

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

Re-accredited by NAAC with 'A' Grade – 3.64 CGPA out of 4 (3rd Cycle)

College of Excellence (UGC)

Coimbatore – 641 029

DEPARTMENT OF COMPUTER SCIENCE (Aided)

COURSE OUTCOMES (CO)

B.Sc. COMPUTER SCIENCE

For the students admitted

In the

Academic Year 2018-2019

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS101		Core Paper 1 – COBOL Programming		
Batch 2018-2019	Semester I	Hours / Week 4	Total Hours 60	Credits 4

Course Objectives

1. To make use of COBOL programming in business, finance, and administrative systems.
2. To identify the four divisions of COBOL program and describe their purpose.
3. To construct conditions to execute procedures within a COBOL program.
4. To recognize similarities and common characteristics of two or more programming languages.

Course Outcomes (CO)

K1	CO1	Understand the syntax and semantics of the COBOL language
K2	CO2	Recognize how to develop and implement a program in the COBOL language
K3	CO3	Develop various forms of data representation and structures supported by the COBOL language
K4	CO4	Appreciate the appropriate applications (typically business) of the COBOL language

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCSICL		Title: Core Practical 1 – COBOL Programming - Lab		
Batch 2018-2019	Semester I	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. To expose different features of COBOL language and implement them.
2. To learn the fundamental concepts of four Divisions.
3. To understand Input and Output Statements.
4. To develop programs relevant to business applications.

Course Outcomes (CO)

K1	CO1	Study the logical structure of a computer program and to develop programs in COBOL language.
K2	CO2	Understand Control structures.
K3	CO3	Learn how to compile, debug, link and executing COBOL programs.
K4	CO4	Demonstrate practical applications of programs developed in COBOL.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS202		Core Paper 2 – C Programming		
Batch 2018-2019	Semester II	Hours / Week 4	Total Hours 60	Credits 4

Course Objectives

1. To impart adequate knowledge on the need of programming languages and problem solving techniques.
2. To develop an in-depth understanding of functional and logical concepts of C Programming.
3. To provide exposure to problem-solving through C programming.
4. To familiarize the basic syntax and semantics of C Language

Course Outcomes (CO)

K1	CO1	Recollect various programming constructs and to develop C programs.
K2	CO2	Understand the fundamentals of C programming.
K3	CO3	Choose the right data representation formats based on the requirements of the problem.
K4	CO4	Implement different Operations on arrays, functions, pointers, structures, unions and files.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS2CM		Core Practical 2 – C Programming - Lab		
Batch 2018-2019	Semester II	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. To introduce the field of programming using C language.
2. To enhance the analyzing and problem solving skills and use the same for writing programs in C.

Course Outcomes (CO)

K3	CO1	Develop programming skills using the fundamentals and basics of C Language.
K3	CO2	Develop programs using the basic elements like control statements, Arrays and Strings
K4	CO3	Enable effective usage of arrays, structures, functions and pointers.
K5	CO4	Implement files and command line arguments.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS303		Core Paper 3 – Computer Organization and Architecture		
Batch 2018-2019	Semester III	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To educate the basics of computer hardware and how software interacts with computer hardware.
2. To familiarize with different numbering methods like binary, octal, and hexadecimal.
3. To impart the knowledge of buses, I/O devices, flip flops, Memory and bus structure.
4. To understand the concepts of memory hierarchy and compare different methods for computer architecture.

Course Outcomes (CO)

K1	CO1	Remember basic structure of computer and numbering methods like binary, octal and hexadecimal and explain how arithmetic and logical operations are performed by computers.
K2	CO2	Understand various data transfer techniques in digital computer and control unit operations.
K3	CO3	Apply performance issues in processor and memory design of a digital computer various data representations.
K4	CO4	Analyze architectures and computational designs and computer architecture concepts related to design of modern processors, memories and I/Os.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS304		Core Paper 4 – Database Management System		
Batch 2018-2019	Semester III	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To grasp the different issues involved in the design of a database system.
2. To study the physical and logical database designs and database modeling like relational, hierarchical, and network models.
3. To understand essential DBMS concepts such as: database security, integrity and normalization.
4. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling and designing a DBMS.

Course Outcomes (CO)

K1	CO1	Define data independence, data models for database systems, database schema and database instances.
K2	CO2	Understand and use data manipulation language to query and manage a database.
K3	CO3	Analyze and design a real database application.
K4	CO4	Apply normalization concepts for designing a good database with integrity constraints.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS305		Core Paper 5 – Object Oriented Programming with C++		
Batch 2018-2019	Semester III	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To develop a greater understanding of the issues involved in programming language design and object oriented paradigms and its implementation.
2. To impart adequate knowledge on the need of object oriented programming languages.
3. To enhance problem solving and programming skills in C++ by implementing the object oriented concepts.

Course Outcomes (CO)

K1	CO1	Remember the characteristics of Procedure and Object Oriented Programming Languages
K2	CO2	Understand the fundamentals of C++ programming structure, function overloading and constructors.
K3	CO3	To be able to program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.
K4	CO4	Apply the concepts in object oriented programming in terms of software reuse and managing complexity to solve real-world problems.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS3CN		Core Practical 3 – Object Oriented Programming with C++ - Lab		
Batch 2018-2019	Semester III	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. To familiarize the students with language environment and to develop the programs for solving the problems using function overloading, constructors and object.
2. This course provides methods and technologies involved in building complex software. It also introduces concepts that includes various steps involved in developing software including requirement elicitation, system design, object design and testing.

