Course Outcomes (CO) - Department of Computer Science Engineering

Course Outcomes are narrower statements that describe what students are expected to know, and be able to do at the end of each course/subject. While the POs define the departmental outcomes, the COs are more oriented towards the subjects and are mostly defined by the faculties consulting higher authorities. The COs are more like statements that relate to the skills, knowledge, and behavior the students acquire as they go through a specific course within a program. They collectively contribute to the program outcomes. They are to be mapped to the POs, and not necessarily to a single one.

Course Outcomes from Semester 3 onwards are mentioned below

II Year/III Semester

Subject Name: Advanced Engineering Mathematics **Subject Code: 3CS1-01**

SUBJECT Course Outcomes	
CO1	Compute the discrete and continuous random variables, probability distributions, expectations, moments, MGF, mean and variances.
CO2	Define and explain the different statistical distributions like Binomial, Poisson, Normal, Uniform, Exponential Distribution and to compute the method of least squares, correlation and regression
CO3	To apply the theory of optimization methods to develop and for solving various types of optimization problems.
CO4	To make aware of the linear programming problem by solving techniques theoretically as well as applications of Linear Programming problem.
CO5	To study the numerical interpolations for equal and unequal intervals, numerical differentiation, integration and solving ordinary differential equations by numerical methods.

Subject Name: Digital Electronics **Subject Code: 3CS4-02**

SUBJECT Course Outcomes	
CO1	Have a thorough understanding of the fundamental concepts and techniques used in digital electronics
CO2	To understand and examine the structure of various number systems and its application in digital design.
CO3	The ability to understand, analyze and design various combinational and sequential circuits.
CO4	Ability to identify basic requirements for a design application and propose a cost-effective solution.
CO5	The ability to identify and prevent various hazards and timing problems in a digital design.

Subject Name: Data Structures & Algorithms **Subject Code: 3CS4-03**

SUBJECT Course Outcomes	
CO1	Understanding the fundamental analysis and time complexity for a given problem.
CO2	Articulate linear & non data structures and legal operations permitted on them.
CO3	Applying a suitable algorithm for searching and sorting.
CO4	Understanding graph algorithms, operations, and applications and the importance of hashing.
CO5	Application of appropriate data structures to find solutions to practical problems.

Subject Name: Object Oriented Programming **Subject Code: 3CS4-04**

SUBJECT Course Outcomes	
CO1	Understand the requirement and benefits of object-oriented programming languages.
CO2	Understand basic concepts & structure of object-oriented programming language using C++.
CO3	Understand the memory management in object-oriented paradigm.
CO4	Understand and implement polymorphism using different ways such as function and operator overloading.
CO5	Learn and implement exception handling mechanism for robust software development in C++.

Subject Name: Software Engineering **Subject Code: 3CS4-05**

SUBJECT Course Outcomes	
CO1	Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
CO2	Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
CO3	Communicate effectively with a range of audiences.

Subject Name: Linux and Shell Programming **Subject Code: 3CS4-06**

SUBJECT Course Outcomes	
CO1	Explain multi user Linux OS and its features
CO2	Interpret Linux Commands, Shell basics, and shell environments
CO3	Design and develop shell programs, communication, System calls
CO4	Handling installation of software for Linux based OS with source code management

Subject Name: Data Structures & Algorithms Lab **Subject Code: 3CS4-21**

SUBJECT Course Outcomes	
CO1	Be able to design and analyze the time and space efficiency of the data structure.
CO2	Understand the concept of static & Dynamic memory management.
CO3	Be capable to identity the appropriate data structure for given problem.
CO4	Have practical knowledge on the applications of data structures.

