

DEPARTMENTOF COMPUTER SCIENCE AND ENGINEERING

COURSE OUTCOMES (COs)

Course Outcomes (COs) describe what students can able to do after completion of the course.

S.No	Year-	Course	Course Name	Course Outcomes
	Sem	Code		After completion of the course student can able to
1	11-1	BS	Mathematic-III	 CO1: Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) CO2:Estimate the work done against a field, circulation and flux using vector calculus (L5) CO3:Apply the Laplace transform for solving differential equations (L3)Find or compute the Fourier series of periodic signals (L3) CO4:Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) CO5:Identify solution methods for partial differential equations that model physical
				processes (L3)
2	11-1	CS	Object Oriented Programming Through C++	 CO1:Classify object oriented programming and procedural programming CO2: Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling CO3: Build C++ classes using appropriate encapsulation and design principles CO4: Apply object oriented or non-object oriented techniques to solve bigger computing problems
				CO1: Describe various generations of Operating System and functions of Operating System
3	11-1	CS	Operating System	CO2:Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance Co3:Solve Inter Process Communication
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				problems using Mathematical Equations by
				various methods
				CO4: Compare various Memory Management
				Schemes especially paging and Segmentation in
				Operating System and apply various Page
				Replacement Techniques
				CO5: Outline File Systems in Operating System
				like UNIX/Linux and Windows
				CO1: Ability to transform an Object-Oriented
				Design into high quality, executable code
				CO2: Skills to design, implement, and execute test
				cases at the Unit and Integration level
		~	Software	CO3: Compare conventional and agile software
4	11-1	CS	Engineering	methods
			2	CO4 : Analyze software reliability and quality
				management
				CO5: Apply coftware maintenance activities and
				re-usability of coftware
				CO1 : Demonstrate skills in solving mathematical
				problems
		<i>cc</i>	Mathematical	CO2 Compared and most constituted uninsingles and
				CO2;Comprehend mathematical principles and
_				CO3 :Demonstrate knowledge of mathematical
5	11-1	CS	Foundation Of	modeling and proficiency in using mathematical
			Computer Science	software
				CO4: Manipulate and analyze data numerically
				and/or graphically using appropriate Software
				CO5: Communicate effectively mathematical
				ideas/results verbally or in writing
				CO1: Implement and test the concepts of Classes
				&Objects, friend functions.
		CS	Object Oriented	CO2:Implement and constructors & destructors in
6			Drogramming	program design of a few example exercises
0	11-1		Programming	CO3: Design& implement a few forms of
			Through C++ Lab	inheritance through few exercises.
				CO4: Test the performance of Polymorphism and
				Generic Programming through a few exercises.
				CO1: To use Unix utilities and perform basic shell
				control of the utilities
				CO2: To use the Unix file system and file access
7	11_1	C S	Operating System	sontrol
	11-1	CS	Laboreor	3.To use of an operating system to develop
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				software
				CO4: Solve problems using bash for shell scripting
				CO1: By the end of this lab the student is able to
				elicit, analyze and specify software requirements
				through a productive working relationship with
				various stakeholders of the project
				CO2: prepare SRS document, design document,
				test cases and software configuration management
8	11-1	CS	Software	and risk management related document
			Engineering Lab	CO3: develop function oriented and object
				oriented software design using tools like rational
				rose.
				CO4: use modern engineering tools necessary for
				software project management, estimations, time
				management, software reuse and generate test
				Cases for software testing
			Constitution Of India	constitution making and its importance for
				building a democratic India
		МС		CO2: Understand the functioning of three wings
				of the government is executive legislative and
9	11-1			iudiciary
				CO3: Understand the value of the fundamental
				rights and duties for becoming good citizen of
				India.
				CO4: Analyze the decentralization of power
				between central, state and local self-government.
