in-depth coverage of the most important concepts in contemporary networking like connecting computers/ peripherals, servers and clients, Wi-Fi connectivity, etc. Students are expected to have the skills to build a network / LAN from scratch and maintain, upgrade, and troubleshoot an existing network.

M.Sc. Computer Science Second Year

Sr.No.	Course Title	CSO	CO
1	Advanced Database Administration CS-301	• To Introduce the students physical and Logical Structure of database • To aware the students the role of the database administrator	• Students Will be able to explain and evaluate the fundamental theories and requirements that influence the design of modern database systems. • Students can analyze the background processes involved in queries and transactions, and explain how these impact on database operation and design
2	Web Technologies CS-302	• To aware the Students with advanced web technology • To develop a skill to write applications using PHP and Java Script	• Students Will be Students are able to develop a dynamic webpage by the use of PHP and java script. • student will be able to develop a web application using PHP and java script.
3	Data mining and Data Warehousing CS-303	• To identify the scope and essentiality of Data Warehousing and Mining. • To analyze data, choose relevant models and algorithms for respective applications.	• Students Will be Understand Data Warehouse fundamentals, Data Mining Principles. • Identify appropriate data mining algorithms to solve real world problems
4	Artifitial Intelligence CS-304A	• To provide students of with comprehensive and in-depth knowledge of AI principles and techniques by introducing AI's fundamental problems • To expose students to the frontiers of AI-intensive computing and information systems	• Students will be able to compare AI with human intelligence and traditional information processing and discuss its strengths and limitations as well as its application to complex and human-centered problems. • Students Will be able to apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems.
5	Mobile Application Development CS-304B	• To quickly get you up to speed with writing apps for Android devices. • The student will learn the basics of Android platform and get to understand the application lifecycle	• Student will be able to write simple GUI applications. • Students will be also able to use built-in widgets and components, work with the database tostore data locally
6	Research Methodology CS-304C	• To introduce research and research methodologies in CS to students going to peruse research in CS. • To understand the strengths and weakness of each of different research methods.	• Students Will be demonstrate knowledge of research processes (reading, evaluating, and developing), Perform literature reviews using print and online databases.

7	Cyber Security CS-307B	• To get knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks. • To understand key terms and concepts in cyber law, intellectual	• Students will understand principles of web security. • Students will understand key terms and concepts in cyber law, intellectual property and cybercrimes, trademarks and domain theft.
8	Skill based Activity Seminar Based Presentation CS-308	• To help the student increase self-motivation, personal responsibility, and understanding of his or her role in being an informed participant in the educational process. • To develop a Stage Courage for putting his concepts strongly in front of the audience.	• Help the student increase self-motivation, personal responsibility, and understanding of his or her role in being an informed participant in the educational process. • Create an environment that helps the student establish healthy relationships and support networks.
9	Digital Image Processing CS-401	• To study the image fundamentals and mathematical transforms necessary for image processing. • To study the image enhancement, image restoration procedures and image compression techniques.	• Students will be Analyze images in the frequency domain using various transforms. • Evaluate the techniques for image enhancement and image restoration and also categorize various compression techniques.
10	Linux Administration CS-402	• To describe the relationship between GNU and Linux • To describe various operating system concepts such as multitasking, virtual memory and multiuser environments as they apply to Linux.	• Students will be able carry the duties of a Unix system administer. • Students will learn to do file processing, process management, IO management, queues management, networking, storage backup, account management, proper system start-up and shutting down, as well as other tasks.
11	Major Project Development Activity CS-403	• To provide a postgraduate level knowledge in computer science, including understanding, analysis, management, and handling of real-life information technology problems in workplace.	• Project based learning will increase their capacity and learning through shared cognition. Students will have an ability to identify, formulate and implement computing solutions. Students will be able to design a system, component or process as per needs and specification.
12	Client Server Technology CS-404A	• To understand the different components for developing client/server applications. • To understand the enabling technologies for building Internet and Web database applications.	• Gain Exposure on most common used servers. • Understand the concept of client-server development and learn problem solving skills through design scenarios for network environment.
13	Software Testing Tools CS-404B	• The student should be made to expose the criteria for test cases. • Learn the design of test cases and be familiar with test management and test automation techniques.	• At the end of the course the students will be able to Design test cases suitable for a software development for different domains.