Subject Name: Object Oriented Programming using C++ Lab **Subject Code: 3CS4-22**

SUBJECT Course Outcomes	
CO1	Hands on practice of basic C++ syntax
CO2	Hands on practice of class, object and abstraction
CO3	Hands on practice of inheritance using class hierarchy
CO4	Hands on practice of function and operator overloading, Templates
CO5	Hands on practice of exception handling mechanism for robust software development in C++

Subject Name: Linux and Shell Programming Lab **Subject Code: 3CS4-23**

SUBJECT Course Outcomes	
CO1	To experiment with various basic commands, redirection and input/output of UNIX based operating systems
CO2	To develop shell scripts for various built-in commands of UNIX
CO3	To experiment with fundamental concepts of programming like loops, conditions, operators etc specific to Shell Programming
CO4	To develop shell scripts to perform tasks varying from simple to complex level

Subject Name: Digital Electronics Lab **Subject Code: 3CS4-24**

SUBJECT Course Outcomes	
CO1	Understand different Number systems, Codes, Logic Gates, Boolean laws & theorems
CO2	Simplify the Boolean functions to the minimum number of literals
CO3	Design & implement different types of combinational logic circuits using Logic gates
CO4	Design & implement different types of sequential logic circuits using Flip Flops
CO5	Design & implement different types of Counters, Registers, and Programmable Logic Devices

II Year/IV Semester

Subject Name: Discrete Mathematical Structure **Subject Code: 4CS1-01**

SUBJECT Course Outcomes	
CO1	Understand the language of logic
CO2	Understand the concept of sets, relation, function and counting principle
CO3	Understand different terminologies and theorem of Graph Theory
CO4	Understand Algebraic Structures.

Subject Name: Microprocessor and Interfaces **Subject code: 4CS4-02**

SUBJECT Course Outcomes	
CO1	Basic understanding of 8085 microprocessor, timing diagram and memory mapping.
CO2	Understand ISA for 8085 and also How to design ISA for some other microprocessors.
CO3	Write basic program in assembly language and concept of other Programmable peripheral devices.
CO4	Interface I/O devices, interrupt controller and DMA.
CO4	Basic understanding of design ISA and further design their own processor.

Subject Name: Theory of Computation **Subject Code: 4CS4-03**

SUBJECT Course Outcomes	
CO1	Able to classify Language and Grammar in Type0, Type1, Type2 and Type3. Design the Grammar for given string or languages.
CO2	Able to design the FA, PDA and TM for given string and languages.
CO3	Able to convert PDA to CFG. Able to apply the pumping lemma for regular languages
CO4	Able to demonstrate that a grammar is ambiguous. Simplification of the CFG, representations of grammars in CNF and GNF.
CO5	Understanding the concepts of LBA, NP Complete and NP Hard.

Subject Name: Database Management System **Subject Code: 4CS4-04**

SUBJECT Course Outcomes	
CO1	Describe DBMS architecture, physical and logical database designs, database models, entity-relationship model.
CO2	Understand relational algebra, relational calculus importance and query writing
CO3	Apply Structured query language (SQL) for database definition, database manipulation, data control.
CO4	Understanding of normalization theory and apply it to normalize databases.
CO5	Understand various transaction processing, concurrency control mechanisms and database protection mechanisms.

Subject Name: Introduction to Python Programming **Subject Code: 4CS4-05**

SUBJECT Course Outcomes	
CO1	Know the Essential concepts of Python Programming and its real time use
CO2	Design algorithms and source code
CO3	Use of suitable data structure and logic for problem solving.

Subject Name: Introduction to Java Programming **Subject Code: 4CS4-06**

SUBJECT Course Outcomes	
CO1	Understand the features of Java such as operators, classes, objects, inheritance, packages and exception handling
CO2	Learn latest features of Java like garbage collection, Console class, Network interface, APIs
CO3	Acquire competence in Java through the use of multithreading, applets
CO4	Get exposure to advance concepts like socket and database connectivity

Subject Name: Database Management Systems Lab **Subject Code: 4CS4-21**

SUBJECT Course Outcomes	
CO1	Installation of Backend and front end
CO2	Writing DDL queries effectively
CO3	Writing advance DML queries in MySQL
CO4	Writing DCL queries, triggers and views
CO5	Developing a web-based or client server-based application

Subject Name: Microprocessor and Interfaces Lab **Subject Code: 4CS4-22**

SUBJECT Course Outcomes	
CO1	Ability to write assembly language program for data transfer and control instructions.
CO2	Ability to write assembly language program for Arithmetic calculation using register pair
CO3	Ability to Write assembly language program for interfacing with Programmable peripheral devices.
CO4	Assembly language programming for general purpose problems like traffic light controller, control the speed of step motor etc.
CO5	To make live projects using assembly language and interfacing with PPI and see outputs on CRO and other electronic devices.

