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Subject List B.Tech Artificial Intelligence

Subject List		
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
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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
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50	BTITCS601 -20	Data Analytics using R
51	BTDS603-20	Big Data Analytics
52	BTCS704-18	Deep Learning
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55	BTDS 601-20	Data Mining and Data Warehouse Lab
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57	BTDS604-20	Big Data Analytics Lab
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Course Outcomes B. Tech AI 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.

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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.

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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.

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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.

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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.

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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

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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

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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**

Statistical Computing Techniques using R (BTES 501-20)	
CO1	To use a fundamental tool for computing in the practice of quantitative analytical methods (the 'paper-and-pencil' tool of the 21st century), that can work for the small jobs (like a pocket calculator) as well as for the big jobs (complex statistical data analysis).
CO2	Programming, data handling, transformations, subsetting, exploratory data analysis, probability distributions and simulations, regression and linear models, summarising data, how to handle large data sets, effective graphics
CO3	Modern concepts of statistics based on simulations and writing a report of a quantitative analysis.

Database Management Systems (BTCS501-18)	
CO1	Write 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-MYSQL, ORACLE, and DB2.
CO4	Determine the transaction atomicity, consistency, isolation, and durability
CO5	Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling

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Formal Language & Automata Theory (BTCS502-18)	
CO1	Write a formal notation for strings, languages and machines.
CO2	Design 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 generated by context free grammars
CO5	Distinguish between computability and non-computability and Decidability and undecidability.

Programming in Python (BTAI ML501- 20)	
CO1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
CO2	Demonstrate proficiency in handling Strings, Exceptions, and File Systems.
CO3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries.
CO4	Interpret the concepts of Object-Oriented Programming as used in Python.
CO5	Implement exemplary applications using date and time, generators, iterators, and collections in Python

Artificial Intelligence (BTAI 502-20)	
CO1	Understand different types of AI agents
CO2	Develop different types of various AI search algorithms.
CO3	Construct simple knowledge-based systems and to apply knowledge representation.
CO4	Convert intermediate representation in contest to understand learning.
CO5	Apply for various techniques for Expert Systems.

Java Programming (BTAI ML 509-20)	
CO1	Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism
CO2	Design and develop java programs, analyze, and interpret object oriented data and report results.
CO3	Design an object oriented system, AWT components and multithreaded processes as per needs and specifications.
CO4	Understand the database connectivity and design web based applications on client server model
CO5	Participate and succeed in competitive examinations like GATE, Engineering services, recruitment interviews etc.

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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.

Statistical Computing Techniques using R lab (BTES 502-20)	
CO1	Data manipulation, plot the graphs and charts with the help of computing features in R Programming
CO2	The given data Interpretation with different distribution functions
CO3	The relevance and importance of the theory in solving practical problems in the real world

Database Management Systems Lab (BTCS 505- 18)	
CO1	This practical will enable students to retrieve data from relational databases using SQL.
CO2	Students will be able to implement generation of tables using datatypes.
CO3	Students will be able to design and execute the various data manipulation queries.
CO4	Students will also learn to execute triggers, cursors, stored procedures etc.

Programming in Python Lab (BTAI ML503-20)	
CO1	Understand Python syntax and fundamental programming concepts
CO2	Develop problem-solving skills through Python programming.
CO3	Apply software engineering principles in Python development.
CO4	Create functional Python applications for various domains.
CO5	Configure routers using various router configuration commands.

Artificial Intelligence Lab (BTCS 605- 20)	
CO1	Explain artificial intelligence, its characteristics and its application areas.
CO2	Formulate real-world problems as state space problems, optimization problems or constraint satisfaction problems.
CO3	Select and apply appropriate algorithms and AI techniques to solve complex problems.
CO4	Design and develop an expert system by using appropriate tools and techniques.

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Java Programming Lab (BTAIML 510-20)	
CO1	Use Java compiler and eclipse platform to write and execute java program
CO2	Understand and Apply Object oriented features and Java concepts
CO3	Apply the concept of multithreading and implement exception handling.
CO4	Access data from a Database with java program.
CO5	Develop applications using Console I/O and File I/O, GUI applications

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

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.

Data Analytics using R (BTITCS 601-20)	
CO1	Ability to apply statistical techniques using R Programming for data analytics and decision making.
CO2	To become data analyst.

Big Data Analytics (BTDS 603-20)	
CO1	Describe Big Data and its importance with its applications
CO2	Differentiate various big data technologies like Hadoop MapReduce, Pig, Hive, Hbase and No-SQL.
CO3	Apply tools and techniques to analyze Big Data

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CO4	Design a solution for a given problem using suitable Big Data Techniques
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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

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.

Data Mining and Data Warehouse Lab (BTDS601-20)	
CO1	Understand the various kinds of tools
CO2	Demonstrate the classification, clustering and etc. in large data sets
CO3	Ability to add mining algorithms as a component to the exiting tools.
CO4	Ability to apply mining techniques for realistic data.

Data Analytics using R Lab (BTDS602-20)	
CO1	Develop classes incorporating object-oriented techniques;
CO2	Design and implement object-oriented concepts of inheritance and polymorphism
CO3	Illustrate and implement STL class of containers and need for exceptions to handle errors for object oriented programs; &
CO4	Design and implement any real world based problem involving GUI interface using objectoriented concepts.

Big Data Analytics Lab (BTDS 604-20)	
CO1	Perform data gathering of large data from a range of data sources
CO2	Critically analyse existing Big Data datasets and implementations, taking practicality, and usefulness metrics into consideration.

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CO3	Select and apply suitable statistical measures and analyses techniques for data of various structure and content and present summary statistics
CO4	Employ advanced statistical analytical skills to test assumptions, and to generate and present new information and insights from large datasets

Deep Learning Lab (BTCS 705-18)

CO1	Identify the deep learning algorithms which are more appropriate for various types of learning tasks in various domains.
CO2	Implement deep learning algorithms and solve real-world problems.

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.