Course Outcomes (CO)

K3	CO1	Implement the concepts of object oriented programming.
K3	CO2	Apply string functions to perform operator overloading,
K4	CO3	Demonstrate virtual functions and inheritance.
K5	CO4	Implement files and command line arguments.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS406		Core Paper 6 – Operating Systems		
Batch 2018-2019	Semester IV	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. Students will gain knowledge of basic operating system concepts.
2. To have an in-depth understanding of process concepts, deadlock and memory management.
3. To provide an exposure to scheduling algorithms, devices and information management.
4. Students will familiarize on the general structure of an operating system and case study is also provided.

Course Outcomes (CO)

K1	CO1	Remember the basic concepts of operating system.
K2	CO2	Understand the concepts like interrupts, deadlock , memory management and file management.
K3	CO3	Analyze the need for scheduling algorithms.
K4	CO4	Implement different algorithms used for representation, scheduling, allocation in DOS and UNIX operating system.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS407		Core Paper 7 – Data Structures		
Batch 2018-2019	Semester IV	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To educate the concepts of fundamentals of writing algorithms and approach in problem solving.
2. To represent the basic concepts of stack, queue, linked list, trees and graphs.
3. To understand the concepts of searching and sorting techniques.

Course Outcomes (CO)

K1	CO1	Remember the concepts of algorithms for searching, sorting and dynamic programming.
K2	CO2	Understand the representations of data and various algorithm
K3	CO3	Apply appropriate algorithms and data structures for real time applications.
K4	CO4	Analyze the complexity of different algorithms

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS408		Core Paper 8 – Visual Basic and Oracle		
Batch 2018-2019	Semester IV	Hours / Week 5	Total Hours 75	Credits 5

Course Objective

1. The main aim of the course is to cover visual basic and oracle programming skills required for modern software development.
2. To study the advantages of Controls available with visual basic.
3. To gain a *basic* understanding of database access and management using data controls.
4. To facilitate the learner to carry out project works using the tools available in VB and Oracle.

Course Outcomes (CO)

K1	CO1	Demonstrate fundamental skills in utilizing the tools of a visual environment such as command, menus and toolbars.
K2	CO2	Implement SDI and MDI applications using forms, dialogs, and other types of GUI components.
K3	CO3	Understand the connectivity between VB with MS-ACCESS, ORACLE and SQL and SQL database
K4	CO4	Implement the methods and techniques to develop projects.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS4CO		Core Practical 4 – Visual Basic and Oracle - Lab		
Batch 2018-2019	Semester IV	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. To develop applications using Graphical User Interface tools.
2. To understand the design concepts.
3. To design and build database systems and demonstrate their competence.

Course Outcomes (CO)

K1	CO1	Understand the concepts of Visual Basic
K2	CO2	Learn the advantages of Controls in VB
K3	CO3	Design and develop the event- driven applications using Visual Basic framework.
K4	CO4	Apply the knowledge of database methods.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS509		Core Paper 9 – Software Engineering and Testing		
Batch 2018-2019	Semester V	Hours / Week 6	Total Hours 90	Credits 4

Course Objectives

1. To enhance the basic software engineering methods and practices.
2. To learn the techniques for developing software systems.
3. To understand the object oriented design.
4. To understand software testing approaches.

Course Outcomes (CO)

K1	CO1	Understand the basic concepts of software engineering
K2	CO2	Apply the software engineering models in developing software applications.
K3	CO3	Implement the object oriented design in various projects
K4	CO4	Analyze the various software testing approaches

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS510		Core Paper 10 – Java Programming		
Batch 2018-2019	Semester V	Hours / Week 4	Total Hours 60	Credits 5

Course Objectives

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including managing classes, objects, invoking methods etc and exception handling mechanisms.
3. Concepts of inheritance, packages, interfaces and multithreading are introduced.

Course Outcomes (CO)

K1	CO1	Remember the fundamentals of programming such as variables, conditional statements and iterative execution statements.
K2	CO2	Understand the concepts of arrays, strings, packages and multithreading.
K3	CO3	Analyze the concepts of applet programming, graphics programming and files.
K4	CO4	Create a software application using the Java programming language

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS5CP		Core Practical 5 – Java Programming - Lab		
Batch 2018-2019	Semester V	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
2. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, graphics concepts, applet programming concepts etc.,
3. Upon completion, students should be able to design, code and debug JAVA language programs.

Course Outcomes (CO)

K1	CO1	Remember the fundamentals of Java programming language
K2	CO2	Understand the basics of Java programming, multi-threaded programs and Exception handling
K3	CO3	Analyze and use Java in a variety of applications.
K4	CO4	Write and debug a software application developed using the Java programming language.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS511		Core Paper 11 – Computer Networks		
Batch 2018-2019	Semester V	Hours / Week 6	Total Hours 90	Credits 4

Course Objectives

1. To educate the concepts of terminology and concepts of the OSI reference model and the TCP/IP reference model and protocols such as TCP, UDP and IP.
2. To be familiar with the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
3. Introduce the student to a network routing for IP networks and how a collision occurs and how to solve it and how a frame is created and character count of each frame.