			• Identify suitable tests to be carried out and prepare test planning based on the document.Document test plans and test cases designed and Use of automatic testing tools.
14	Logical Reasoning and Quantitative Aptitude CS-407	• To acquire the skill to solve the problems on Logical Reasoning • To acquire the skill to solve the problems on Quantitative Aptitude	• Understand the basic concepts of QUANTITATIVE ABILITY and LOGICAL REASONING Skills, acquire satisfactory competency in use of VERBAL REASONING and Solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability
15	Skill based Activity Seminar Based Presentation CS-408	• Soft skill Necessary for IT recruitment and further studies so students should have knowledge of it.	• Student will get knowledge of interpersonal skills , entrepreneurial skills etc.

M.Sc. Computer Science First Year (As per NEP 2020) from year 2023-24

Sr.No.	Course Title	CSO	CO
1	SCMPSC-401 Computer Architecture and Microprocessor	• To develop Understanding of Internal Architecture of Computer. • To aware students about Basics of Microprocessor & Assembly Language Programming	• Students will acquire skill of Assembly Language programming using 8086 Microprocessor • Student will be familiar with Internal Processing of Computers..
2	SCMPSC-402 Python Programming	• To understand why Python is a useful scripting language for developers. • To define the structure and components of a Python program. • To understand programming constructs in Python. • To acquire Object Oriented Skills in Python • To develop the ability to write database applications in Python	• Write programs using Python programming constructs. • Design and Develop applications using Python programming. • Design object oriented programs with Python classes. • Use exception handling in Python applications for error handling. • Design and Develop applications connecting with database
3	SCMPSC-403 Advanced Java	• To Design and build robust and maintainable web applications. • To create dynamic HTML content with Servlets and Java Server Pages, using the JSP Standard Tag Library (JSTL). • To Make Servlets and JSP work together cleanly.	• Create dynamic and interactive web sites and interaction with client and server. • Do server side programming with java Servlets and JSP. • Implement different data structure using collection framework
4	SCMPSE-401A Data Analytic with Power BI	• Identify the primary components of the Power BI interface: reports, data, and model views ii. Import Excel data and build basic visuals	• Publish a desktop report to the Power BI Service • Identify common challenges in Power BI data models, implement smart solutions, and avoid common mistakes
5	SCMPSE-401B Statistical Method	• To inspire knowledge across different areas in Statistics and Actuarial Science. • To impart knowledge on Statistical concepts like Data Collection, Measures of Central Tendency and Dispersion, Probability and Distributions, Statistical Methods, Inference, Sampling methods, Experimental Designs, Economical and Vital Statistics, SQC, reliability and Operations Research. • To impart knowledge on Actuarial Science concepts like basics of Economics, Financial Accounting and	Understand the have the basic knowledge on data collection and various statistical elementary tools. ii. Have the critical thinking in the theory of probability and its applications in real life problems

		Mathematics, Surviving models, life contingences, Business communication, Actuarial Statistics , Mortality and Insurance,	
6	SCMPSE-401C Web Technology	• To impart basic Web Designing skills. • To provide the in-depth knowledge about Static and Dynamic Web Designing and make them ready for designing such websites • Develop the modern Web applications using the client and server side technologies and the web design fundamentals	• Describe the concepts of WWW including browser and HTTP protocol. • List the various HTML tags and use them to develop the user friendly web pages. • Define the CSS with its types and use them to provide the styles to the web pages at various levels. • Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications. • Use the JavaScript to develop the dynamic web pages. • Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
7	SVECR-401 Research Methodology	• The main objective of this course is to introduce the basic concepts in research methodology in Social science. • This course addresses the issues inherent in selecting a research problem and discuss the techniques and tools to be employed in completing a research project. • This will also enable the students to prepare report writing and framing Research proposals.	• Students who complete this course will be able to understand and comprehend the basics in research methodology and applying them in research/ project work. • This course will help them to select an appropriate research design. • With the help of this course, students will be able to take up and implement a research project/ study. • The course will also enable them to collect the data, edit it properly and analyse it accordingly. • Thus, it will facilitate students' prosperity in higher education. • The Students will develop skills in qualitative and quantitative data analysis and presentation. • Students will be able to demonstrate the ability to choose methods appropriate to research objectives.
8	SCMPSC-451 Mobile Application Development with Kotlin	Android Application Development course is designed to quickly get you up to speed with writing apps for Android devices. The student will learn the basics of Android platform and get to understand the application lifecycle	: By the end of the course, student will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more.