				CO1: Classify the concepts of data science and its
		BS	Probability And	importance (L4) or (L2)
				CO2: Interpret the association of characteristics
				and through correlation and regression tools (L4)
10	11-11			CO3: Apply discrete and continuous probability
			Statistics	distributions (L3)
				CO4: Design the components of a classical
				hypothesis test (L6)
				COS: Infer the statistical inferential methods
				Dased on small and large sampling tests (L4)
			Database	criented database
11	11-11	CS	Management	CO 2. Create maintain and manipulate a
		C	System	selational database using SQL
			System EGE OF	CO3: Describe ER model and normalization for
		07		
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				database design
				CO4: Examine issues in data storage and query
				processing and can formulate appropriate
				solutions
				of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
				CO1: Classify machines by their power to recognize languages
			Formal Languages	CO2: Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy
12	11-11	CS	And Automata Theory	CO3:E mploy finite state machines to solve problems in computing
				CO4: Illustrate deterministic and non-deterministic machines.
				CO5: Quote the hierarchy of problems arising in the computer science.
				CO1: Able to realize the concept of Object Oriented Programming & Java Programming Constructs
				CO2: Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
13	11-11	ES	Java Programming	CO3: Apply the concept of exception handling and Input/ Output operations
				CO4: Able to design the applications of Java & Java applet
				CO5: Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
			Managarial	CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product
14		ыс	Fearamier And	CO2 . The knowledge of understanding of the
14	11-11	¢٦	Financial Financial	Input-Output-Cost relationships and estimation of
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			Accountancy	CO3: The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units
				CO4: The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
				CO5: The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making
				CO1: Utilize SQL to execute queries for creating database and performing data manipulation operations
15	11-11	CS	Database Management Systems Lab	CO2: Examine integrity constraints to build efficient databases
				CO3: Apply Queries using Advanced Concepts of SQL
				CO4: Build PL/SQL programs including stored procedures, functions, cursors and triggers
				CO1: Access online resources for R and import new function packages into the R workspace
16		C.C.	R Programming	CO2: Import, review, manipulate and summarize data-sets in R
10	11-11	C	Lab	CO3: Explore data-sets to create testable hypotheses and identify appropriate statistical tests and Perform appropriate statistical tests using R
				CO4:Create and edit visualizations with R
17	11-11	ES	Java Programming Lab	CO1: Evaluate default value of all primitive data type, Operations, Expressions, Control flow, Strings
				CO2: Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
			OLEGE OF	O3: Illustrating simple inheritance, multi-level eritance, Exception handling mechanism
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				CO4: Construct Threads, Event Handling, implement packages, developing applets
				CO1: Classify different number systems and apply to generate various codes.
				CO2: Use the concept of Boolean algebra in minimization of switching functions
		Open Elective	Digital Logic and	CO3: Design different types of combination allogic circuits.
18	111-1	/Job Oriente	Design	CO4: Apply knowledge offlip-flops in designing of Registers and counters
		a		CO5: The operation and design methodology for synchronous sequential circuits and algorithmic state machines
				CO6 Produce innovative designs by modifying the traditional design techniques.
		PC	Data Warehousing And Mining	CO1: Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications.
	111-1			CO2: Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration, data transformation and data reduction and Process raw data to make it suitable for various data mining algorithms.
19				CO3: Choose appropriate classification technique to perform classification, model building and evaluation.
				CO4: Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent itemsets generation.
				CO5: Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result.
20	-	PC	Computer Networksge OF	CO1: Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication
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				techniques, methods and protocol standards.
				CO2: Discuss different transmission media and different switching networks.
				CO3: Analyze data link layer services, functions and protocols like HDLC and PPP.
				CO4: Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols
				CO5 Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc
				CO1: Ability to understand, analyze and denote time complexities of algorithms $x \times x$
				CO2: To introduce the different algorithmic approaches for problem solving through numerous example problems
21	111-1	PC	Design and Analysis of Algorithms	CO3: Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic-programming algorithms, and analyze them.
