K.D.K. College of Engineering, Nagpur
Department of Computer Science & Engineering

SESSION 2021-22

Course Outcomes (2021-2022)	
Third Semester	
BECSE301T	**Applied Mathematics-III**
CO301.1	To understand numerical methods, matrices for the solution of linear and nonlinear equations, and the solution of differential equations, among other mathematical processes and activities.
CO301.2	To analyze real world scenarios to recognize when matrices and probability are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches.
CO301.3	To organize, manage and present data in a clear and concise manner.
CO301.4	To develop an ability to identify, formulate and / or solve real world problems.
CO301.5	To understand the impact of scientific and engineering solutions in a global and societal context.
BECSE302T	**Object Oriented Programming with Java**
CO302.1	To identify classes, objects, members of a class and relationships among them for a specific problem.
CO302.2	To understand and demonstrate the concepts of garbage collection, polymorphism, inheritance etc.
CO302.3	To do numeric(algebraic) and string-based computation.
CO302.4	To understand and implement modularity as well as basic error handling techniques.
CO302.5	To develop, design and implement small multithreaded programs using Java language.
BECSE303T	**Operating System**
CO303.1	To describe the important computer system resources and the role of operating system in their management policies and algorithms.
CO303.2	To understand the process management policies and scheduling of processes by CPU.
CO303.3	To describe and analyze the memory management and its allocation policies.
CO303.4	To evaluate the requirement for process synchronization and coordination handled by operating system.
CO303.5	To identify use and evaluate the storage management policies with respect to differentstorage management technologies and also understand the concept of Deadlock Prevention, Avoidance, Detection and Recovery.
BECSE304T	**Computer Architecture &Digital System**
CO304.1	To memorize and understand the basic concept of digital system which will be used to design the computer system.
CO304.2	To study and understand various instruction format used in computer design.
CO304.3	To study and understand the details working principle of basic processing unit.
CO304.4	To perform the arithmetic operation which is being used in the operation of computer system.
CO304.5	Analyze and utilize OP-AMPs To understand variety of memory design system and different ways of communicating with I/O devices.

BECSE305T	Ethics in IT
CO305.1	To acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.
CO305.2	Identify and analyses the process of power generation through solar
CO305.3	To identify the multiple ethical interests at stake in a real-world situation or Practice.
CO305.4	To understand and apply Intellectual Property and related law in reality.
CO305.5	To understood the core values that shape the ethical behavior of an engineer / IT Professional.
BECSE306T	Universal Human Values
CO306.1	To become more aware of themselves, and their surroundings (family, society, nature)
CO306.2	To become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
CO306.3	They would have better critical ability.
CO306.4	To become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
BECSE307T	Environmental Engineering (Audit Course)
CO307.1	Identify different types of air pollutions as well as explain their causes, detrimental effectson environment and effective control measures.
CO307.2	Recognize various sources of water pollutants and interpret their causes.
CO307.3	Illustrate various types of pollutant waste Management.
CO307.4	Analyze various environmental social issues and challenges in implementation of environmental laws.
BECSE308P	Object Oriented Programming with Java
CO308.1	Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods.
CO308.2	Be able to use the Java SDK environment to create, debug and run simple Java programs.
CO308.3	To analyze the object-oriented paradigm using java programming language.
CO308.4	To implement small/medium scale java programs to resolve small business problems.
BECSE309P	Operating System
CO309.1	Practical implementation of Process concept, scheduling algorithms.
CO309.2	To implement demand paging using FIFO method, strings using LRU method.
CO309.3	Implementation of virtual memory management, producer and consumer processes using semaphore.
CO309.4	Apply knowledge for implementation of MVT (Multiprogramming with a Variable number of Tasks) and MFT (Multiprogramming with a fixed number of Tasks) memory management techniques.
BECSE310P	Computer Workshop-1
CO310.1	Get a fundamental understanding of Hyper Text Markup Language and apply the concepts of basic H.T.M.L code structure.
CO310.2	Implementation of list tag, marquee tag, href tag, frame tag, form tag and designing of small website using tags.
CO310.3	Designing the concepts for creation of H.T.M.L Table using Rows and Columns.
CO310.4	Describing Variables, Arrays, Operators and Conditional Statement using Java script.