Course Outcomes (CO)

K1	CO1	Remember the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
K2	CO2	Understand Internet structure and can see how standard problems are solved and the use of cryptography and network security
K3	CO3	Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.
K4	CO4	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS612		Core Paper 12 – Software Project Management		
Batch 2018-2019	Semester VI	Hours / Week 4	Total Hours 60	Credits 4

Course Objectives

1. To understand the overview of Software Project Characteristics and software Management.
2. To familiarize with the different methods and techniques used in project management.
3. To understand and reduce the failure issues of software projects.
4. To learn how effectively the project scheduling, risk analysis, quality management and project cost estimation can be implemented using various techniques.

Course Outcomes (CO)

K1	CO1	Analyze the fundamentals of project management and compare different software engineering process models.
K2	CO2	Understand various concepts involved in project management, project planning and project scheduling.
K3	CO3	Analyze project risks, monitor and track project deadlines and produce a work plan and resource schedule.
K4	CO4	Apply the project management tools and techniques in a diversity of fields that include new product and process development, construction, information technology, and applied research.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS613		Core Paper 13 – Python Programming		
Batch 2018-2019	Semester VI	Hours / Week 4	Total Hours 60	Credits 5

Course Objectives

1. To introduce the fundamentals of Python Programming.
2. To teach about the concept of Functions in Python.
3. To impart the knowledge of Lists, Tuples, Files and Directories.
4. To learn about dictionaries in python.

Course Outcomes (CO)

K1	CO1	Remembering the concept of operators, data types, looping statements in python programming.
K2	CO2	Understanding the concepts of Input / Output operations in file.
K3	CO3	Applying the concept of functions and exception handling
K4	CO4	Analyzing the structures of list, tuples and maintaining dictionaries.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS6CQ		Core Practical 6 – Python Programming - Lab		
Batch 2018-2019	Semester VI	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. To gain knowledge about the concepts of python programming.
2. To understand the concepts of Built-in functions and User-defined functions.
3. To develop programs using String functions.

Course Outcomes (CO)

K1	CO1	Remember different types of operators in programming.
K2	CO2	Implement the concepts of built-in functions in programming.
K3	CO3	Analyze the use control structures in programming.
K4	CO4	Apply the concepts of exception handling in programs.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS614		Core Paper 14 – Information Security		
Batch 2018-2019	Semester VI	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To learn basics of computer security and cyber crimes.
2. To familiarize the role of security in operations system and databases.
3. To know various types of viruses, attacks and threats in hardware, software and data security.

Course Outcomes (CO)

K1	CO1	Students can able to understand the basics of computer security and its terminology.
K2	CO2	Recapitulate various Attacks, Threats and Vulnerabilities in the system.
K3	CO3	Assess cyber security risk management policies in order to adequately protect critical information and assets.
K4	CO4	Students can employ, design and implement appropriate security technologies and policies to protect computers and digital information.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS6Z1		Project Work and Viva-Voce		
Batch 2018-2019	Semester VI	Hours / Week 4	Total Hours 60	Credits 4

Course Objectives

1. To understand and select the task based on their core skills.
2. To get the knowledge about analytical skill for solving the selected task.
3. To get confidence for implementing the task and solving the real time problems.

Course Outcomes (CO)

K3	CO1	Identify and formulate the problem
K4	CO2	Analyse the problem and collect necessary data.
K5	CO3	Design and develop the project using appropriate software by applying the programming skills.
K5	CO4	Implement, evaluate and generate reports.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS4A4		Allied 4 – Microprocessors, PC Hardware and Interfacing		
Batch 2018-2019	Semester IV	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To understand the design of the various functional units of digital computers.
2. To understand basic architecture of 16 bit and 32 bit microprocessors with block diagrams and pins and signals.
3. To make the students to estimate the required hardware and software resources for an electronic systems.
4. To discuss about the various types of storage systems and port systems.
5. To discuss about the various components of motherboard, serial port and parallel port.

Course Outcomes (CO)

K1	CO1	Familiar with the functionality of the various components of a system.
K2	CO2	Learning about interfacing and various applications of microprocessor.
K3	CO3	Comprehend the features of advanced microprocessors including Intel, Pentium, etc.
K4	CO4	Understand and devise techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS3S1		Skill Based Subject 1 - (Web Programming - HTML, CSS, XML)		
Batch 2018-2019	Semester III	Hours / Week 2	Total Hours 30	Credits 3

Course Objectives

1. The course introduces the basic concepts of the World Wide Web, principles and tools that are used to develop Web applications.
2. To develop an ability to design and implement static and dynamic website.
3. Design and develop a Web site using text, images, links, lists, and tables for navigation and layout.

Course Outcomes (CO)

K1	CO1	Remember the internet related concepts that are vital in understanding web development.
K2	CO2	Understand the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.
K3	CO3	Design and develop web pages using CSS styles, internal and/or external style sheets.
K4	CO4	Develop interactive web applications through coding using HTML , CSS and XML.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS4SL		Skill Based Subject 2 - (Web Programming Lab - HTML, CSS, XML)		
Batch 2018-2019	Semester IV	Hours / Week 2	Total Hours 30	Credits 3

Course Objectives

1. The course introduces the basic concepts of the World Wide Web, principles and tools that are used to develop Web applications.
2. To develop an ability to design and implement static and dynamic website.
3. Design and develop a Web site using text, images, links, lists, and tables for navigation and layout.

