Subject List B. Tech CSE

S. No	PTU Code	Subject Name
1	BTPH104-18	Semiconductor Physics
2	BTPH114-18	Semiconductor Physics Lab
3	BTAM104-18	Mathematics Paper-I
4	BTEE101-18	Basic Electrical Engineering
5	BTEE102-18	Basic Electrical Engineering Lab
6	BTME101-18	Engineering Graphics & Design
7	BTCH101-18	Chemistry-I
8	BTCH102-18	Chemistry-I Lab
9	BTAM204-18	Mathematics Paper-II
10	BTPS101-18	Programming for Problem Solving
11	BTPS102-18	Programming for Problem Solving Lab
12	BTMP101-18	Workshop/Manufacturing Practices
13	BTHU101-18	English
14	BTHU102-18	English Lab
15	BMPD101-18	Mentoring and Professional Development
16	BMPD201-18	Mentoring and Professional Development
17	BTES 301-18	Digital Electronics
18	BTCS 301-18	Data structure & Algorithms
19	BTCS 302-18	Object Oriented Programming
20	BTAM 304-18	Mathematics-III
21	HSMC 101/102-18	Development of Societies
22	BTES 302-18	Digital Electronics Lab
23	BTCS 303-18	Data structure & Algorithms Lab
24	BTCS 304-18	Object Oriented Programming lab.
25	BTCS 305-18	IT Workshop
26	SIT	Summer Institutional Training
27	BTCS 401-18	Discrete Mathematics
28	BTCS 402-18	Operating Systems
29	BTCS 403-18	Design & Analysis of Algorithms
30	BTES 401-18	Computer Organization & Architecture
31	EVS101- 18	Environmental Sciences

32	HSMC 122-18	Universal Human Values
33	BTCS 404-18	Operating Systems Lab
34	BTCS 405-18	Design & Analysis of Algorithms Lab
35	BTES 402-18	Computer Organization & Architecture Lab
36	BTCS 501-18	Database Management System
37	BTCS 502-18	Formal Language &Automata Theory
38	BTCS 503-18	Software Engineering
39	BTCS 504-18	Computer Networks
40	BTES 501-18	Enterprise Resource Planning
41	BTCS 510-18	Programming in Python
42	MC	Constitution of India
43	BTCS 505-18	Database Management Systems Lab
44	BTCS 506-18	Software Engineering Lab
45	BTCS 507-18	Computer Networks Lab
46	BTCS 513-18	Programming in Python Lab
47	Ind. Training	Industrial Training
48	BTCS 601-18	Compiler Design
49	BTCS 602-18	Artificial Intelligence
50	BTCS 612-18	Cloud Computing
51	BTCS 618-18	Machine Learning
52	BTEC-906A-18	WLAN & Security
53	BTCS 603-18	Project-1
54	BTCS 604-18	Compiler Design Lab
55	BTCS 605-18	Artificial Intelligence Lab
56	BTCS 613-18	Cloud Computing Lab
57	BTCS 619-18	Machine Learning Lab
58	BTCS-701-18	Network Security and Cryptography
59	BTCS-702-18	Data Mining and Data Warehousing
60	BTEC-908A-18	Artificial Intelligence
61	BTCS 705-18	Deep Learning
62	BTCS 712-18	Blockchain Technologies
63	BTCS-703-18	Project-II
64	BTCS-711-18	Deep Learning Lab
65	BTCS 713-18	Blockchain Technologies Lab

66	BTCS-801-18	Semester Training

Course Outcomes B. Tech

1st Year (1st and 2nd Semester)

Semiconductor Physics (BTPH104-18)	
CO1	Illustrate the fundamental principles and properties of electronic materials.
CO2	Explain the basics of semiconductors and transport of charge carriers in a semiconductor junction.
CO3	Elaborate the interaction of light with semiconductors and its application in semiconductor laser.
CO4	Evaluate the parameters of semiconductor devices using measurement techniques.