FOURTH SEMESTER B. Tech.	
BECSE401T	**Discrete Mathematics & Graph Theory**
CO401.1	Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction.
CO401.2	Gain an introduction into how mathematical models for engineering are designed, analyzed and implemented in industry and organizations.
CO401.3	Reason mathematically about basic data types and structures (such as numbers, sets, graphs, and trees) used in computer algorithms and systems; distinguish rigorous definitions and conclusions from merely plausible ones.
CO401.4	Analyze real world scenarios to recognize when Logic, sets, functions are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches.
CO401.5	Apply knowledge of mathematics, physics and modern computing tools to scientific and engineering problems.
BECSE402T	**Data Structures & Program Design**
CO402.1	Analyze the complexity of algorithms and sorting techniques.
CO402.2	Apply the concept of stack and queues to solve real world problem.
CO402.3	Describe and implement linked list operation.
CO402.4	Demonstrate different methods for traversing trees.
CO402.5	Utilize the concepts of graphs to build solution. Design and implement searching techniques and hashing function
BECSE403T	**Database Management System**
CO403.1	Understand basic database concepts and data modeling techniques used in database design.
CO403.2	Study the concept of functional dependency and perform the calculus with Design database by using different normalization technique.
CO403.3	Study query processing and Perform optimization on query processing.
CO403.4	Understand the concept of transaction processing and different recovery technique used in RDBMS.
CO403.5	Study and implement advanced databases which are used real time system.
BECSE404T	**Computer Networks**
CO404.1	Describe the functions of each layer in OSI model along with basic networking concepts.
CO404.2	Explain physical layer functionality and it's working along with transmission media with real time applications.
CO404.3	Describe the functions of data link layer and explain the protocols used in data link layer.
CO404.4	Classify the routing protocols and analyze how to map IP addresses. Identify the issues related to transport layer, congestion control.
CO404.5	Describe Quality of Service, DNS, Application layer protocols & Network security issues.
BECSE405T	**Theory of Computation**
CO405.1	Design finite automata and its minimization along with Moore and Mealy machines.
CO405.2	Apply regular expression and create grammar for the same.
CO405.3	Deal with context free grammar and various normal forms of CFGs.
CO405.4	Create Push Down Automata for the given CFG and inter-conversion of the same.
CO405.5	Create Turning Machine for the grammar and Deal with Recursive and Recursively numerable Languages.
BECSE406T	**System Programming**
CO406.1	Identify the relevance of different system programs.

CO406.2	Describe the various data structures and passes of assembler design.
CO406.3	Identify the need for different features and designing of macros.
CO406.4	Distinguish different loaders and linkers and their contribution in developing efficient user applications.
CO406.5	Grab the concepts of phases of compiler, LEX and YACC.
BECSE407P	**Computer Workshop-II**
CO407.1	Declare python operators, numeric data types and string operations.
CO407.2	Implement conditional blocks, loops in python and functions.
CO407.3	Implement modules, packages using python, exception Handling and sorting algorithms.
CO407.4	Implement various file operations using python and implement concept of object oriented programming and python database connectivity.
FIFTH SEMESTER B.E.	
BECSE301T	**Data Communication**
CO301.1	Recall fundamental concepts of Data Communication
CO301.2	Understand different signal conversion techniques
CO301.3	Illustrate communication media, frequency allocation & propagation of radio waves
CO301.4	Elaborate spread spectrum along with its services and various multiplexing schemes
CO301.5	Compare and contrast various Digitizing &Compression of multimedia
CO301.6	Analyze various encoding & compression schemes.
BECSE302T	**Object Oriented Programming**
CO302.1	Recall fundamental concepts of Object -Oriented Programming.
CO302.2	To develop simple programs on operator overloading, pointers and arrays in C++.
CO302.3	To understand different functions and its application in C++ programming.
CO302.4	To understand different functions and its application in C++ programming.
CO302.5	To incorporate Exception handling & File streams in C++ programming.
CO302.6	To design containers, iterates, templates using C++.
BECSE303T	**Database Management System**
CO303.1	Understand architecture of DBMS and general idea of database management systems. Understand complex queries using PL/SQL to improve performance of database. Relate the problems in day to day life by implementing the Entity relationship model.
CO303.2	Explore the various models of DBMS. Understanding queries in terms of relational algebra, Tuple relation calculus and Domain relational calculus.
CO303.3	Understand the concept indexing to make query more efficient. Apply various normal forms to reorganize data in a database
CO303.4	Understand the various database optimization techniques to serve the industry in more efficient way.
CO303.5	Understand the concept of transaction processing and different recovery technique used in RDBMS.
CO303.6	Face and resolve the crash in database system. Apply various database recovery techniques also understand various databases.
BECSE304T	**Computer Graphics**
CO304.1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
CO304.2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
CO304.3	Discuss OpenGL application programming Interface and apply it for 2D & 3D

