Allenhouse Institute of Technology, Rooma Kanpur

Department of Computer Science Engineering

Course Outcome (ODD Sem 2022-23)

S. No.	Course Code	Course Name	COs
1	KVE-301	Human Values	CO-1 :Students who complete this course should be able to realize the importance & need of human values and value education to human being. CO-2 :Students should be able to realize the importance of self-exploration in harmony of family. They should be able to understand and appreciate role of harmonious family in peaceful society. CO-3 :They should be able to understand and appreciate role of harmonious family in peaceful society. CO-4 :Students who complete this course should be able to investigate his/her self & make it suitable to society and existence. CO-5 :Students should be able to apply the ethical and human values in family, society, nature and professional life.
2	KOE 034	Sensors & Instrumentations	CO 1: Apply the use of sensors for measurement of displacement, force and pressure. CO 2: Employ commonly used sensors in industry for measurement of temperature, position, accelerometer, vibration sensor, flow and level. CO 3: Demonstrate the use of virtual instrumentation in automation industries. CO 4: Identify and use data acquisition methods. CO 4: Comprehend intelligent instrumentation in industrial automation.
3	KCS301	Data Structure	CO-1 :Describe how arrays, linked lists, stacks, queues, trees, and graphs are Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications. CO-2 :Discuss the computational efficiency of the sorting and searching algorithms. CO-3 :Implementation of Trees and Graphs and perform various operations on these data structure. CO-4 :Understanding the concept of recursion, application of recursion and its implementation and removal of recursion. CO-5 :Identify the alternative implementations of data structures with respect to its performance to solve a real-world problem.
4	KCS 302	Computer Organization	CO1:Study of the basic structure and operation of a digital computer system. CO2:Analysis of the design of arithmetic & logic unit and understanding of the fixed point and floating point arithmetic operations. CO3:Understand the Design & Implementation of control unit techniques and the concept of Pipelining. CO4:Understanding the hierarchical memory system, cache memories , virtual memory and mapping techniques. CO5:Understanding the different ways of communication with I/O devices and standard I/O interfaces.
5	KCS303	Discrete Structures and Theory of Logic	CO1:Cite an argument using logical notation and determine if the argument is or not valid. CO2:Explain and discuss the basic principles of logic and structures. CO3:Employ understanding of relations and functions and be able to determine their properties. CO4:Analyse models using concepts of discrete structures such as graphs and trees.
6	KCS351	Data Structures Using C Lab	CO-1 :Identify the alternative implementations of data structures with respect to its performance to solve a real-world problem.Interpret and compute asymptotic notations of an algorithm to analyze the consumption of recourses(time/space). CO-2 : Exemplify and implement stack, queue and list ADT, tree and graph to manage the memory using static and dynamic allocations. CO-3 :Implement binary search tree to design applications like expression trees. CO-4 :Identify, model, solve and develop code for real life problems like shortest path and MST using graph theory. CO-5 :Develop and compare the comparison-based search algorithms and sorting Algorithms. CO-6 :Identify appropriate data structure and algorithm for a given contextual problem and develop in c.

7	KCS352	Computer Organization Lab	CO-1 :Understand the operations of digital logic circuits and the organization of computer system. CO-2 :Design digital logic circuit for Input / Output and Arithmetic and Logical Unit CO-3 :Design and Implement the circuit for Control Unit of the Computer System
8	KNC302	Python Programming	CO-1 :To read and write simple Python programs. CO-2 :To develop Python programs with conditionals and loops. CO-3 :To define Python functions and to use Python data structures –- lists, tuples, dictionaries. CO-4 :To do input/output with files in Python. CO-5 :To do searching ,sorting and merging in Python.
9	KCS353	Discrete Structue & Theory of Logic Lab	CO-1 :Students are able to recall, from previous set theoretical knowledge, concepts of basic set operations and should be able to design solutions to simple socio-engineering problems by way of computer programs. CO-2 :Students are able to simulate probability theory concepts in Scilab environment. The students should be able to analyze a socio-engineering problem of probability theory, design algorithm for it and implement it in Scilab. CO-3 :Students are able to design algorithmic solutions to socio-engineering problems of binary relations that would answer complex queries of the user. CO-4 :Students are able to apply the concepts of inference theory to prove validity of mathematical or societal arguments. CO-5 :Students learnt the concepts of graph theory and apply in complex engineering and social problems.
10	KCS-055	Machine Learning Techniques	CO1:To understand the need for machine learning for various problem solving. CO2:To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning. CO3:To understand the latest trends in machine learning. CO4:To design appropriate machine learning algorithms for problem solving. CO5:To understand the need for machine learning for various problem solving.
11	KCS-052	Web Designing	CO-1 :Demonstrate the knowledge of Basic principles involved in developing a web site, Planning process, Domains and Hosting, Responsive Web Designing, Types of Websites (Static and Dynamic Websites), Web Standards and W3C recommendations CO-2 :Analyse and develop the website using HTML. CO-3 :Develop the responsive website using CSS. CO-4 :Implement script using JavaScript scripting language. CO-5 :Capable to host and rank the web pages and website using Hosting Servers & SEO.
12	KCS-501	Database Management Systems	CO-1 :Apply knowledge of database management system with the example of real life applications. CO-2 :Apply query processing techniques with different operations to automate the real time problems of databases. CO-3 :Identify and solve the redundancy problem with different approach in database tables using normalization. CO-4 :Understand the concepts of transactions, their processing so they will familiar with broad range of database management issues including data integrity, deadlock handling, security and recovery. CO-5 :Design, develop and implement a small database project using database tools with concurrency control techniques.