Semiconductor Physics Lab (BTPH114-18)	
CO1	Demonstrate some of the theoretical concepts learnt in the theory courses.
CO2	Analysing and applying precise measurements and handling sensitive equipment.
CO3	Propose the methods used for estimating and dealing with experimental uncertainties and systematic "errors."
CO4	Interpret conclusions from data and develop skills in experimental design.
CO5	Create technical reports which communicate scientific information in a clear and concise manner.

Mathematics - I (BTAM104-18)	
CO1	Estimate functions by using fundamental theorems.
CO2	Apply differential and integral calculus to evaluate definite, improper integrals and its applications.
CO3	Determine the existence and uniqueness of the solution of system of linear equations using matrix algebra
CO4	Utilize the acquired knowledge of eigen values and eigen vectors to diagonalize the matrix.
CO5	Relate the concept of Basis and Dimension of a vector space in linear transformation.

Basic Electrical Engineering (BTEE101-18)	
CO1	Categorize circuit elements, sources and mathematical analysis of DC circuits
CO2	Analyze the behaviour of AC circuits.
CO3	Interpret the basic magnetic circuits and apply it to the working of electrical machines.
CO4	Classify the components of low voltage electrical installations.

Basic Electrical Engineering Lab (BTEE102-18)	
CO1	Make use of common electrical measuring instruments and interpret the fundamentals of electrical engineering.
CO2	Construct electrical connections and measure power, power factor using appropriate equipment.
CO3	Utilize the knowledge of basic magnetism to understand working of transformers.
CO4	Demonstrate operation of electrical machines, components and their ratings.

Engineering Graphics & Design (BTME 101-21)	
CO1	Illustrate and prepare drawings.
CO2	Apply the principles of orthographic projections
CO3	Analyze and visualize of two and three dimensional planes and solids respectively.
CO4	Design and fabricate surfaces of different shapes.
CO5	Construct the objects in three dimensional appearances.

Chemistry - I (BTCH101-18)	
CO1	Interpret concepts related to atomic and molecular structure at orbital level as well as categorize various intermolecular forces.
CO2	Infer about thermodynamic functions, chemical equilibria, water chemistry and corrosion.
CO3	Interpretation of data by using different spectroscopic techniques and its daily life applications.
CO4	Explain and distinguish different periodic properties of elements such as ionization energy, electron affinity, electronegativity, oxidation state and polarizability.
CO5	Classify major organic chemical reactions used for the synthesis of molecules as well as drugs.
CO6	Illustrate three dimensional arrangements and isomers possible for a molecule and their properties.

Chemistry-I Lab (BTCH102-18)	
CO1	Rephrase interactions among molecules on the basis of surface tension, viscosity and Partition Coefficient.
CO2	Develop Polymer and drug molecule as well as analyze salt samples.
CO3	Estimate rate constants of chemical reactions as a function of time.
CO4	Discover acidity and chloride content present in water sample.
CO5	Evaluate adsorption isotherm and extent of adsorption using TLC

Mathematics -II (BTAM204-18)	
CO1	Determine different types of statistical tools.
CO2	Apply the concepts of probability and probability distributions to analyze the data
CO3	Examine and predict the relationship between variables using correlation and regression techniques.
CO4	Formulate and test the Hypothesis for different samples.

Programming for Problem Solving (BTPS101-18)	
CO1	Demonstrate the knowledge and working of a computer with its parts.
CO2	Formulate simple algorithms and translate the algorithms to programs (in C language).
CO3	Evaluate conditional branching, iteration statements and recursion process.
CO4	Develop coding using arrays and implement various operations using 1D and 2D array (Matrix arithmetic operations).
CO5	Interpret the identified problems using functions and implementing searching and sorting algorithms on the given list as well as construct recursive functions.
CO6	Apply programming to design pointers, structures and file handling.

Programming for Problem Solving Lab (BTPS102-18)	
CO1	Evaluate given algorithms for the development of correct program.
CO2	Identify syntax errors and logical errors at compile and run time for correction.
CO3	Develop iterative as well as recursive programs.
CO4	Formulate data in arrays, strings and structures and manipulate them through a program.
CO5	Create pointers of different types and implement them in defining self-referential structures.
CO6	Design coding to create, read and write to and from simple text files.