Course Outcomes (CO)

K1	CO1	Remember the internet related concepts that are vital in understanding web development.
K2	CO2	Understand the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.
K3	CO3	Design and develop web pages using CSS styles, internal and/or external style sheets.
K4	CO4	Develop interactive web applications through coding using HTML, CSS and XML.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS5S2		Skill Based Subject 3 – (Web Programming – Java Script, VB Script and ASP)		
Batch 2018-2019	Semester V	Hours / Week 2	Total Hours 30	Credits 3

Course Objectives

1. Students will gain the skills and project based experience needed for entry into web application and development careers.
2. To understand internet technology concepts.
3. To understand the concepts of scripting languages VBScript, JavaScript and ASP.

Course Outcomes (CO)

K1	CO1	Understand VB Script language programming constructs.
K2	CO2	Gain knowledge of JavaScript language programming constructs.
K3	CO3	Develop web pages using ASP
K4	CO4	Develop a dynamic web page using client side and server side scripting languages.

Programme Code : 09		B.Sc Computer Science		
Course Code: 18UCS6SM		Skill Based Subject 4 – (Web Programming Lab – Java Script, VB Script and ASP)		
Batch 2018-2019	Semester VI	Hours / Week 2	Total Hours 30	Credits 3

Course Objectives

1. To develop the proficiency in implementing various programming concepts using Scripting Languages like JavaScript, VBScript, and ASP in the workings of the web and web applications
2. To familiarize how JavaScript programs are used in a web page including the use of event- handlers and the Document Object Model.
3. To understand and practice embedded dynamic scripting on client side Internet Programming.
4. Students gain the skills and project-based experience needed for entry into web design and development careers.

Course Outcomes (CO)

K1	CO1	Remember client-Side Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications
K2	CO2	Understand difference between client side web technologies and server side web technologies
K3	CO3	Apply role of languages like HTML, JavaScript, VBScript, ASP and protocols in the workings of the web and web applications
K4	CO4	Analyze a web project and identify its elements and attributes in comparison to traditional projects and build customize web sites and web applications

Programme Code : 09	B.Sc Computer Science		
Batch : 2018-2019	Elective Paper – Systems Software		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objective

1. To comprehend the processing of programs on a computer system.
2. To understand the design and implementation of language processor.
3. To enhance the ability of program generation through expansion.
4. To gain knowledge about Code optimization and software tools.

Course Outcomes (CO)

K1	CO1	Know the program generation and program execution activities in detail.
K2	CO2	Understand the concepts of Macro Expansions.
K3	CO3	Gain the knowledge of Editing processes.
K4	CO4	Apply appropriate software tools for program development.

Programme Code : 09	B.Sc Computer Science		
Batch : 2018-2019	Elective Paper – Soft Computing		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To Identify and describe soft computing techniques and their roles in building intelligent machines.
2. To recognize the feasibility of applying a soft computing methodology for a particular problem.
3. To identify and select a suitable Soft Computing technology to solve the problem and construct a solution and implement a Soft Computing solution.

Course Outcomes (CO)

K1	CO1	Remember Neural Networks, architecture, functions and various algorithms involved.
K2	CO2	Understand the fundamental theory and concepts of neural networks, several neural network paradigms and its applications.
K3	CO3	Apply soft computing techniques to solve engineering or real life problems
K4	CO4	Analyze the genetic algorithms and their applications and neural network architectures.

Programme Code : 09	B.Sc Computer Science		
Batch : 2018-2019	Elective Paper – Client / Server Techniques		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To improve the role of server and client over a network.
2. To gain exposure on most common used servers.
3. To understand the concept of Data ware house.
4. To develop a client -server based application.

Course Outcomes (CO)

K1	CO1	Remember the concepts of client server techniques
K2	CO2	Understand the client and server operating systems and middleware
K3	CO3	Realize the concept of Data Ware house
K4	CO4	Analyze the web security and understand the concepts of DCOM, OLE and CORBA.

Programme Code : 09	B.Sc Computer Science		
Batch : 2018-2019	Elective Paper – Cloud Computing		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objective

1. To understand the basic knowledge about the cloud computing techniques and architecture.
2. To learn the presents cloud computing collaborations and applications.
3. To impart the new concept of various virtualization in cloud computing
4. To gain knowledge of cloud services and cloud security.

Course Outcomes (CO)

K1	CO1	Understand the concepts of cloud Architecture and its services.
K2	CO2	Classify different services providers and its services, tools.
K3	CO3	Demonstrate various web based applications for collaborating everyone in the cloud computing.
K4	CO4	Analyze the best service provider for cloud computing in terms of storage, services.

Programme Code : 09	B.Sc Computer Science		
Batch : 2018-2019	Elective Paper – Artificial Intelligence		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To understand the basic concepts of Artificial Intelligence (AI) and identify the AI problems and domains.
2. To provide search techniques to solve the problems.
3. To represent and access the domain specific knowledge.