	computer graphics.
CO304.4	Analyze and apply clipping algorithms and transformation on 2D images.
CO304.5	Solve the problems on viewing transformations and explain the projection and hidden surface removal algorithms.
CO304.6	Explain basic ray tracing algorithm, shading, shadows, curves and surfaces and also solve the problems of curves.
BECSE305T	**Design Analysis and Algorithm**
CO305.1	Define the basic concept of algorithm and analyze the asymptotic performance of algorithms.
CO305.2	Derive and solve recurrences describing the performance of divide and Conquer algorithms.
CO305.3	Find optimal solution by applying greedy approach**.**
CO305.4	Find optimal solution by applying dynamic approach, backtracking.
CO305.5	Explain the major graph algorithms and their analyses and Differentiate Polynomial and non-polynomial problems.
CO305.6	Can define the classes P and NP and explain the significance of NP-completeness.
BECSE302P	**Object Oriented Programming**
CO302.1	Be able to understand the difference between object oriented programming and procedural oriented language and data types in C++.
CO302.2	To prepare object-oriented design for small/medium scale problems.
CO302.3	To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code.
CO302.4	Able to program using C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
BECSE303P	**Database Management System**
CO303.1	Learning a systematic way of describing and defining a business process of Entity relationship model and understands various components of it.
CO303.2	Implementation of various queries in SQL.
CO303.3	Understand and execute complex queries using PL/SQL.
BECSE305P	**Design & Analysis of Algorithm**
CO305.1	Ability to design the algorithm using divide and conquer method.
CO305.2	Ability to apply the concept of Greedy Approach.
CO305.3	Ability to apply the concept of Dynamic programming.
CO305.4	Ability to apply the concept of backtracking.
SIXTH SEMESTER B.E.	
BECSE306T	**Artificial Intelligence**
CO306.1	Understand the foundation of Artificial intelligence. Able to Identify problem space and apply various AI techniques to solve it.
CO306.2	Able to analyze real world problem and apply appropriate searching technique to reach the goals.
CO306.3	Understand the fundamentals of knowledge representation and apply it for drawing inferences and theorem proving.
CO306.4	Analyze how uncertainty is being tackled in knowledge representation and reasoning process based on probability theory.
CO306.5	Analyze various learning techniques and its implementation model.
CO306.6	Should be able to design build and implement expert system.
BECSE307T	**Design Pattern**
CO307.1	Understand and analyze the role of design pattern in software development.

CO307.2	Develop and implement design solution using creational design pattern.
CO307.3	Understand standard structural design patterns. Develop design solution and its implementation using structural design patterns.
CO307.4	Understand standard behavioral design patterns and construct design solutions.
CO307.5	Analyze the case study and the appropriate design pattern to the recurring problems.
CO307.6	Able to analyze the Complexity of Design Patterns. Develop Implementation techniques and applications of design pattern in various domains.
BECSE308T	**Software Engineering & Project Management**
CO308.1	Understand architecture of DBMS and general idea of database management systems. Understand complex queries using PL/SQL to improve performance of database. Relate the problems in day-to-day life by implementing the Entity relationship model.
CO308.2	Explore the various models of DBMS. Understanding queries in terms of relational algebra, tuple relation calculus and Domain relational calculus.
CO308.3	Understand the concept indexing to make query more efficient. Apply various normal forms to reorganize data in a database
CO308.4	Understand the various database optimization techniques to serve the industry in more efficient way.
CO308.5	Understand the concept of transaction processing and different recovery technique used in RDBMS.
CO308.6	Face and resolve the crash in database system. Apply various database recovery techniques also understand various databases.
BECSE309T	**Computer Networks**
CO309.1	Develop a fundamental understanding of network design principles and performance metrics.
CO309.2	Understand the physical layer concepts, protocols, and types of Errors in networks.
CO309.3	Understand Random Access Protocol and Distinguish Multiple Access Techniques in Networks.
CO309.4.	Understand different network interfaces and routing techniques for IP based networking infrastructure.
CO309.5	Develop mechanisms for effective network management, congestion control and
CO309.6	Apply the knowledge on various application level services like ISDN, ATM etc.
BECSE310T	**Functional English**
CO310.1	Students have better reading comprehension, pronunciation, and functional English grammar.
CO310.2	Students are able to write letters and resumes
CO310.3	Students are able to organize their thoughts for Effective presentation and writing.
CO310.4	Students are able to learn skills to present the themselves well in an interview, and handle a Group Discussion.
BECSE307P	**Design Pattern**
CO307.1	Implementing creational design pattern.
CO307.2	Implementing creational design pattern.
CO307.3	Implementing creational design pattern.
CO307.4	Case study and analysis of complexity of software Design.
BECSE309P	**Computer Networks**
CO309.1	Demonstrate the IP Addressing.
CO309.2	Implement shortest path Algorithm.
CO309.3	Implement Congestion Control Algorithm.
CO309.4	Study and Monitor TCP & UDP streaming.
BECSE311P	**Mini Project**