13	KCS-502	Compiler Design	CO-1 :Acquire knowledge of different phases and passes of the compiler and also able to use the compiler construction toolkit, etc. Ability to analyze & design grammars for different formal languages. CO-2 :Detailed working of parser and its types i.e. like TDP and BUP and construction of parsing tables for some popular parsers like LL, SLR, CLR, and LALR parsing table. CO-3 :Implementation of compilers using syntax-directed translation (SDT) methods including L-attributed and S-attributed SDT, and get knowledge about the synthesized and inherited attributes. CO-4 :Acquire knowledge about run time data structure like symbol table organization and different techniques used in Error Detection & Recovery. CO-5 :Understand the target machine's run time environment, its instruction set for code generation, and techniques used for code optimization including Machine-Independent Optimizations and Machine-Dependent Optimizations.
14	KCS 503	Algorithm Design and Analysis	CO1: Understand the process of analysing the Time and Space complexity of algorithms. Sorting problems will be evaluated for time and space complexity. CO2:Understand and apply the concepts Advance data structures like Red- Black Trees, B-Trees, Binomial Heaps, Fibonacci Heaps, etc. CO3:Apply the Divide & conquer design strategy to various problems. Understanding the difference between Divide & Conquer& Dynamic programming design strategies. CO4:Understanding and applying the concepts of Greedy programming, Back Tracking & Branch & Bound algorithm design approaches to problems of real world. CO5:Understand the concepts of applying the Non-Deterministic and approximation approach to complex problems
15	KNC-501	Constitution of India, Law and Engineering	CO-1 :Explain the basic features and modalities about Indian constitution. CO-2 :Discuss the functioning of Indian parliamentary system at the center and state level. CO-3 :Analyse different aspects of Indian Legal System and its related bodies. CO-4 :Demostrate and apply different laws and regulations related to engineering practices. Describe and analyze various reliability methods and able to identifying the defects CO-5 :Correlate role of engineers and apply in different organizations and governance models
16	KCS-551	Database Management Systems Lab	CO-1 :Understand and apply oracle 11 g products for creating and managing tables, views, indexes, sequences and other database objects. CO-2 :Design and implement a database schema for real life examples like company data base, banking data base, library information system, payroll processing system, student information system. CO-3 :Write and execute simple and complex queries using DDL, DML, DCL and TCL. CO-4 :Write and execute PL/SQL blocks, procedure functions, packages and triggers, cursors. CO-5 :Enforce entity integrity, referential integrity, key constraints, and domain constraints on database..
17	KCS-552	Compiler Design Lab	CO-1 :Identify patterns, tokens & regular expressions for lexical analysis. CO-2 :Design Lexical analyser for given language using C and LEX /YACC tools CO-3 :Design and analyze top down and bottom up parsers. CO-4 :Generate the intermediate code CO-5 :Generate machine code from the intermediate code forms