Course Outcomes (CO)

K1	CO1	Understand the nature of AI problems and task domains of AI.
K2	CO2	Apply the appropriate search procedures to solve the problems by using best algorithms.
K3	CO3	Analyze and select the suitable knowledge representation method.
K4	CO4	Manipulate the acquired knowledge and infer new knowledge.
K5	CO5	Demonstrate the development of AI systems by encoding the knowledge.

Programme Code : 09	B.Sc Computer Science		
Batch : 2018-2019	Elective Paper – Data Mining and Warehousing		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
2. To study the methodology of Clustering, OLAP tools and OLTP tools to derive business rules for decision support systems
3. To develop and apply critical thinking, problem-solving, and decision-making skills.

Course Outcomes (CO)

K1	CO1	Remember the concepts of the data mining techniques, algorithms, methods and tools.
K2	CO2	Understand an application by using various data mining techniques to identify a pattern that evolves in various business domains.
K3	CO3	Apply the patterns that can be extracted on application of data mining techniques in various domains
K4	CO4	Analyze the market needs by applying suitable OLAP operations

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DEPARTMENT OF COMPUTER SCIENCE (Aided)

COURSE OUTCOMES (CO)

B.Sc. COMPUTER SCIENCE

For the students admitted

In the

Academic Year 2019-2020

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Course Code: 19UCS101		Core Paper 1 – COBOL Programming		
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Course Outcomes (CO)

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Course Code: 19UCSICL		Title: Core Practical 1 – COBOL Programming - Lab		
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1. To expose different features of COBOL language and implement them.
2. To learn the fundamental concepts of four Divisions.
3. To understand Input and Output Statements.
4. To develop programs relevant to business applications.

Course Outcomes (CO)

K1	CO1	Study the logical structure of a computer program and to develop programs in COBOL language.
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K3	CO3	Learn how to compile, debug, link and executing COBOL programs.
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Course Code: 19UCS202		Core Paper 2 – C Programming		
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3. To provide exposure to problem-solving through C programming.
4. To familiarize the basic syntax and semantics of C Language

Course Outcomes (CO)

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Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS2CM		Core Practical 2 – C Programming - Lab		
Batch 2019-2020	Semester II	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. To introduce the field of programming using C language.
2. To enhance the analyzing and problem solving skills and use the same for writing programs in C.

Course Outcomes (CO)

K3	CO1	Develop programming skills using the fundamentals and basics of C Language.
K3	CO2	Develop programs using the basic elements like control statements, Arrays and Strings
K4	CO3	Enable effective usage of arrays, structures, functions and pointers.
K5	CO4	Implement files and command line arguments.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS303		Core Paper 3 – Computer Organization and Architecture		
Batch 2019-2020	Semester III	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To educate the basics of computer hardware and how software interacts with computer hardware.
2. To familiarize with different numbering methods like binary, octal, and hexadecimal.
3. To impart the knowledge of buses, I/O devices, flip flops, Memory and bus structure.
4. To understand the concepts of memory hierarchy and compare different methods for computer architecture.

Course Outcomes (CO)

K1	CO1	Remember basic structure of computer and numbering methods like binary, octal and hexadecimal and explain how arithmetic and logical operations are performed by computers.
K2	CO2	Understand various data transfer techniques in digital computer and control unit operations.
K3	CO3	Apply performance issues in processor and memory design of a digital computer various data representations.
K4	CO4	Analyze architectures and computational designs and computer architecture concepts related to design of modern processors, memories and I/Os.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS304		Core Paper 4 – Database Management System		
Batch 2019-2020	Semester III	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To grasp the different issues involved in the design of a database system.
2. To study the physical and logical database designs and database modeling like relational, hierarchical, and network models.
3. To understand essential DBMS concepts such as: database security, integrity and normalization.
4. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling and designing a DBMS.

Course Outcomes (CO)

K1	CO1	Define data independence, data models for database systems, database schema and database instances.
K2	CO2	Understand and use data manipulation language to query and manage a database.
K3	CO3	Analyze and design a real database application.
K4	CO4	Apply normalization concepts for designing a good database with integrity constraints.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS305		Core Paper 5 – Object Oriented Programming with C++		
Batch 2019-2020	Semester III	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To develop a greater understanding of the issues involved in programming language design and object oriented paradigms and its implementation.
2. To impart adequate knowledge on the need of object oriented programming languages.
3. To enhance problem solving and programming skills in C++ by implementing the object oriented concepts.

Course Outcomes (CO)

K1	CO1	Remember the characteristics of Procedure and Object Oriented Programming Languages
K2	CO2	Understand the fundamentals of C++ programming structure, function overloading and constructors.
K3	CO3	To be able to program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.
K4	CO4	Apply the concepts in object oriented programming in terms of software reuse and managing complexity to solve real-world problems.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS3CN		Core Practical 3 – Object Oriented Programming with C++ - Lab		
Batch 2019-2020	Semester III	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. To familiarize the students with language environment and to develop the programs for solving the problems using function overloading, constructors and object.
2. This course provides methods and technologies involved in building complex software. It also introduces concepts that includes various steps involved in developing software including requirement elicitation, system design, object design and testing.