Workshop/Manufacturing Practices (BTMP101-18)	
CO1	Interpret the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials
CO2	Apply knowledge to construct different jobs with their own hands.
CO3	Interpret the dimensional accuracies and tolerances possible with different manufacturing processes.
CO4	Develop small devices of their interest.

English (BTHU101-18)	
CO1	Improve their vocabulary to use different words and phrases in formulating meaningful sentences.
CO2	Identify and ascertain knowledge about the basic grammatical aspects and sentence structures for developing effective communication.
CO3	Interpret the given text and employ effective writing techniques for organizing and producing clear and coherent forms of expression.
CO4	Identify and interpret the literal and contextual meaning of the given text to Compose their responses accordingly.
CO5	Apply their point of view effectively for developing and generating their ideas in creative written form.
CO6	Compose varied forms of business correspondence and professional documents for the purpose of informing, recognizing, analysing and official reporting.

English Lab (BTHU102-18)	
CO1	Build their listening and speaking skills by acquiring new forms of expressions for lucid communications.
CO2	Formulate structured conversation and put forth their point of view fluently on a variety of topics.
CO3	Overcome their inhibition and feel confident while demonstrating their language skills to make the transitions clear.
CO4	Interpret, analyse and use correct language in general, academic and professional environment.
CO5	Understand and function as per the expectations of the industry to prepare themselves for future interviews.
CO6	Design presentation on a given topic, learn to modulate their voice along with exhibiting the right body language.

Mentoring & Professional Development (MPD101-18)	
CO1	Improve themselves by setting and working towards individual goals.
CO2	Demonstrate the importance of moral & ethical values that exemplify professionalism.
CO3	Develop physical fitness, wellness & sports to promote a healthy lifestyle.
CO4	Construct various analytical & training methods for their development.
CO5	Utilize physical activity as a tool to manage stress, pressure & work in life.

Mentoring & Professional Development (MPD201-18)	
CO1	Improve themselves by setting and working towards individual goals.
CO2	Demonstrate the importance of moral & ethical values that exemplify professionalism.
CO3	Develop physical fitness, wellness & sports to promote a healthy lifestyle.
CO4	Construct various analytical & training methods for their development.
CO5	Utilize physical activity as a tool to manage stress, pressure & work in life.

2nd Year

3rd Semester

Digital Electronics (BTES 301-18)	
CO1	Interpret the number system, binary arithmetic, binary codes and their applications
CO2	Demonstrate the role of logic gates in the realization of Boolean function
CO3	Design and development of combinational circuits using problem formulation and logic optimization
CO4	Design and development of sequential circuits using problem formulation and logic optimization
CO5	Construct digital logic circuits using ROM, PLA and PAL units
CO6	Analyzing the operation and performance of A/D and D/A converters and their application in system design

Data Structures & Algorithms (BTCS 301-18)	
CO1	Demonstrate how the data is organized as well as categorize into various data structures and solve complex engineering problems.
CO2	Utilize appropriate data structure to solve problems efficiently and provide better solution to reduce space and time complexity.
CO3	Illustrate various methods of organizing large amounts of data and identify systematic approach to retrieve data and solve problems.
CO4	Identify and analyze linear and non-linear data structures to understand and design algorithmic solutions for their applications.
CO5	Formulate new solutions for real world problems or improve existing code using well defined algorithms.