Subject Name: Python Programming Lab **Subject Code: 4CS4-23**

SUBJECT Course Outcomes	
CO1	Demonstrate and understanding of programming language concepts
CO2	Identify and abstract the programming task involved for a given problem
CO3	Design and develop modular programming skills
CO4	Trace and debug a program.

Subject Name: Java Programming Lab **Subject Code: 4CS4-24**

SUBJECT Course Outcomes	
CO1	Implement the features of Java such as operators, classes, objects, inheritance, packages and exception handling
CO2	Design problems using latest features of Java like garbage collection, Console class, Network interface, APIs
CO3	Develop competence in Java through the use of multithreading, Applets etc
CO4	Apply advance concepts like socket and database connectivity, and develop project based on industry orientation

III Year/V Semester

Subject Name: Microprocessor & Interfaces **Subject Code: 5CS3-01**

SUBJECT Course Outcomes	
CO1	Be able to distinguish components of microprocessor and working of 8085 and also memory mapping in microprocessors.
CO2	Learn and understand codes and instructions related to microprocessor for programming 8085.
CO3	To learn advanced codes and programming styles using different techniques of instruction handling and memory management.
CO4	To learn and remember different peripheral devices that connect to 8085 and understand their working with former to get advanced usages.
CO5	To learn the applications of microprocessors in different advancements of communication.

Subject Name: Compiler Design **Subject Code: 5CS4-02**

Compiler Design Course Outcomes	
CO1	Discuss the major phases of compilers and use the knowledge of the Lex tool
CO2	Develop the parsers and experiment with the knowledge of different parsers design without automated tools.
CO3	Describe intermediate code representations using syntax trees and DAG's as well as use this knowledge to generate intermediate code in the form of three address code representations.
CO4	Classify various storage allocation strategies and explain various data structures used in symbol tables
CO5	Summarize various optimization techniques used for dataflow analysis and generate machine code from the source code of a novel language.

Subject Name: Operating System **Subject Code: 5CS4-03**

Operating System Course Outcomes	
CO1	Able to understand the fundamental concepts of operating system
CO2	Describe and analyze the memory management and its allocation policies
CO3	Apply different deadlock management techniques to handle the basic operating system resources
CO4	Understand file concepts, file structures and file management techniques
CO5	Able to understand and analyses the concept of Linux, Unix and time operating system.

Subject Name: Computer Graphics and Multimedia **Subject Code: 5CS4-04**

SUBJECT Course Outcomes	
CO1	Be able to understand the scan conversion of mathematical objects like line, circle, ellipse and curve.
CO2	Be able to apply color fill algorithms on user defined objects that are modeled using polygons
CO3	Be able to implement two dimensional transformation operation on user defined objects
CO4	Be able to implement three dimensional transformation operations on user defined objects
CO5	Be able to understand basic illumination model and color models along with their suitable use

Subject Name: Analysis of Algorithms **Subject Code: 5CS4-05**

SUBJECT Course Outcomes	
CO1	Learn to prove the correctness, using running time of algorithms in research and able to implement divide and conquer method with its complexity analysis.
CO2	Be able to understand concept of and implement greedy method and dynamic programming and use for problem solving.
CO3	Learn to use backtracking and branch & bound algorithms and various pattern matching algorithms implementation and their complexity analysis.
CO4	Be able to understand assignment problems and randomized algorithms and explore their applications.
CO5	Study ad understand about problem classes and understand their concept for proving NP Complete problems and use it in research work.