Course Outcomes (CO)

K3	CO1	Implement the concepts of object oriented programming.
K3	CO2	Apply string functions to perform operator overloading,
K4	CO3	Demonstrate virtual functions and inheritance.
K5	CO4	Implement files and command line arguments.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS406		Core Paper 6 – Operating Systems		
Batch 2019-2020	Semester IV	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. Students will gain knowledge of basic operating system concepts.
2. To have an in-depth understanding of process concepts, deadlock and memory management.
3. To provide an exposure to scheduling algorithms, devices and information management.
4. Students will familiarize on the general structure of an operating system and case study is also provided.

Course Outcomes (CO)

K1	CO1	Remember the basic concepts of operating system.
K2	CO2	Understand the concepts like interrupts, deadlock , memory management and file management.
K3	CO3	Analyze the need for scheduling algorithms.
K4	CO4	Implement different algorithms used for representation, scheduling, allocation in DOS and UNIX operating system.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS407		Core Paper 7 – Data Structures		
Batch 2019-2020	Semester IV	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To educate the concepts of fundamentals of writing algorithms and approach in problem solving.
2. To represent the basic concepts of stack, queue, linked list, trees and graphs.
3. To understand the concepts of searching and sorting techniques.

Course Outcomes (CO)

K1	CO1	Remember the concepts of algorithms for searching, sorting and dynamic programming.
K2	CO2	Understand the representations of data and various algorithm
K3	CO3	Apply appropriate algorithms and data structures for real time applications.
K4	CO4	Analyze the complexity of different algorithms

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS408		Core Paper 8 – Visual Basic and Oracle		
Batch 2019-2020	Semester IV	Hours / Week 5	Total Hours 75	Credits 5

Course Objective

1. The main aim of the course is to cover visual basic and oracle programming skills required for modern software development.
2. To study the advantages of Controls available with visual basic.
3. To gain a *basic* understanding of database access and management using data controls.
4. To facilitate the learner to carry out project works using the tools available in VB and Oracle.

Course Outcomes (CO)

K1	CO1	Demonstrate fundamental skills in utilizing the tools of a visual environment such as command, menus and toolbars.
K2	CO2	Implement SDI and MDI applications using forms, dialogs, and other types of GUI components.
K3	CO3	Understand the connectivity between VB with MS-ACCESS, ORACLE and SQL and SQL database
K4	CO4	Implement the methods and techniques to develop projects.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS4CO		Core Practical 4 – Visual Basic and Oracle - Lab		
Batch 2019-2020	Semester IV	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. To develop applications using Graphical User Interface tools.
2. To understand the design concepts.
3. To design and build database systems and demonstrate their competence.

Course Outcomes (CO)

K1	CO1	Understand the concepts of Visual Basic
K2	CO2	Learn the advantages of Controls in VB
K3	CO3	Design and develop the event- driven applications using Visual Basic framework.
K4	CO4	Apply the knowledge of database methods.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS509		Core Paper 9 – Software Engineering and Testing		
Batch 2019-2020	Semester V	Hours / Week 6	Total Hours 90	Credits 4

Course Objectives

1. To enhance the basic software engineering methods and practices.
2. To learn the techniques for developing software systems.
3. To understand the object oriented design.
4. To understand software testing approaches.

Course Outcomes (CO)

K1	CO1	Understand the basic concepts of software engineering
K2	CO2	Apply the software engineering models in developing software applications.
K3	CO3	Implement the object oriented design in various projects
K4	CO4	Analyze the various software testing approaches

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS510		Core Paper 10 – Java Programming		
Batch 2019-2020	Semester V	Hours / Week 4	Total Hours 60	Credits 5

Course Objectives

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including managing classes, objects, invoking methods etc and exception handling mechanisms.
3. Concepts of inheritance, packages, interfaces and multithreading are introduced.

Course Outcomes (CO)

K1	CO1	Remember the fundamentals of programming such as variables, conditional statements and iterative execution statements.
K2	CO2	Understand the concepts of arrays, strings, packages and multithreading.
K3	CO3	Analyze the concepts of applet programming, graphics programming and files.
K4	CO4	Create a software application using the Java programming language

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS5CP		Core Practical 5 – Java Programming - Lab		
Batch 2019-2020	Semester V	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
2. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, graphics concepts, applet programming concepts etc.,
3. Upon completion, students should be able to design, code and debug JAVA language programs.

Course Outcomes (CO)

K1	CO1	Remember the fundamentals of Java programming language
K2	CO2	Understand the basics of Java programming, multi-threaded programs and Exception handling
K3	CO3	Analyze and use Java in a variety of applications.
K4	CO4	Write and debug a software application developed using the Java programming language.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS511		Core Paper 11 – Data Communication and Networking		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	V	6	90	4

Course Objectives

1. To educate the concepts of terminology and concepts of the OSI reference model and the TCP/IP reference model and protocols such as TCP, UDP and IP.
2. To be familiar with the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
3. Introduce the student to a network routing for IP networks and how a collision occurs and how to solve it and how a frame is created and character count of each frame.

Course Outcomes (CO)

K1	CO1	Remember the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
K2	CO2	Understand Internet structure and can see how standard problems are solved and the use of cryptography and network security
K3	CO3	Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.
K4	CO4	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS612		Core Paper 12 – Software Project Management		
Batch 2019-2020	Semester VI	Hours / Week 4	Total Hours 60	Credits 4

Course Objectives

1. To understand the overview of Software Project Characteristics and software Management.
2. To familiarize with the different methods and techniques used in project management.
3. To understand and reduce the failure issues of software projects.
4. To learn how effectively the project scheduling, risk analysis, quality management and project cost estimation can be implemented using various techniques.