CO311.1	Acquire practical knowledge within the chosen area of technology. Analyze the area and find the requirement with systematic approach.
CO311.2	Contribute as an individual in a team to development technical projects.
CO311.3	Understand the paper writing skill in IEEE paper format and develop effective communication skills for presentation of project work.
CO311.4	Prepare a report on developed project.
Seventh Semester B.E.CT	
BECT401T	**Compilers**
CO401.1	Find out the basic concepts and application of Compiler Design, Students will get the concepts of the actual roles of the lexical analyser.
CO401.2	Students will get the concepts of different Parsing techniques and Construction of syntax trees
CO401.3	Students will get the concepts of Intermediate code generation, Code optimization and Code generations.
CO401.4	Apply their basic knowledge of Data Structure to design Symbol Table.
BECT402T	**Artificial Intelligence**
CO402.1	Understand the problem spaces, problem solving and learning methods in artificial intelligence. Apply basic artificial intelligence algorithms to solve problems.
CO402.2	Understand the fundamentals of knowledge representation, inference and theorem proving. Develop skill to create small to medium sized programs in Prolog, Python, Matlab.
CO402.3	Analyze how uncertainty is being tackled in the knowledge representation and reasoning process, in particular, techniques based on probability theory and possibility theory.
CO402.4	Should be able to design, build and implement expert system and to explain most of the knowledge-based systems used in AI to provide solutions to real-world problems.
CO402.5.	Ability to apply reasoning, and machine learning techniques to real-world problems Master the skills and techniques in Natural Language Processing.
CO402.6	Able to explain the function of artificial neural networks, neural learning, neural network paradigms, Genetic Algorithm and its applications.
BECT403T	**Advanced Database Management Systems**
CO403.1	Student will understand the issues and challenges faced while designing distributed database systems & have a broad picture of distributed transaction management, concurrency control, distributed DBMS reliability and replication techniques.
CO403.2	Understand the fundamental principles and architecture of parallel database systems.
CO403.3.	Design and implement an Object-based database according to well known design principles that balances data retrieval performance with data consistency.
CO403.4	Understand the use of XML in web application development.
CO403.5.	Get the fundamental concepts, benefits and problem areas associated with data warehousing.
CO403.6	Analysis of essential DBMS concept such as Statistical Database security PL/SQL Security and integrity threats
BECT404T	**Architecture of Web Application**
CO404.1	To understand Basic web Architecture, Web development Framework, Protocol position in TCP/IP stack.
CO404.2	To understand concept of HTTP, URL, SGML and CSS with their common syntax & key-terms.
CO404.3	To understand XML, XHTML, XSL, Dynamic & Static Contents .Further to understand server Security concept.
CO404.4	To know the process of HTTP Request, Processing HTTP Responses, Cookie coordination, & different Mail transfer Protocol