Subject Name: Computer Graphics and Multimedia Lab **Subject Code: 5CS4-21**

SUBJECT Course Outcomes	
CO1	Be able to understand the scan conversion of mathematical objects like line, circle, ellipse and curve.
CO2	Be able to apply color fill algorithms on user defined objects that are modeled using polygons
CO3	Be able to implement two dimensional transformation operation on user defined objects
CO4	Be able to implement three dimensional transformation operations on user defined objects
CO5	Be able to understand basic illumination model and color models along with their suitable use

Subject Name: Analysis of Algorithms Lab **Subject Code: 5CS4-23**

SUBJECT Course Outcomes	
CO1	Implement sorting algorithms using divide & conquer approach
CO2	Implement problems using dynamic programming approach
CO3	Implement problems using greedy approach
CO4	Implement graph traversal algorithms
CO5	Learn & implement backtracking algorithm

Subject Name: Advanced Java Lab **Subject Code: 5CS4-24**

SUBJECT Course Outcomes	
CO1	Be able to apply swing technology for development of Graphical User Interface
CO2	Be able to examine the JDBC code
CO3	Be able to write a code to perform communication between two java applications running on different system using RMI technology
CO4	Be able to use Apache tomcat server for running the JSP and servlet programs
CO5	Be able to implement and modify JSP and Servlet Programs which run on server side.

Subject Name: Industrial Training **Subject Code: 5CS7-30**

SUBJECT Course Outcomes	
CO1	To enable students to learn basic concepts of project and production management
CO2	Demonstrate the interpersonal, communication skills and awareness in field related to the subject
CO3	Discussion & critical thinking about the topic of current intellectual importance
CO4	Develop interest towards research oriented field with ability to search the literature and brief report preparation
CO5	Demonstrate professionalism with ethics

III Year/VI Semester

Subject Name: Digital Image Processing **Subject Code: 6CS3-01**

SUBJECT Course Outcomes	
CO1	Remember the fundamental concepts of digital image processing such as image acquisition, representation and image transform.
CO2	Apply different image enhancement techniques such as image transformation and histogram processing.
CO3	Understand and review image transform model, image restoration and applications of image filters.
CO4	Analyze the basic algorithms used for image processing and image compression.
CO5	Recapitulate the technique of edge detection, boundary descriptors, and regional descriptors.

Subject Name: Machine Learning **Subject Code: 6CS4-02**

SUBJECT Course Outcomes	
CO1	Able to remember basic terminologies of machine learning
CO2	Able to understand workflow to apply machine learning algorithm
CO3	Able to apply supervised & unsupervised algorithm
CO4	Able to analyze or interpret results of algorithms output
CO5	Able to evaluate algorithms performance based on different datasets

Subject Name: Computer Architecture and Organization **Subject Code: 6CS4-04**

SUBJECT Course Outcomes	
CO1	Explaining the basic of computer architecture- classification, Basic computer data types and representation, micro-operations, Registers, Instructions, instruction cycle and design of basic computer.
CO2	Apply the basic concept of Assembly Language and understand Micro programmed control.
CO3	Outlining the organization of CPU, concept of instruction and arithmetic pipeline, vector processing including the RISC/CISC Architecture.
CO4	Checking how computer perform arithmetic operation. Demonstrate the basic knowledge of I/O mechanism, interfacing of I/O device with computer.
CO5	Identify the concept of memory organization and multiprocessors.

Subject Name: Artificial Intelligence **Subject Code: 6CS4-05**

SUBJECT Course Outcomes	
CO1	Explain the basic concept and evolution of artificial intelligence and intelligent agents
CO2	Formulate a problem as a particular type such as defining a state space for a search problem
CO3	Identify and distinguish problems that are amenable to solution by AI methods and which ai methods may be suited in solving a given problem
CO4	Analyze and apply different machine learning algorithms according to the type of problem.
CO5	Explain pattern recognition techniques and apply them for solving parametric and non-parametric problems

Subject Name: Distributed System **Subject Code: 6CS4-06**

SUBJECT Course Outcomes	
CO1	Understand various terminologies, system concept and architecture of distributed system.
CO2	Understand concurrent processes and programming and interprocess communication.
CO3	Understand distributed process scheduling and distributed file system
CO4	Understand concept of distributed shared memory
CO5	Understand distributed agreement and replicated data management.