Course Outcomes (CO)

K1	CO1	Analyze the fundamentals of project management and compare different software engineering process models.
K2	CO2	Understand various concepts involved in project management, project planning and project scheduling.
K3	CO3	Analyze project risks, monitor and track project deadlines and produce a work plan and resource schedule.
K4	CO4	Apply the project management tools and techniques in a diversity of fields that include new product and process development, construction, information technology, and applied research.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS613		Core Paper 13 – Python Programming		
Batch 2019-2020	Semester VI	Hours / Week 4	Total Hours 60	Credits 5

Course Objectives

1. To introduce the fundamentals of Python Programming.
2. To teach about the concept of Functions in Python.
3. To impart the knowledge of Lists, Tuples, Files and Directories.
4. To learn about dictionaries in python.

Course Outcomes (CO)

K1	CO1	Remembering the concept of operators, data types, looping statements in python programming.
K2	CO2	Understanding the concepts of Input / Output operations in file.
K3	CO3	Applying the concept of functions and exception handling
K4	CO4	Analyzing the structures of list, tuples and maintaining dictionaries.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS6CQ		Core Practical 6 – Python Programming - Lab		
Batch 2019-2020	Semester VI	Hours / Week 6	Total Hours 90	Credits 2

Course Objectives

1. To gain knowledge about the concepts of python programming.
2. To understand the concepts of Built-in functions and User-defined functions.
3. To develop programs using String functions.

Course Outcomes (CO)

K1	CO1	Remember different types of operators in programming.
K2	CO2	Implement the concepts of built-in functions in programming.
K3	CO3	Analyze the use control structures in programming.
K4	CO4	Apply the concepts of exception handling in programs.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS614		Core Paper 14 – Information Security		
Batch 2019-2020	Semester VI	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To learn basics of computer security and cyber crimes.
2. To familiarize the role of security in operations system and databases.
3. To know various types of viruses, attacks and threats in hardware, software and data security.

Course Outcomes (CO)

K1	CO1	Students can able to understand the basics of computer security and its terminology.
K2	CO2	Recapitulate various Attacks, Threats and Vulnerabilities in the system.
K3	CO3	Assess cyber security risk management policies in order to adequately protect critical information and assets.
K4	CO4	Students can employ, design and implement appropriate security technologies and policies to protect computers and digital information.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS6Z1		Project Work and Viva-Voce		
Batch 2019-2020	Semester VI	Hours / Week 4	Total Hours 60	Credits 4

Course Objectives

1. To understand and select the task based on their core skills.
2. To get the knowledge about analytical skill for solving the selected task.
3. To get confidence for implementing the task and solving the real time problems.

Course Outcomes (CO)

K3	CO1	Identify and formulate the problem
K4	CO2	Analyse the problem and collect necessary data.
K5	CO3	Design and develop the project using appropriate software by applying the programming skills.
K5	CO4	Implement, evaluate and generate reports.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS4A4		Allied 4 – Digital Principles and Computer System Architecture		
Batch 2019-2020	Semester IV	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To educate the basics of computer hardware and how software interacts with computer hardware.
2. To familiarize with different numbering methods like binary, octal, and hexadecimal.
3. To impart the knowledge of buses, I/O devices, flip flops, Memory and bus structure.
4. To understand the concepts of memory hierarchy and compare different methods for computer architecture.

Course Outcomes (CO)

K1	CO1	Remember basic structure of computer and numbering methods like binary, octal and hexadecimal and explain how arithmetic and logical operations are performed by computers.
K2	CO2	Understand various data transfer techniques in digital computer and control unit operations.
K3	CO3	Apply performance issues in processor and memory design of a digital computer various data representations.
K4	CO4	Analyze architectures and computational designs and computer architecture concepts related to design of modern processors, memories and I/Os.

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS3S1		Skill Based Subject 1 – PHP Programming		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	III	2	30	3

Course Objectives

1. To learn the basic programming techniques using JavaScript and PHP.
2. To gain an insight of creating classes and using functions in PHP.
3. To learn the process of developing a PHP application and to work with files and directories.

Course Outcomes (CO)

K1	CO1	Remember the basic syntax of PHP and Java script
K2	CO2	Understand Arrays and Strings in PHP
K3	CO3	Implement the concepts of files and directories
K4	CO4	Evaluate the database connectivity using PHP and SQLite

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS4SL		Skill Based Subject 2 – PHP Programming Lab		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	IV	2	30	3

Course Objectives

1. To develop the ability to build efficient web based applications using PHP
2. To learn the basic constructs in PHP Programming.
3. To utilize the concepts of Strings and Array functions in PHP applications.

.Course Outcomes (CO)

K3	CO1	Recollect the concepts of HTML Programming ,creating a web page using HTML and validate it using PHP
K4	CO2	Understand the concept of String functions and Arrays
K5	CO3	Validate the file system functions

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS5X1		EDC – Web Designing using HTML		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	V	2	30	3

Course Objectives

1. The course introduces the basic concepts of the World Wide Web, principles and tools that are used to develop Web applications.
2. To develop an ability to design and implement static and dynamic website.
3. Design and develop a Web site using text, images, links, lists, and tables for navigation and layout.