Object Oriented Programming (BTCS 302-18)	
CO1	Interpret the behaviour of simple programs involving the fundamental programming concepts.
CO2	Outline the meaning of object-oriented paradigm with implementation.
CO3	Illustrate various forms of inheritance and identify systematic approach to access class hierarchy.
CO4	Elaborate the concept of polymorphism and generic programming.
CO5	Combine the concept of exception handling and I/O streams in object-oriented programs

Mathematics-III (BTAM 304-18)	
CO1	Demonstrate the concept and use of partial differentiation in various problems and examine the function for maxima and minima and discover its extreme value.
CO2	Determine if an infinite sequence is bounded, monotonic or oscillating and determine the sequence whether it is convergent or divergent by using the appropriate tests.
CO3	Construct and evaluate multiple integrals for regions in the plane and to find Area of the region bounded by curves and to find volume and surface area of solid geometric figures.
CO4	Create, select and utilize the learnt techniques of first degree ordinary differential equations to Model real world problems.
CO5	Obtain the generated solution of an inhomogeneous linear constant coefficient second order differential equation by combining its complementary function with particular integral

Development of Societies (HSMC 101-18)	
CO1	Apply the knowledge of the basic social concepts for understanding the different social systems.
CO2	Interpret the different models of Social Structures and their evolution.
CO3	Evaluate the political ideology and comprehend all the governing systems since its emergence.
CO4	Analyze the working scenario of development in pre-British, British and post British period.
CO5	Compare the economic development ideas according to different economists in different eras.

Digital electronics Lab (BTES 302-18)	
CO1	Demonstrate and understand the operations of digital trainer and logic gates using integrated circuits.
CO2	Design and realization of combinational circuits and verification of their operations.
CO3	Design and realization of sequential circuits and verification of their operations.
CO4	Evaluation of operation of different ICs for various applications

Data structure & Algorithms Lab (BTCS 303-18)	
CO1	Apply the knowledge of programming skills to implement and analyze different data structure.
CO2	Outline and implement various data structures algorithms in high level programming language.
CO3	Identify and apply the appropriate data structure to solve real world problems.
CO4	Design and analyze the time and space efficiency of the data structures.
CO5	Implement appropriate searching and sorting techniques for application development.

Object Oriented Programming Using C++ Lab (BTCS 304-18)	
CO1	Develop classes incorporating object-oriented techniques.
CO2	Make use of C++ features to program design and implement.
CO3	Illustrate and evaluate the file Input Output mechanisms.
CO4	Utilize C++ to demonstrate practical experience in developing object oriented solutions.
CO5	Implement virtual function to achieve dynamic polymorphism.

IT Workshop (BTCS 305-18)	
CO1	Describe various python programming basics and apply them in solving computational problems
CO2	Choose appropriate python looping, control statements to provide better solution.
CO3	Identify and analyse methods of file handling and exception handling
CO4	Develop model database connectivity with front end.
CO5	Apply knowledge for computer assembling and software installation.

Summer Institutional Training	
CO1	Apply knowledge and skills they learned in previous classes to solve real-life problems.
CO2	Make use of techniques, skills and modern engineering tools for engineering practice.
CO3	Develop communication, interpersonal and other critical skills in the job interview process.
CO4	Adapt the professional and ethical responsibilities.
CO5	Analyze the functioning of internship organization and recommend changes for improvement in processes.

4th Semester

Discrete Mathematics (BTCS 401-18)	
CO1	Elaborate logical sentence in terms of predicates, quantifiers, and logical connectives.
CO2	Construct the solution for a given problem using deductive logic and prove the solution based on logical inference.
CO3	Analyze a given a mathematical problem, classify its algebraic structure.
CO4	Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
CO5	Design the given problem as graph networks and solve with techniques of graph theory.

Operating System (BTCS 402-18)	
CO1	Interpret the basic operating system mechanisms such as overall architecture, system calls, user mode and kernel mode
CO2	Compare and contrast concepts related to processes, threads, process scheduling, race conditions and critical sections
CO3	Evaluate and apply CPU scheduling algorithms, deadlock detection and prevention algorithms
CO4	Examine and categorize various memory management techniques like caching, paging, segmentation, virtual memory, and thrashing
CO5	Formulate and implement file management system
CO6	Appraise high-level operating systems concepts such as file systems, disk-scheduling algorithms and various file systems

Design & Analysis of Algorithms (BTCS 403-18)	
CO1	Compare the correctness of algorithms using inductive proofs and analyze worst-case running times of algorithms using asymptotic analysis.
CO2	Explain important algorithmic design paradigms (brute force, greedy method, dynamic-programming and Backtracking, branch and bound) and apply when an algorithmic design situation calls for it.
CO3	Explain the major graph algorithms and Employ graphs to model engineering problems, when appropriate.
CO4	Describe the classes P, NP, and NP Complete and be able to prove that a certain problem is NP-Complete.
CO5	Analyze approximation/randomized/heuristic algorithms and recite analyses of these algorithms that employ this method of analysis.