18	KCS 553	Algorithm Design and Analysis Lab	CO1: Implement algorithm to solve problems by iterative approach. CO2:Implement algorithm to solve problems by divide and conquer approach CO3:Implement algorithm to solve problems by Greedy algorithm approach. CO4:Implement algorithm to solve problems by Dynamic programming, backtracking, branch and bound approach. CO5:Implement algorithm to solve problems by branch and bound approach.
19	KCS 553	Algorithm Design and Analysis Lab	CO1: Implement algorithm to solve problems by iterative approach. CO2:Implement algorithm to solve problems by divide and conquer approach CO3:Implement algorithm to solve problems by Greedy algorithm approach. CO4:Implement algorithm to solve problems by Dynamic programming, backtracking, branch and bound approach. CO5:Implement algorithm to solve problems by branch and bound approach.
20	KHU702	Project Management	CO-1 :Students can understand the definitions, concepts and components of PROJECT MANAGEMENT & ENTREPRENEURSHIP. CO-2 :Students will be able to explore about the Entrepreneurial Idea and Innovation. CO-3 :Students will be able to explain the basic steps in the appraisal of project management. CO-4 :Students will be able to understand about Project Financing methods CO-5 :Students will be able to understand about Social Entrepreneurship to create Successful Models.
21	KCS713	Cloud Computing	CO-1 :Describe architecture and underlying principles of cloud computing. CO-2 :Explain need, types and tools of Virtualization for cloud. CO-3 :Describe Services Oriented Architecture and various types of cloud services. CO-4 :Explain Inter cloud resources management cloud storage services and their providers Assess security services and standards for cloud computing. CO-5 :Analyze advanced cloud technologies.
22	KCS071	Artificial Intelligence	CO-1 :Explain the basics of the theory and practice of Artificial Intelligence as a discipline and about intelligent agents CO-2 :Articulate search techniques and gaming theory. CO-3 :Apply knowledge representation techniques and problem solving strategies to common AI applications. CO-4 :Explain the techniques used for classification and clustering. CO-5 :Explain benefits of AI in various application areas.
23	KOE-068	SOFTWARE PROJECT MANAGEMENT	CO1: Identify project planning objectives, along with various cost/effort estimation models. CO2:Organize & schedule project activities to compute critical path for risk analysis. CO3:Monitor and control project activities. CO4:Formulate testing objectives and test plan to ensure good software quality under SEI-CMM. CO5:Configure changes and manage risks using project management tools.

24	KCS071	Artificial Intelligence	CO-1 :Explain the basics of the theory and practice of Artificial Intelligence as a discipline and about intelligent agents CO-2 :Articulate search techniques and gaming theory. CO-3 :Apply knowledge representation techniques and problem solving strategies to common AI applications. CO-4 :Explain the techniques used for classification and clustering. CO-5 :Explain benefits of AI in various application areas.
25	KOE074	Renewable Energy Resources	CO-1 :To Understand the Need, importance and scope of non conventional and solar cell and its implementation in industry. CO-2 :Experiment solar thermal energy method in power plant and its limitations. CO-3 :To Examine the geothermal energy conversion performances of various types of fuel cell. CO-4 :Ability to analyse the viability of wind and alternative energy projects CO-5 :Ability to analyze the performance of bio mass, ocean energy, wave and tidal wave.
26	KCS771	ARTIFICIAL INTELLIGENCE LAB	CO-1 :Implement different searching algorithms, using Python CO-2 :Implement basic problem solving games, using Python. CO-3 :Implement basic AI techniques, over String data type. CO-4 :Understand and Implement Natural Language Tool Kit.
27	KCS753, KCS 851	Project	CO-1 :Analyze and understand the real life problem and apply their knowledge to get programming solution. CO-2 :Engage in the creative design process through the integration and application of diverse technical knowledge and expertise to meet customer needs and address social issues. CO-3 : Use the various tools and techniques, coding practices for developing real life solution to the prob software applications CO-4 : Find out the errors in software solutions and establishing the process to design maintainable software applications CO-5 :Write the report about what they are doing in project and learning the team working skills
28	KCS 354 , KCS 554 , KCS 752	Mini Project or Internship Assessment	CO-1 :Developing a technical artifact requiring new technical skills and effectively utilizing a new software tool to complete a task CO-2 : Writing requirements documentation, Selecting appropriate technologies, identifying and creating appropriate test cases for systems. CO-3 : Demonstrating understanding of professional customs & practices and working with professional standards. CO-4 : Improving problem-solving, critical thinking skills and report writing. CO-5 :Learning professional skills like exercising leadership, behaving professionally, behaving ethically, listening effectively, participating as a member of a team, developing appropriate workplace attitudes.