		•	
9	SCMPSC-452 Cloud Computing	• To provide students with the fundamentals and essentials of Cloud Computing. • To provide students a sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios. • To enable students exploring some important cloud computing driven commercial systems and applications. • To expose the students to frontier areas of Cloud Computing and information systems, while providing sufficient foundations to enable further study and research.	• Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. • Apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency and cost. • Identify resource management fundamentals, i.e. resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing. • Analyze various cloud programming models and apply them to solve problems on the cloud
10	SCMPSC-453 NoSQL with MongoDB	• Define, compare and use the four types of NoSQL Databases (Document-oriented, Key Value Pairs, Column-oriented and Graph). • Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases. • Explain the detailed architecture, define objects, load data, query data and performance tune Document-oriented NoSQL databases.	• Define, compare and use the four types of NoSQL Databases (Documentoriented, KeyValue Pairs, Column-oriented and Graph). • Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases. • Explain the detailed architecture, define objects, load data, query data and performance tune Document-oriented NoSQL databases. • Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Key-Value Pair NoSQL databases. • Explain the detailed architecture, define objects, load data, query data and performance tune Graph NoSQL databases. • Evaluate NoSQL database development tools and programming languages. • Perform hands-on NoSql database lab assignments that will allow students to use the four NoSQL

			database types via products such as Cassandra, Hadoop Hbase, MongoDB, Neo4J and Riak.
11	SCMPSE-451A Data Structure	• To teach the basic concepts of data structures and algorithms • ii. To understand concepts about searching and sorting techniques • iii. To understand basic concepts about stacks, queues, lists, trees and graphs • iv. To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures	• Ability to analyze algorithms and algorithm correctness. • Ability to summarize searching and sorting techniques • Ability to describe stack, queue and linked list operation. • Ability to have knowledge of tree and graphs concepts.
12	SCMPSE-451B Software Testing	• The student should be made to expose the criteria for test cases. • Learn the design of test cases and be familiar with test management and test automation techniques.	• At the end of the course the students will be able to Design test cases suitable for a software development for different domains. • Identify suitable tests to be carried out and prepare test planning based on the document. • Document test plans and test cases designed and Use of automatic testing tools.
13	SCMPSE-451C PHP and MySQL	• Learn Core-PHP, Server Side Scripting Language. • Learn to design dynamic and interactive Web pages. • Learn PHP-Database handling.	• Able to design dynamic and interactive web pages, websites. • Able to run PHP scripts on server and retrieve results. • Able to handle databases like MySQL using PHP in web sites.

M.Sc. Information Technology

Program Outcomes and Course Outcomes

Program Outcome(s): Students / graduates will be able to

PO1: Apply knowledge of mathematics, science and algorithm in solving Computer problems.

PO2: Generate solutions by conducting experiments and applying techniques to analyze and interpret data

PO3: Design component, or processes to meet the needs within realistic constraints.

PO4: Identify, formulate, and solve problems using computational temperaments.

PO5: Comprehend professional and ethical responsibility in computing profession.

PO6: Express effective communication skills.

PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.

PO8: Actual hands on technology to understand it's working.

PO9: Knowledge of contemporary issues and emerging developments in computing profession.

PO10: Utilize the techniques, skills and modern tools, for actual development process

PO11: Function effectively as an individual and as a member in diverse teams and in multidisciplinary settings in actual development

PO12: Research insights and conduct research in computing environment.

Course Outcome(s):

Every individual course under this program has course objectives and course outcomes (CO). The course objectives rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below

M.Sc. Information Technology First Year

Sr.No.	Course Title	CSO	CO
1	Basics of IT and Networking IT-101	The goal is to provide all the program, date and hardware is available to everyone on the network without regard to the physical location of the resource and the users.	• Have a good understanding of the OSI Reference Model and in particular have a good knowledge of Layers 1-3. • Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;
2	Database Management System IT-102	The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS	Identify what students will know and be able to do if they master the material. At the end of this class, the successful student will: have a broad understanding of database concepts and database management system software. have a high-level understanding of major DBMS components and their function.
3	Foundation of programming using C++ IT-103	The focus of all learning activities in the course is to build students' conceptual and practical skills in building software projects in the C++ programming language to reasonably advanced level. This will involve analysis, design and implementation of solutions to programming problems.	To practically students able to do programs in object oriented using C++
4	Operating system concepts IT-104A	To learn the fundamentals of Operating Systems - To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols - To gain insight on to the distributed resource management components viz.	A student understands of design issues associated with operating systems. Masters various process management concepts including scheduling, synchronization, deadlock. Be familiar with multithreading
5	Data structures and algorithm IT-104B	To assess how the choice of data structures and algorithm design methods impacts the performance of programs. ... To solve problems using data structures such as linear lists, stacks, queues, hash tables, binary trees, heaps, binary search trees, and graphs and writing programs for these solutions.	Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching.
6	Communication Skills-I IT-107B	• To make a comprehensive use of English in day-to-day life. • To help Students develop the ability to learn and contribute critically.	• Understand and demonstrate Basic English usages for their different purposes. • Clear entrance examination and aptitude tests.
7	Skill Based Activity PC Assembly and maintenance IT-108	• Practically understand the PC and surrounding peripherals.	• The student will assemble / setup and upgrade personal computer systems • install OS and other application software, diagnose and isolate faulty components; optimize system performance and install / connect peripherals.