CO404.5	To understand the Concepts of JavaScript, AJAX, & clickable maps.
CO404.6	To understand Advanced concepts like Internet Telephoning, Virtual reality over the web, Intranet and Extranet, Firewall
BECT401P	**Compiler Construction Lab**
CO401.1	Should be able to understand Flex lexical analyzer.
CO401.2	Design flex program for recognize token.
CO401.3	Implement flex program for infix and postfix using Yacc.
CO401.4	Design flex program for check syntax "for" and "switch" statement.
BECT402P	**Artificial Intelligence-Lab**
CO402.1	Apply the concept of backtracking.
CO402.2	Apply the concept of Dynamic programming.
CO402.3	Master the skills and techniques in Natural Language Processing.
CO402.4	Be able to design a simple agent system and associated ontology and justify the design.
BECT405P	**Project & Seminar Lab**
CO405.1	Deliver effective presentations in contexts that may require power point, extemporaneous or impromptu oral presentations.
CO405.2.	Master the skills and techniques in Natural Language Processing.
CO405.3	Conceive, arrange, and articulate ideas logically and clearly.
CO405.4	Design and develop technical reports.
	Eighth Semester B.E.
BECT406T	**Data Warehousing & Mining**
CO406.1	Explore architecture of Data warehouse and different OLAP operations.
CO406.2.	Understand data mining functionalities and major issues and challenges in data mining.
CO406.3	Recognize various classification methods and clustering techniques to implement the same in real world in efficient way.
CO406.4	Understand the various frequent patterns and association rules with the help of Apriori and FP growth algorithms.
CO406.5	Realize importance of web data mining, temporal and spatial data mining.
CO406.6	Understand Big data analytics, different technologies and tools. And significance of Hadoop from industry point of view.
BECT406T	**Cyber and Information Security**
CO407.1	To understand design issues in Information Security and security threats, services and mechanisms to counter them.
CO407.2	Classify computer and security threats and develop a security model, to prevent, detect and recover from attacks.
CO407.3	Design and analyze authentication protocols for two party communications and analyze various key agreement algorithms to identify their weaknesses.
CO407.4	Analysis of ethical issues related to the misuse of computer security, Message Authentication and key management
CO407.5	To be familiar with advanced security issues and technologies (such as DDoS attack detection and containment, and anonymous communications).
CO407.6	Analyze various Software vulnerability and various security issues related to the Electronic transaction
BECT408T	**Parallel Computing**
CO408.1	Recall fundamental concepts of parallelism.
CO408.2	Analyze the parallel models and Dependencies for parallelism.
CO408.3	Illustrate multithreaded and message passing parallel algorithms.

CO408.4	Learn parallel programming languages and implement MPI Programs.
CO408.5.	Compare and contrast various parallel algorithms using shared memory and MPI.
CO408.6	Analyze parallel paradigms and standard laws
BECT409T	**Cloud Computing**
CO409.1	To provide students a sound foundation of the cloud computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.
CO409.2	The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including Iaas, Paas, Saas, and developing cloud based software applications on top of cloud platforms
CO409.3.	Gain a clear understanding of the concepts that underlie big data analysis systems along with design and implementation issues using Hadoop.
CO409.4	Understanding the key dimensions of the challenge of Cloud Computing like securities.
CO409.5	To enable students to learn about the basic concept of .NET.
CO409.6	To enable students exploring some important cloud computing driven commercial systems such as Microsoft Azure and other businesses cloud applications.
BECT406P	**Data warehousing & Mining Lab**
CO406.1	Get a knowledge of different data mining tools.
CO406.2	Demonstrate WEKA Explorer, Mining techniques and Attribute Relation File.
CO406.3	Implement clustering, classification, association finding, feature selection and visualization techniques on real world data.
CO406.4	Determine whether a real-world problem has a data mining solution.
BECT407P	**Cyber and Information Security Lab**
CO407.1	Get a fundamental understanding of Cyber and Information Security and applying the concept of Information Security
CO407.2	Designing the concepts of conventional Encryption.
CO407.3	Analysis of various Algorithms and its efficiency.
CO407.4	Implementation of protection and security mechanisms using security tools.
BECT410P	**Project**
CO410.1	Deliver effective presentations in contexts that may require power point, extemporaneous or impromptu oral presentations.
CO410.2.	Master the skills and techniques in Natural Language Processing.
CO410.3	Conceive, arrange, and articulate ideas logically and clearly.
CO410.4	Design and develop technical reports.

Dr.A.A.Jaiswal
HOD-CSE