Computer Organization & Architecture (BTES 401-18)	
CO1	Identification of functional units and internal architecture of a microprocessor
CO2	Illustration of instruction set of a microprocessor and performing the arithmetic and logical operations on binary data.
CO3	Categorization of design approaches of control unit and I/O data transfer approaches
CO4	Evaluation and classification of pipelined and parallel processors
CO5	Determine the functions and role of memory systems in processors

Environmental Studies (EVS 101-18)	
CO1	Develop the knowledge on various natural resources, their utilization for sustainable lifestyles and their repercussion.
CO2	Discuss the values, threats and conservation of biodiversity and classify various Ecosystems
CO3	Identify and implement technological and economical solution to environmental problems.
CO4	Outline the environmental solutions and perform activities to generate public awareness.
CO5	Demonstrate individuals to conduct activities on social issues, environment awareness campaigns etc.

Universal Human Values (HSMC 122-18)	
CO1	Identify the need of Self-Exploration and Basic requirements for fulfilment of Aspirations of every Human Being
CO2	Analyse the value of Harmony in the Human Being
CO3	Illustrate the existence of Human being with the Family and Society and understand the idea of Human-Human relationship
CO4	Examine the existence of a Human Being with the Nature to Coexist
CO5	Apply the human values to achieve Ethical Human Conduct and Universal Human Order

Operating System Lab (BTCS 404-18)	
CO1	Identify and implement basic services and functionalities of the operating system
CO2	Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority
CO3	Construct the virtual machine to install the various operating systems.
CO4	Implement the commands for files and directories.
CO5	Compute and simulate the concepts of shell programming, files and directories
CO6	Examine the concepts of deadlock in operating systems and implement them in multiprogramming system

Design & Analysis of Algorithms Lab (BTCS 405-18)	
CO1	Implement Algorithm to solve problem by iterative search
CO2	Design algorithms using divide and conquer, greedy and dynamic programming.
CO3	Execute sorting algorithms such as sorting, graph related and combinatorial algorithm in a high level language
CO4	Analyze the performance of merge sort and quick sort algorithms using divide and conquer technique.
CO5	Apply the dynamic programming technique to solve real world problems such as knapsack and TSP.

Computer Organization & Architecture Lab (BTES 402-18)	
CO1	Identification and recognition of computer anatomy - Memory, Ports, Motherboard etc.
CO2	Make use of the computer parts for assembling a PC
CO3	Define the functional units of the processor such as the registers, memory space and other parts available on trainer
CO4	Illustration of instruction set of a microprocessor and perform the arithmetic and logical operations on binary data.

3rd Year
5th Semester

Database Management Systems (BTCS 501-18)	
CO1	Describe relational algebra expressions for a query and optimize the Developed expressions
CO2	Design the databases using ER method and normalization.
CO3	Construct the SQL queries for Open source and Commercial DBMS
CO4	Illustrate various methods of organizing data and transaction properties
CO5	Implement the optimization techniques for security handling and enhance knowledge about advance databases

Formal Language & Automata Theory (BTCS 502-18)	
CO1	Perceive formal notation for strings, languages and machines.
CO2	Classify finite automata to accept a set of strings of a language.
CO3	Design context free grammars to generate strings of context free language.
CO4	Determine equivalence of languages accepted by Push Down Automata and languages.
CO5	Comparison between computability and non-computability and Decidability and un-decidability.
CO6	Analyse the importance of Co-NP.