8	Web Design and Development It-201	Develop skills in analyzing the usability of a web site. Understand how to plan and conduct user research related to web usability. Learn the language of the web: HTML and CSS. Learn techniques of responsive web design, including media queries.	This course will introduce you to the realm of web design website development, reflective report, collaborative website development, website
9	Relational DBMS IT-202	The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.	At the end of this class, the successful student will: have a broad understanding of database concepts and database management system software. have a high-level understanding of major DBMS components and their function.
10	Software Engineering IT-203	Understanding on quality control and how to ensure good quality software. Learning Outcomes: . Basic knowledge and understanding of the analysis and design of complex systems. Ability to develop maintains and evaluates large-scale software systems.	Basic knowledge and understanding of the analysis and design of complex systems. Ability to apply software engineering principles and techniques.
11	VB.Net IT-204A	Apply fundamental programming concepts, using an object oriented programming language, to solve substantial problems. Understand basic types and the benefits of static typing for object oriented programs. Understand the basics of event-driven programming, and its use in constructing GUI applications. Programming approaches that avoid common coding errors	Understand basic Structure of the VB.Net, declaration and usage of variables. Programming languages draw their foundations from mathematical logic. To familiarize the students with language environment. To implement various concepts related to language.
12	C#.Net IT-204B	Apply fundamental programming concepts, using an object oriented programming language, to solve substantial problems. Understand basic types and the benefits of static typing for object oriented programs. Understand the basics of event-driven programming, and its use in constructing GUI applications. Programming approaches that avoid common coding errors	Understand basic Structure of the C#.Net, declaration and usage of variables. Programming languages draw their foundations from mathematical logic. To familiarize the students with language environment. To implement various concepts related to language.
13	ASP.Net IT-204C	Apply fundamental programming concepts, using an object oriented programming language, to solve substantial problems. Understand basic types and the benefits of static typing for object oriented programs. Understand the basics of event-driven programming, and its use in constructing GUI applications. Programming approaches that avoid common coding errors	Understand basic Structure of the ASP.Net, declaration and usage of variables. Programming languages draw their foundations from mathematical logic. To familiarize the students with language environment. To implement various concepts related to language.
14	Communication Skills-II IT-207B	• A comprehensive use of English in day-to-day life. • To help Students develop the ability to learn and contribute critically.	• Understand and demonstrate Basic English usages for their different purposes. • Clear entrance examination and aptitude tests.

		• To develop the writing skills of the students.	• Write various letters, reports required for professional life.
15	Skill Based Activity SK-02 Network Essentials IT-208	• Networking Essentials deals with knowing what is a network, how to install, configure, and troubleshoot a computer network • It includes knowledge of the fundamental building blocks that form a modern network, such as various cables, switches, routers, connectors, LAN-NIC cards and network operating systems.	• It provides in-depth coverage of the most important concepts in contemporary networking like connecting computers/ peripherals, servers and clients, Wi-Fi connectivity, etc. • Students are expected to have the skills to build a network / LAN from scratch and maintain, upgrade, and troubleshoot an existing network. Technology like 4G, 5G etc