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2	KOE048	Electronics Engineering	CO-1 :Express the concept of PN junction and special purpose diodes CO-2 :Analyze the application of conventional diode and semiconductor diodes. CO-3 : Examine the I-V characteristic of BJT and FET. CO-4 :Analyze of Op-Amp, amplifiers , integrator and differentiator. CO-5 :Express the concept of digital strorage oscilloscope and compare of DSO with analog oscilloscope:
3	KCS401	Operating Systems	CO-1 :Understand the structure and functions of OS CO-2 : Learn about Processes, Threads and Scheduling algorithms. CO-3 : Understand the principles of concurrency and Deadlocks CO-4 : Learn various memory management scheme CO-5 :Study I/O management and File systems.
4	KCS 402	Theory of Automata and Formal Languages	CO-1 :Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars CO-2 :CO2:Analyse and design, Turing machines, formal languages, and grammars CO-3 :Demonstrate the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving CO-4 :Prove the basic results of the Theory of Computation. CO-5 :State and explain the relevance of the Church-Turing thesis.
5	KCS403	Microprocessor	CO-1 :1Apply a basic concept of digital fundamentals to Microprocessor based personal computer System. CO-2 :Analyze a detailed s/w & h/w structure of the Microprocessor. CO-3 :Illustrate how the different peripherals (8085/8086) are interfaced with Microprocessor. CO-4 :Analyze the properties of Microprocessors CO-5 :Evaluate the data transfer information through serial & parallel ports.
6	KCS451	Operating Systems Lab	CO-1 :Understand and remember various CPU scheduling, memory management, process system CO-2 :Analyse and apply the various operating system algorithms. CO-3 :Implement and execute the various operating system algorithms
7	KCS452	Microprocessor Lab	CO-1 :Understand 8085, 8086 microprocessor and familiarize with the assembly level programming CO-2 :Interface various devices to the microprocessor CO-3 :Measure and record the experimental data, analyze the results, and prepare a formal laboratory report

8	KCS453	Python Language Programming Lab	CO-1 :Apply basic programming constructs like conditional statement, loops condition and functions in python program. Develop Python programs step-wise by defining functions and calling them. CO-2 :Where and how to use the python data collections like lists, tuples, dictionaries for representing compound data. Read and write data from/to files in Python. CO-3 :To deal with exceptions while coding and the use of built in functions and user define functions. CO-4 :Practiced and now familiar with the coding platforms and how to solve coding questions.
9	KNC401	Computer System Security	CO-1 :Explain the meaning of Computer System Security along with vulnerabilities which pave the way for various threats and mitigation policies against such threats. CO-2 :Articulate the significance of Confinement Principles and Intrusion Detection System. CO-3 :Illustrate the ways to enhance the system security by Access Control Mechanisms and various measures to mitigate threats over web. CO-4 :Articulate the need of various cryptographic techniques and their amalgamation with various networking protocols. CO-5 :Demonstrate the basic security problems leading to different attack scenarios, along with proposed mitigation techniques.
10	KCS601	Software Engineering	CO-1 :Explain various software characteristics and analyze different software Development Models. CO-2 :Demonstrate the contents of a SRS and apply basic software quality assurance practices to ensure that design, development meet or exceed applicable standards. CO-3 :Compare and contrast various methods for software design CO-4 :Formulate testing strategy for software systems, employ techniques such as unit testing, Test driven development and functional testing. CO-5 :Manage software development process independently as well as in teams and make use of Various software management tools for development, maintenance and analysis.
11	KCS602	Web Technology	CO-1 :Explain web development Strategies and Protocols governing Web. CO-2 :Develop Java programs for window/web-based applications. CO-3 :Design web pages using HTML, XML, CSS and JavaScript. CO-4 :Creation of client-server environment using socket programming. CO-5 :Building enterprise level applications and manipulate web databases using JDBC. CO-6 :Design interactive web applications using Servlets and JSP.
12	KCS603	Computer Networks	CO-1 :Explain basic concepts, OSI reference model, services and role of each layer of OSI model and TCP/IP, networks devices and transmission media, Analog and digital data transmission CO-2 :Apply channel allocation, framing, error and flow control techniques. CO-3 :Describe the functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism. CO-4 :Explain the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism. CO-5 :Explain the functions offered by session and presentation layer and their Implementation CO-6 :Explain the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and VPN.
13	KCS-064	Data Compression	CO-1 :Describe the evolution and fundamental concepts of Data Compression and Coding Techniques. CO-2 :Apply and compare different static coding techniques (Huffman & Arithmetic coding) for text compression.