				CO4: To provide some theoretical grounding in terms of finding the lower bounds of algorithms and the NP-completeness
				CO1: Apply the process to be followed in the software development life-cycle models
				CO2: Apply the concepts of project management & planning
22	111-1	PE	Software Project	CO3: Implement the project plans through managing people, communications and change
			Management	CO4: Conduct activities necessary to successfully complete and close the Software projects
			LEGE OF	CO5: Implement communication, modeling, and struction & deployment practices in software
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				development
				CO1: Know how reliable data communication is achieved through data link layer.
				CO2: Suggest appropriate routing algorithm for the network.
23	111-1	PC	Computer Networks Lab	CO3: Provide internet connection to the system and its installation.
				CO4: Work on various network management tools
			Continuous	CO1: Understand the why, what and how of DevOps adoption
24	111-1	SO	Integration and	CO2: Attain literacy on Devops.
27	111-1	50	Delivery using	CO3: Align capabilities required in the team
			DevOps	CO4: Create an automated CICD pipeline using a stack of tools
25		PC	Data Warehouse and Data Mining Lab	CO1: Design a data mart or data warehouse for any organization
	111-1			CO2: Extract knowledge using data mining techniques and enlist various algorithms used in information analysis of Data Mining Techniques
				CO3: Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification for realistic data
				CO4: Implement and Analyze on knowledge flow application on data sets and Apply the suitable visualization techniques to output analytical results
				CO1: Understand the corporate etiquette.
26	111-1	MC	Employability	CO2: Make presentations effectively with appropriate body language
20		me	Skills-li	CO3: Be composed with positive attitude
				CO4: Understand the core competencies to succeed in professional and personal life
27	111-11	PC	Machine Learning	CO1: Explain the fundamental usage of the concept Machine Learning system

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				CO2: Demonstrate on various regression Technique
				CO3: Analyze the Ensemble Learning Methods
				CO4: Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.
				CO5: Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
				CO1: Demonstrate phases in the design of compiler
				CO2: Organize Syntax Analysis, Top Down and LL(1) grammars
		20	Compiler Design	CO3: Design Bottom Up Parsing and Construction of LR parsers
28	111-11	РС		CO4: Analyze synthesized, inherited attributes and syntax directed translation schemes
				CO5: Determine algorithms to generate code for a target machine
	111-11	PC	Cryptography and Network Security	CO1: Explain different security threats and countermeasures and foundation course of cryptography mathematics.
				CO2: Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography
29				CO3: Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more
				CO4: Design applications of hash algorithms, digital signatures and key management techniques
				CO5: Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL,TSL, and IPsec.
			LEGE OF	CO1: Analyze the nature of complex system and its solutions.
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30	-	PE	Object Oriented Analysis and Design	CO2: Illustrate & relate the conceptual model of the UML, identify & design the classes and
				relationships CO3: The The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
				CO4: Analyze & Design behavioral aspects of a Software System using Use Case, Interaction and Activity Diagrams.
				CO5: Analyze & Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems.
				CO1: Build static web pages using HTML 5 elements.
				CO2: Apply JavaScript to embed programming interface for web pages and also to perform Client side validations.
31	111-11	Open Elective /Job	Mean Stack Development	CO3: Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js.
		Oriente d		CO4: Develop JavaScript applications using typescript and work with document database using MongoDB.
				CO5: Utilize Angular JS to design dynamic and responsive web pages.
				CO1: Implement procedures for the machine learning algorithms
				CO2: Design and Develop Python programs for various Learning algorithms
32	111-11	PC	Machine Learning using Python Lab	CO3: Apply appropriate data sets to the Machine Learning algorithms
			LEGE OF	CO4: Develop Machine Learning algorithms to
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				CO1: Design simple lexical analyzers
				CO2: Determine predictive parsing table for a CFG
				CO3: Apply Lex and Yacc tools
		PC	Compiler Design	CO4: Examine LR parser and generating SLR Parsing table
33	111-11	-	Lab	CO5: Relate Intermediate code generation for subset C language
				CO1: Apply the knowledge of symmetric cryptography to implement encryption and decryption using Ceaser Cipher, Substitution Cipher, Hill Cipher
34	111-11	PC	Cryptography and Network Security Lab	CO2: Demonstrate the different algorithms like DES, BlowFish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm.