M.Sc. Information Technology First Year

1	Information Security Management IT-301	• To Understand need of information Security in digital era. • To understand types of security. • To Understand different types of threats to security • To understand security planning	• At the end students will understand need of security, it types and various threat to security. • Also, students will understand various security measures and how to secure the information from threats.
2	Programming in JAVA IT-302	• To learn why Java is useful for the design of desktop and web applications. • To learn how to implement object-oriented designs with Java. • To identify Java language components and how they work together in applications. • To design and program stand-alone Java applications.	• Identify classes, objects, members of a class and relationships among. them needed for a specific problem. • Write Java application programs using OOP principles and proper program structuring
3	Software Testing IT-303	• To learn detection of bugs and performance issues in software. • Understanding to develop and run test plans. • Learn testing tools to detecting quickly bugs and error to smarter testing. • To work with various software testing methods.	• Determines the correctness, completeness and quality of software being developed. • Technical documentation is well organized using testing.
4	Computer Graphics IT-304A	• To introduce the use of the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them.To learn the basic principles of 3-dimensional computer graphics. • Provide an understanding of how to scan convert the basic geometrical primitives, how totransform the shapes to fit them as per the picture definition. • Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections. To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization.	• To list the basic concepts used in computer graphics. • To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.To describe the importance of viewing and projections, Understand a typical graphics pipeline • To define the fundamentals of animation, virtual reality and its related technologies.
5	Digital Image Processing IT-304B	• To learn fundamental concepts of Digital Image Processing,to study basic image processing operations. • To understand image analysis algorithms	• Review the fundamental concepts of a digital image processing system, Analyze images in the frequency domain using various transforms.

		• To expose students to current applications in the field of digital image processing	• Evaluate the techniques for image enhancement and imagerestoration, Categorize various compression techniques. • Interpret Image compression standards, Interpret image segmentation and representation techniques.
6	Logical Reasoning IT-307B	• Understand and explain the importance of critical thinking • Identify the core skills associated with critical thinking • Construct a logically sound and well reasoned argument • Demonstrate the difference between deductive and inductive reasoning	• Identify logical relations among statements. • Analyse logically complex statements into their truth functional or quantificational components • This enable students to develop their ability to reason by introducing them to elements of formal reasoning
7	Seminar Presentation Activity IT-308	• To help the student increase self-motivation, personal responsibility, and understanding of his or her role in being an informed participant in the educational process. • To develop a Stage Courage for putting his concepts strongly in front of the audience.	• Help the student increase self-motivation, personal responsibility, and understanding of his or her role in being an informed participant in the educational process. • Create an environment that helps the student establish healthy relationships and support networks.
8	Mobile Communication IT-401	• To understand the basics of wireless voice and data communication technologies. • To study about the wireless communication Techniques, to understand measurement and performance of mobile and wireless system. • To understand security and privacy issues in wireless environments.	• Evaluate the usability of mobile devices such as smart phones. • Select appropriate wireless technologies in commercial and enterprise applications. • Assess the capabilities of next generation networks and role of mobile technologies.
9	Introduction to scripting language IT-402	• The principles of scripting languages,Motivation for and applications of scripting • Difference between scripting languages and non-scripting languages. • Types of scripting languages.	• Ability to create and run scripts in design flow. • Ability to use and write programs for automation of scripts
10	Major Project Development Activity IT-403	To provide a postgraduate level knowledge in computer science, including understanding, analysis, management, and handling of real-life information technology problems in workplace. Students are encouraged to problems from real life / NGO/ / state-central govt projects/ hackathon/ etc	Project based learning will increase their capacity and learning through shared cognition. Students will have an ability to identify, formulate and implement computing solutions. Students will be able to design a system, component or process as per needs and specification.
11	Linux Administration IT-404A	• This course shall build a platform for students to start their own enterprise • For Making Student Job Ready	• Awareness of existing demanding trends in IT industry in order to get placement & research in open source market.

		• To become familiar with open source software and user interface. • To securely handle OS without any viruses and malwares. • For easily use free software available on internet. • To understand the basic operating system command. To understand the basic concept of Linux operating system administration	• Understand the Linux OS architecture. • Install and use different types of distributions available in market. Understand the different Linux administration commands.
12	Mobile Application Development IT-404B	• This course shall build a platform for students to start their own enterprise • For Making Student Job Ready, to gain an understanding of the processes that are involved in an Android developed, application, to become familiar with Android development tools and user interface. • To understand Activity and Intends,& SQLite Database. Web view control, Ability to build Many simple apps that can be shared with mobile users.	• Understand the Android OS architecture. • Install and use appropriate tools for Android development, including IDE, deviceemulator, and profiling tools. • Understand the Android application architecture, including the roles of the task stack, activities, & services. Build user interfaces with fragments, views, form widgets, text input, lists, tables, andmore.
13	Numerical Aptitude IT-407B	• To enhance the problem solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.	• Solve mathematical problems using analytical methods; • Solve mathematical problems using computational methods; • Students can develop design and analyze numerical techniques to approximate solutions to problems .
14	Skill Based Activity Soft Skills IT-408	• Soft skill Necessary for IT recruitment and further studies so students should have knowledge of it.	• Student will get knowledge of interpersonal skills , entrepreneurial skills etc.