Software Engineering (BTCS 503-18)	
CO1	Develop a Strategy for the selection of Life cycle models and plan software requirements by analysing and specifying the problem.
CO2	Identify various design issues by specifying software requirements and inspecting coding techniques.
CO3	Formulate an appropriate testing strategy for the given software system.
CO4	Elaborate planning for software project management and ensure quality is enriched.
CO5	Determine state-of-the-art engineering tools for software transformation and reverse engineering work.

Computer Networks (BTCS 504-18)	
CO1	Develop knowledge of various networking models with respect to functionalities.
CO2	Enhance the major reasons involved in collision and resolve the issues of error detection and correction.
CO3	Assess various protocols to recognise the need of particular protocol to develop network related applications.
CO4	Discover knowledge of routing and congestion control algorithms to develop networking structures.
CO5	Apply the knowledge of different network designs and improvise quality of transmissions and services.
CO6	Design various protocols for end user to develop applications and provide required services to the user.

Enterprise Resource Planning (BTES 501-18)	
CO1	Describe the use of Enterprise software and its role in integrating business functions.
CO2	Analyze the strategic options for ERP identification and implementation.
CO3	Demonstrate the technical aspect of telecommunication systems, internet and their roles in business environment.
CO4	Develop skills necessary for building and managing relationships with customers, and stakeholders.
CO5	Formulate the reengineered business processes for future directions.

Programming in Python (BTCS 510-18)	
CO1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions
CO2	Demonstrate proficiency in handling Strings and File Systems
CO3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
CO4	Interpret the concepts of Object-Oriented Programming as used in Python.
CO5	Implement exemplary applications related to Network Programming, Web Services and Databases in Pyhon

Constitution of India (MC)	
CO1	Illustrate basic knowledge about the Constitution of India.
CO2	Explain to the students about their obligations, responsibilities, privileges and rights, duties and get insights on administrative and judicial setup of the country.
CO3	Outline national and patriotic spirit among the students as responsible citizens of the country.
CO4	Relate knowledge about state and central policies, fundamental duties, electoral process, amendment procedure and emergency provisions.
CO5	Analyze the History, features of Indian constitution, the role Governor and Chief Minister, role of state election commission, the decentralization of power between central, state and local self-government.
CO6	Apply the knowledge on directive principle of state policy, the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

Database Management Systems Lab (BTCS 505-18)	
CO1	Describe relational algebra expressions for a query and optimize the Developed expressions
CO2	Design the databases using ER method and normalization.
CO3	Construct the SQL queries for Open source and Commercial DBMS
CO4	Illustrate various methods of organizing data and transaction properties
CO5	Implement the optimization techniques for security handling and enhance knowledge about advance databases

Software Engineering Lab (BTCS 506-18)	
CO1	Demonstration to draft a project plan and track the progress of a project using the Openproj tool.
CO2	Create SRS documents, design documents, test cases, and software configuration management and risk management document.
CO3	Build a Function-oriented and object-oriented software design using tools such as Rational Rose.
CO4	Implement unit testing and integration testing.
CO5	Implement several white Box and Black box testing techniques to test the process.

Computer Networks Lab (BTCS 507-18)	
CO1	Analyse and configure about various networking devices, implement them using various cables and develop understanding of network topologies
CO2	Utilize knowledge of modern network simulation tools to propose solution for efficient working of networks for real world problems.
CO3	Configure network using IP addressing and sub netting.
CO4	Solve various network devices problems using Packet Tracer simulation tool.
CO5	Discover various configuration commands to configure router.