			CO-3 : Apply and compare different dynamic coding techniques (Dictionary Technique) for text compression. CO-4 :Evaluate the performance of predictive coding technique for Image Compression. CO-5 :Apply and compare different Quantization Techniques for Image Compression.
14	KOE-068	SOFTWARE PROJECT MANAGEMENT	CO1: Identify project planning objectives, along with various cost/effort estimation models. CO2:Organize & schedule project activities to compute critical path for risk analysis. CO3:Monitor and control project activities. CO4:Formulate testing objectives and test plan to ensure good software quality under SEI-CMM. CO5:Configure changes and manage risks using project management tools.
15	KCS651	Software Engineering Lab	CO-1 :Identify ambiguities, inconsistencies and incompleteness from Requirements specification and state functional and non-functional requirement CO-2 :Identify differentactors and use cases from a given problem statement and draw use casediag ramtoassociate use cases with different types of relationship CO-3 :Draw a class diagram after identifying classes and association among them CO-4 :Graphically represent various UML diagrams ,and associations among them and identify thelogical sequence of activities undergoing in a system, and represent them pictorially CO-5 :Abletouse modern engineering tools fors pecification, design, implementation and testing
16	KCS652	Web Technology Lab	CO-1 :Develop static web pages using HTML CO-2 :Develop Java programs for window/web-based applications. CO-3 :Design dynamic web pages using Javascript and XML. CO-4 :Design dynamic web page using server site programming Ex. ASP/JSP/PHP CO-5 :Design server site applications using JDDC,ODBC and section tracking API
17	KCS653	Computer Networks Lab	CO-1 :Simulate different network topologies CO-2 :Implement various framing methods of Data Link Layer CO-3 :Implement various Error and flow control techniques CO-4 :Implement network routing and addressing techniques CO-5 : Implement transport and security mechanisms
18	KNC602	Indian Tradition, Culture and Society	CO-1 :To recall & state thought process of social setting in ancient India to identify the roots and details of some contemporary issues faced by Indians and try to formulate& construct possible solutions to these challenges by digging deep into our past. CO-2 :The students are able to identify & inspect the importance of our surroundings & culture to design & formulate sustainable developmental solutions of prevailing social evils. CO-3 : The students are able to &understand the issues related to 'Indian' culture, tradition and its composite character to apply the same in the socio-technological developments in present scenario. CO-4 :The students will be able to identify and understand the holistic life styles of Yogic- science and wisdom described in ancient literatures that are important to design & develop sustainability in modern society with rapid technological advancements and societal disruptions. CO-5 :The students are able to relate & assess Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system to illustrate, devise, manage, the health care, architecture, water management & other systems in the present scenario.

19	KHU802	PROJECT MANAGEMENT & ENTREPRENEURSHIP	CO-1 :Apply critical and creative thinking in the design of engineering projects, Plan and manage your time effectively as a team CO-2 :Consider the business context and commercial positioning of designed devices or systems and apply knowledge of the 'real world' situations that a professional engineer can encounter CO-3 :Use fundamental knowledge and skills in engineering and apply it effectively on a project and design and develop a functional product prototype while working in a team CO-4 :Undertake an engineering project under mentorship and timely reflect on your own and peers' technical and non-technical learning CO-5 :Orally present and demonstrate your product to peers, academics, general and industry community and Manage any disputes and conflicts within and outside your team.
20	KOE-085	Quality Management	CO-1 :Identify the contribution of quality Concepts in QM journey and acknowledge the importance on Purchased Product in Manufacturing Quality CO-2 :Explain and analyze quality management and organizational structures to apply quality principles in different approaches CO-3 :Design an effective performance measurement system to optimize standard statistical process by analysis and control chart CO-4 :Describe and analyze various reliability methods and able to identifying the defects CO-5 :Apply the concepts of ISO - 9000 and its concept of Quality Management such as JIT and Taguchi Method
21	KOE094	DIGITAL AND SOCIAL MEDIA MARKETING	CO-1 :Explain the Evolution and Landscape of Digital Marketing. CO-2 :Analyze the Social Media Marketing Strategy for Consumer Engagement CO-3 :Interpret the concepts of various Digital Promotion Strategies CO-4 :Evaluate the CRM and web analytics techniques. CO-5 :Use social media analytics and integrative media strategies