Course Outcomes (CO)

K1	CO1	Remember the internet related concepts that are vital in understanding web development.
K2	CO2	Understand the important HTML tags for designing static pages
K3	CO3	Design and develop web pages using internal or external linking
K4	CO4	Develop interactive web applications through coding using HTML

Programme Code : 09		B.Sc Computer Science		
Course Code: 19UCS6SM		Skill Based Subject 4 – (Web Programming Lab – Java Script, VB Script and ASP)		
Batch 2019-2020	Semester VI	Hours / Week 2	Total Hours 30	Credits 3

Course Objectives

1. To develop the proficiency in implementing various programming concepts using Scripting Languages like JavaScript, VBScript, and ASP in the workings of the web and web applications
2. To familiarize how JavaScript programs are used in a web page including the use of event- handlers and the Document Object Model.
3. To understand and practice embedded dynamic scripting on client side Internet Programming.
4. Students gain the skills and project-based experience needed for entry into web design and development careers.

Course Outcomes (CO)

K1	CO1	Remember client-Side Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications
K2	CO2	Understand difference between client side web technologies and server side web technologies
K3	CO3	Apply role of languages like HTML, JavaScript, VBScript, ASP and protocols in the workings of the web and web applications
K4	CO4	Analyze a web project and identify its elements and attributes in comparison to traditional projects and build customize web sites and web applications

Programme Code : 09	B.Sc Computer Science		
Batch : 2019-2020	Elective Paper – Systems Software		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objective

1. To comprehend the processing of programs on a computer system.
2. To understand the design and implementation of language processor.
3. To enhance the ability of program generation through expansion.
4. To gain knowledge about Code optimization and software tools.

Course Outcomes (CO)

K1	CO1	Know the program generation and program execution activities in detail.
K2	CO2	Understand the concepts of Macro Expansions.
K3	CO3	Gain the knowledge of Editing processes.
K4	CO4	Apply appropriate software tools for program development.

Programme Code : 09	B.Sc Computer Science		
Batch : 2019-2020	Elective Paper – Soft Computing		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To Identify and describe soft computing techniques and their roles in building intelligent machines.
2. To recognize the feasibility of applying a soft computing methodology for a particular problem.
3. To identify and select a suitable Soft Computing technology to solve the problem and construct a solution and implement a Soft Computing solution.

Course Outcomes (CO)

K1	CO1	Remember Neural Networks, architecture, functions and various algorithms involved.
K2	CO2	Understand the fundamental theory and concepts of neural networks, several neural network paradigms and its applications.
K3	CO3	Apply soft computing techniques to solve engineering or real life problems
K4	CO4	Analyze the genetic algorithms and their applications and neural network architectures.

Programme Code : 09	B.Sc Computer Science		
Batch : 2019-2020	Elective Paper – Client / Server Techniques		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To improve the role of server and client over a network.
2. To gain exposure on most common used servers.
3. To understand the concept of Data ware house.
4. To develop a client -server based application.

Course Outcomes (CO)

K1	CO1	Remember the concepts of client server techniques
K2	CO2	Understand the client and server operating systems and middleware
K3	CO3	Realize the concept of Data Ware house
K4	CO4	Analyze the web security and understand the concepts of DCOM, OLE and CORBA.

Programme Code : 09	B.Sc Computer Science		
Batch : 2019-2020	Elective Paper – Cloud Computing		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objective

1. To understand the basic knowledge about the cloud computing techniques and architecture.
2. To learn the presents cloud computing collaborations and applications.
3. To impart the new concept of various virtualization in cloud computing
4. To gain knowledge of cloud services and cloud security.

Course Outcomes (CO)

K1	CO1	Understand the concepts of cloud Architecture and its services.
K2	CO2	Classify different services providers and its services, tools.
K3	CO3	Demonstrate various web based applications for collaborating everyone in the cloud computing.
K4	CO4	Analyze the best service provider for cloud computing in terms of storage, services.

Programme Code : 09	B.Sc Computer Science		
Batch : 2019-2020	Elective Paper – Artificial Intelligence		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To understand the basic concepts of Artificial Intelligence (AI) and identify the AI problems and domains.
2. To provide search techniques to solve the problems.
3. To represent and access the domain specific knowledge.

Course Outcomes (CO)

K1	CO1	Understand the nature of AI problems and task domains of AI.
K2	CO2	Apply the appropriate search procedures to solve the problems by using best algorithms.
K3	CO3	Analyze and select the suitable knowledge representation method.
K4	CO4	Manipulate the acquired knowledge and infer new knowledge.
K5	CO5	Demonstrate the development of AI systems by encoding the knowledge.

Programme Code : 09	B.Sc Computer Science		
Batch : 2019-2020	Elective Paper – Data Mining and Warehousing		
	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
2. To study the methodology of Clustering, OLAP tools and OLTP tools to derive business rules for decision support systems
3. To develop and apply critical thinking, problem-solving, and decision-making skills.

K1	CO1	Remember the concepts of the data mining techniques, algorithms, methods and tools.
K2	CO2	Understand an application by using various data mining techniques to identify a pattern that evolves in various business domains.
K3	CO3	Apply the patterns that can be extracted on application of data mining techniques in various domains
K4	CO4	Analyze the market needs by applying suitable OLAP operations