Programming in Python Lab (BTCS 513-18)	
CO1	Demonstrate proficiency in fundamental Python programming concepts such as variables, data types, control structures, and functions.
CO2	Apply object-oriented programming principles to design and implement Python classes and objects.
CO3	Develop problem-solving skills through hands-on exercises and projects, showcasing the ability to analyze, design, and implement solutions using Python programming techniques.
CO4	Collaborate effectively in a team setting, employing version control systems and best practices for code documentation and sharing in Python development projects
CO5	Demonstrate the use of various website designing tools

Industrial Training	
CO1	Illustrate knowledge about latest trends of the Industry such as software, hardware and other tools.
CO2	Developing the ability to study projects deeply and systematically to produce solutions for various problems.
CO3	Inference the skills such as communicational and managerial skills of the individual as per the requirement of the Industry.
CO4	Developing moral ethics such as commitment, teamwork spirit to achieve continuous development.

CO5	Utilising the mathematical and engineering concepts for solving the problems of society and industry.

6th Semester

Compiler Design (BTCS 601-18)	
CO1	Explain concepts on lexical analysis.
CO2	Compare top down and bottom up strategies of syntax analysis.
CO3	Implement techniques of Intermediate code generation.
CO4	Discuss code design issues and design code generator.
CO5	Analyze the technique used for optimized codes.

Artificial Intelligence (BTCS 602-18)	
CO1	Analyzing the concept of Artificial Intelligence, Agents, their types and structure.
CO2	Demonstrate search strategies to solve the informed and uninformed problems.
CO3	Design and evaluate intelligent expert models for perception and prediction from intelligent environment.
CO4	Evaluating valid solutions for problems involving uncertain inputs or outcomes by using decision making techniques.
CO5	Demonstrate and enhanced knowledge to select and apply AI tools to analyze information and develop models within constraints of application area.
CO6	Design and develop programs for a reinforcement agent to learn and examine the issues involved in knowledge bases, reasoning systems and planning.

Cloud Computing (BTCS 612-18)	
CO1	Identify the core concepts of Cloud Computing
CO2	Illustrate the significance of Virtualization along with their technologies
CO3	Analyse Cloud Computing Service models and Deployment models and implementing these to solve problems on the cloud.
CO4	Execution of various Security Strategies for different cloud platforms
CO5	Identify the modern Cloud Platforms along with Cloud Service Providers

Machine Learning (BTCS 618-18)	
CO1	Analyze methods and theories in the field of machine learning.
CO2	Design and extract features of complex datasets.
CO3	Implement techniques to comment for the Regression.
CO4	Comprehend and apply different classification and clustering techniques.
CO5	Implement the concept of Neural Networks and Genetic Algorithm.

WLAN AND SECURITY (BTEC-906A-18)	
CO1	Develop an understanding WLAN and its architecture
CO2	Understand the gap between wired and wireless networks
CO3	Build the knowledge of security building blocks which enable them to solve the problems of designing security solutions in wireless networks
CO4	Learn the wireless LAN authentication protocols in detail, and enhance the skills of configuring a secure wireless network.

PROJECT-1 (BTCS 603-18)	
CO1	Demonstrate a sound technical knowledge of their selected project topic.
CO2	Interpret problem identification, formulation and solution.
CO3	Design engineering solutions to complex problems utilising a systems approach.
CO4	Construct an engineering project.
CO5	Demonstrate the knowledge, skills and attitudes of a professional engineer.

Compiler Design Lab (BTCS 604-18)	
CO1	Develop the functionalities of Lexical Analyzer
CO2	Demonstrate the functionalities of Predective parsers
CO3	Implement operator precedence parsing
CO4	Analyze the concept of strings
CO5	Build abstract syntax tree

Artificial Intelligence Lab (BTCS 605-18)	
CO1	Apply the concept of uninformed and informed search to build program.
CO2	Identify various AI techniques to conduct game search.
CO3	Interpret the concept of AI to Construct and Design Bayesian network from a given data set.
CO4	Build a program to run a value and policy iteration in a grid world.
CO5	Interpret the concept of reinforcement learning to develop the algorithm.

Cloud Computing Lab (BTCS 613-18)	
CO1	Apply virtualization and understand the core concept of virtualization along with their technologies.
CO2	Design and implement different cloud scheduling algorithm using simulation tool.
CO3	Describe the concept of cloud security and identity management.
CO4	Illustrate the key components of Amazon web Service and other cloud service providers
CO5	Identify various resource management fundamentals and interpret various data, scalability & cloud services.