				CO3: Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm
				CO1: Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles.
	MEAN Stack Technologies- Module I (HTML 5, JavaScript, Node is, Eveness is MEAN Stack CO2: Utilize JavaScript for develo HTML web pages and validate for also working with Node Package N	CO2: Utilize JavaScript for developing interactive HTML web pages and validate form data.		
35		so	Module I (HTML 5, JavaScript,	CO3: Build a basic web server using Node.js and also working with Node Package Manager (NPM).
			and TypeScript)	CO4: Build a web server using Express.js
				CO5: Make use of Typescript to optimize JavaScript code by using the concept of strict type checking.
36	111-11	мс	Employability skills-	CO1: Solve various Basic Mathematics problems by following different methods x x x
			II	CO2: Follow strategies in minimizing time
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				methods to solve problems
				CO3: Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
				CO4: Analyze, summarize and present information in quantitative forms including table, graphs and formulas
				CO1: Illustrate the key dimensions of the challenge of Cloud Computing
				CO2: Classify the Levels of Virtualization and mechanism of tools.
37	IV-I	PE	Cloud Computing	CO3: Analyze Cloud infrastructure including Google Cloud and Amazon Cloud.
				CO4: Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud
				CO5: Assess control storage systems and cloud security, the risks involved its impact and develop cloud application
				CO1: Demonstrate social network analysis and measures.
				CO2: Analyze random graph models and navigate social networks data
38	IV-I	PE	Social Networks and Semantic Web	CO3: Apply the network topology and Visualization tools.
				CO4: Analyze the experiment with small world models and clustering models.
				CO5: Compare the application driven virtual communities from social network Structure.
				CO1: Explain the concepts related to hacking, ports and protocols, pen testing and virtualization
39	IV-I	PE	Ethical Hacking	CO2: Determine the applicable foot printing techniques and scanning methods
			OULEOSOF	3: Explain the process of system hacking and
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				Explain the concepts Trojans, backdoors, worms and virus and it's countermeasures
				CO4: Demonstrate systematic understanding of the concepts of Sniffing and Social Engineering and it's attacks
				CO5: Determine the applicable methods of cryptography, stenography and Vulnerability Assessment
40	IV-I	Open Elective /Job Oriente d	Internet of Things and Applications	CO1: Understand internet of Things and its hardware and software components. 2. 3. 4.
				CO2: Interface I/O devices, sensors & communication modules.
				CO3: Remotely monitor data and control devices.
41	IV-I	Open Elective /Job Oriente d	Principles of communications	CO4: Design real time IoT based applications
				CO1: Analyze the performance of analog modulation schemes in time and frequency domains.
				CO2: Analyze the performance of angle modulated signals.
				CO3: . Characterize analog signals in time domain as random processes and noise
				CO4: Characterize the influence of channel on analog modulated signals
				CO5: Determine the performance of analog communication systems in terms of SNR
				CO6: . Analyze pulse amplitude modulation, pulse position modulation, pulse code modulation and TDM systems.
42	IV-I	HS	Universal Human Values 2	CO1: Students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability
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				commitment towards what they have understood (human values, human relationship and human society).
				CO3: It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.
43	IV-I	SO	Mean Stack Technologies Module II Angular JS and MangoDB	CO1: Build a component-based application using Angular components and enhance their functionality using directives.
				CO2: Utilize data binding for developing Angular forms and bind them with model data.
				CO3: Apply Angular built-in or custom pipes to format the rendered data.
				CO4: Develop a single page application by using synchronous or asynchronous Angular routing.
				CO5: Make use of MongoDB queries to perform CRUD operations on document database.
44	IV-II		Project	CO1: Demonstrate the technical knowledge to identify problems in the field of Computer Science and Engineering and its allied areas.
				CO2: Analyze and formulate technical projects with a comprehensive and systematic approach.
				CO3: Identify the modern tools to implement technical projects
				CO4: Design engineering solutions for solving complex engineering problems.
				CO5: Develop effective communication skills, professional behavior and team work.

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