Subject Name: Cloud Computing **Subject Code: 6CS5-12**

SUBJECT Course Outcomes	
CO1	To learn and understand the basics of Cloud computing.
CO2	Understanding the cloud Design and Infrastructure. Cloud computing service and deployment models. Programming languages and software used for developing cloud applications.
CO3	To understand virtualization and its role in cloud computing.
CO4	To understand the Cloud Computing Services and security issues.
CO5	To Study popular Cloud Platforms Available in market. Advance topics in Cloud computing.

Subject Name: Ecommerce & ERP **Subject Code: 6CS5-13**

SUBJECT Course Outcomes	
CO1	Understand the basic concepts and technologies used in the field of E-Commerce and analyze the impact of ecommerce business models and strategy.
CO2	Have the knowledge of the different types of E commerce activities.
CO3	Understand the use of Internet in developing E commerce facilities.
CO4	Understanding the use of portals and online publishing and advertising in ecommerce
CO5	Have the knowledge and understanding the use of XML and E-marketing tools and strategies.

IV Year/VII Semester

Subject Name: Big Data Analytics **Subject Code: 7CS4-01**

SUBJECT Course Outcomes	
CO1	**CO1**: Able to define the concept of Big Data and their challenges with solutions.
CO2	**CO2**: Able to explain and Analyze the Big Data using Map-reduce programming in Hadoop framework.
CO3	**CO3**: Able to Understand the Hadoop data type for big data.
CO4	**CO4**: Analyze pig architecture to made easier Hadoop programming
CO5	**CO5**: Able to apply structure to Hadoop data with hive

Subject Name: Big Data Analytics Lab **Subject Code: 7CS4-21**

SUBJECT Course Outcomes	
CO1	Understand and implement basic data structure like linked list, stack, queue, set and map in java
CO2	Demonstrate knowledge of big data analytics and implement different file management task in Handoop
CO3	Understand map reduce paradigm and develop data applications using variety of systems
CO4	Analyze and perform different operations on data using Pig Latin Scripts
CO5	Illustrate and apply different operation on relations and databased using Hive

Subject Name: Seminar **Subject Code: 7CS4-40**

SUBJECT Course Outcomes	
CO1	Ability to choose latest & trending topics in field of engineering
CO2	Demonstrate the interpersonal, communication skills and awareness in the field to the subject.

IV Year/VIII Semester

Subject Name: Internet of Things **Subject Code: 8CS4-21**

SUBJECT Course Outcomes	
CO1	Explain the concept and application of internet of thing
CO2	Illustrate key technologies, protocol & standards in internet of things
CO3	Analyze trade offs in interconnected wireless embedded device network
CO4	Application of IOT in automation of commercial & real world examples
CO5	Design a simple IOT System comprising sensors, edge devices & wireless network connections involving prototyping, programming, and data analysis

Subject Name: Software Testing & Validation Lab **Subject Code: 8CS4-22**

SUBJECT Course Outcomes	
CO1	Understand & automation testing approach using JABuTi tool.
CO2	Analyse & discuss performance of different website using Jmeter
CO3	Describe & Calculate mutation score for various programs using jumble testing tool
CO4	Calculate the coverage analysis of programs using Eclemma tool
CO5	Generate test sequence and compare using Selenium tool for different websites.

Subject Name: Disaster Management **Subject Code: 8CS6-60.2**

SUBJECT Course Outcomes	
CO1	To be able to understand disaster related social issues.
CO2	Able to assess risk and vulnerability factors.
CO3	Understand various aspects of natural disasters.
CO4	Understand issues involved in manmade disasters.
CO5	Understand the role of management and production people in mitigating disaster.

Subject Name: Project **Subject Code: 8CS7-50**

SUBJECT Course Outcomes	
CO1	Present effective communication skills and relate engineering issues to broader societal content
CO2	Get capable of self education and clearly understand the value of achieving perfection in project implementation and completion
CO3	Ability to apply and explain basic concepts and broad principles of engineering project and production management
CO4	Able to write effective reports and design documents
CO5	Demonstrate professionalism with ethics and punctuality throughout project life cycle