Machine Learning Lab (BTCS 619-18)	
CO1	Design, analyze and visualize the implementation of machine learning algorithms
CO2	Create and develop various algorithms for specific problems with appropriate datasets
CO3	Examine the need for machine learning techniques for specific domain
CO4	Formulate solutions of real time problems with the prediction and visualization
CO5	Evaluate and implement Genetic Algorithms for optimization of engineering solutions

4th Year

7th Semester

Network Security and Cryptography (BTCS 701-18)	
CO1	Make use of fundamental principles of access control models, techniques and authentication to secure system design.
CO2	Analyze the different cryptographic protocols and techniques and be able to use them.
CO3	Apply methods for content integrity, authentication, and access control.
CO4	Identify and mitigate software security vulnerabilities in existing systems.
CO5	Develop an understanding of security policies and apply methods of Intrusion detection and Prevention.

Data Mining and Data Warehousing (BTCS 702-18)	
CO1	Illustrate the concept of data warehouse and data mining along with different data models.
CO2	Classify the mathematical foundations of data pre-processing and data mining challenges.
CO3	Demonstrate techniques for pattern prediction and analysis from large dataset
CO4	Evaluate the research and design of new Search engine Software.
CO5	Formulate the performance of various data mining algorithms.

Artificial Intelligence (BTEC-908A-18)	
CO1	Learn about the basic understanding of Artificial Intelligent system
CO2	Explain about various types of Artificial Neural Networks & their models
CO3	Describe Artificial Neural networks methods, operation and parameters
CO4	Explore Neural Network MATLAB Toolbox

Deep Learning (BTCS 704-18)	
CO1	Comprehend the advancements in learning techniques
CO2	Compare and explain various deep learning architectures and algorithms
CO3	Demonstrate the applications of Convolution Networks
CO4	Apply Recurrent Network for Sequence Modelling
CO5	Deploy the Deep Generative Models

Block Chain Technology (BTCS721-18)	
CO1	Understand emerging abstract models for Block chain Technology
CO2	Identify major research challenges and technical gaps existing between theory and practice in crypto currency domain.
CO3	It provides conceptual understanding of the function of Blockchain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable.
CO4	Apply hyperledger Fabric and Etherum platform to implement the Block chain Application

Project-II (BTCS 703-18)	
CO1	Analyze how to apply software development methodology on application development.
CO2	Determine about advance programming languages and techniques.
CO3	Identify and solve real world problems.
CO4	Infer how to write technical report.
CO5	Create Test cases and to perform software Testing.
CO6	Interpret the concept of security aspects and backup recovery

Deep Learning Lab (BTCS 705-18)	
CO1	Illustrate neural networks, including feedforward, convolutional, recurrent, and generative models, and their applications in deep learning.
CO2	Develop proficiency in frameworks such as TensorFlow and PyTorch for building and training deep learning models
CO3	Explore advanced topics in deep learning, such as transfer learning, reinforcement learning, and adversarial training
CO4	Apply deep learning concepts to various domains including computer vision, natural language processing, and time series analysis

Block Chain Technologies Lab (BTCS 717-18)	
CO1	Design and implement a toy application using blockchain principles, showcasing practical applications and the integration of cryptographic techniques
CO2	Apply mathematical models and problem-solving skills through programming techniques to address real-time challenges in blockchain development, emphasizing data structures and algorithms
CO3	Demonstrate the ability to design, build, and deploy distributed applications utilizing blockchain technology.
CO4	Analyze cryptocurrencies, gaining a comprehensive technical understanding of blockchain technologies

8th Semester

Semester Training (BTCS 801-18)	
CO1	Illustrate the uses of softwares on Application development.
CO2	Develop knowledge about advance programming techniques and modern tools.
CO3	Identify the real world problems and provide solutions to solve them
CO4	Organize the platform to use the latest technologies like Artificial intelligence, Data science, Cloud computing for making computer algorithms.

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