

Computer Science Engineering

Program Specific Outcome:

Two PSO have been defined as:

PSO 1: Problem Solving Ability: Ability to analyze, formulate and develop computer programs and computer-based software for real time environment related to database, networking, web development and AI.

PSO 2: Software Development: Ability to apply their practical knowledge in software project management and development using suitable programming environments to deliver quality product for the industry and society.

Scheme:2012

Punjab Technical University

B.Tech. Computer Science Engineering (CSE)
Contact Hours: 30 Hrs.

Third Semester

Course Code	Course Name	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BTCS301	Computer Architecture	3	1	-	40	60	100	4
BTAM302	Mathematics –III	3	1	-	40	60	100	4
BTCS303	Digital Circuits & Logic Design	3	1	-	40	60	100	4
BTCS304	Data Structures	3	1	-	40	60	100	4
BTCS305	Object Oriented Programming using C++	3	1	-	40	60	100	4
BTCS306	Data Structures Lab	-	-	4	30	20	50	2
BTCS307	Institutional Practical Training [#]	-	-	-	60	40	100	1
BTCS308	Digital Circuits & Logic Design Lab	-	-	2	30	20	50	1
BTCS309	Object Oriented Programming using C++ Lab	-	-	4	30	20	50	2
Total		15	5	10	350	400	750	26

[#] The marks will be awarded on the basis of 04 weeks Institutional Practical training conducted after 2nd semester

Fourth Semester
Contact Hours: 30 Hrs.

Course Code	Course Name	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BTCS401	Operating Systems	3	1	-	40	60	100	4
BTCS402	Discrete Structures	3	1	-	40	60	100	4
BTCS403	Computer Networks-I	3	1	-	40	60	100	4
BTCS404	Microprocessor& Assembly Language Programming	3	1	-	40	60	100	4
BTCS405	System Programming	3	1	-	40	60	100	4
BTCS406	Operating System Lab	-	-	2	30	20	50	1
BTCS407	Computer Networks-I Lab	-	-	4	30	20	50	2
BTCS408	Microprocessor& Assembly Language Programming Lab	-	-	2	30	20	50	1
BTCS409	System Programming Lab	-	-	2	30	20	50	1
General Fitness					100	-	100	-
Total		15	5	10	420	380	800	25

Fifth Semester
Contact Hours: 29 Hrs.

Course Code	Course Name	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BTCS501	Computer Networks –II	3	1	-	40	60	100	4
BTCS502	Relational Database Management System	3	1	-	40	60	100	4
BTCS503	Design & Analysis of Algorithms	3	1	-	40	60	100	4
BTCS504	Computer Graphics	3	1	-	40	60	100	4
BTCS505	Computer Peripherals & Interfaces	3	0	-	40	60	100	3
BTCS506	RDBMS Lab	-	-	4	30	20	50	2
BTCS507	Computer Networks –II Lab	-	-	2	30	20	50	1
BTCS508	Design & Analysis of Algorithms Lab	-	-	2	30	20	50	1
BTCS509	Computer Graphics Lab	-	-	2	30	20	50	1
BTCS510	Industrial Training*	-	-	-	60	40	100	1
Total		15	4	10	380	420	800	25

*The marks will be awarded on the basis of 06 weeks industrial training conducted after 4th semester

Sixth Semester

Contact Hours: 30 Hrs.

Course Code	Course Name	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BTCS601	Simulation and Modeling	3	-	-	40	60	100	3
BTCS602	RDBMS -II	3	1	-	40	60	100	4
BTCS603	Software Engineering	3	-	-	40	60	100	3
BTCSXXX	Elective –I	3	1	-	40	60	100	4
BT***	Open Elective	3	1	-	40	60	100	4
BTCS604	RDBMS-II Lab	-	-	4	30	20	50	2
BTCS605	Free/ Open Source Software Lab	-	-	4	30	20	50	2
BTCS606	Software Engineering Lab	-	-	2	30	20	50	1
BTCS607	Simulation and Modeling Lab	-	-	2	30	20	50	1
General Fitness					100	-	100	
Total		15	3	12	420	380	800	24

Seventh Semester / Eighth Semester

Contact Hours: 29 Hrs

Course Code	Course Name	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BTCS701	Artificial Intelligence	3	-	-	40	60	100	3
BTCS702	Theory of Computation	3	1	-	40	60	100	4
BTCS 703	Project	-	-	12	150	150	300	12
BTCSYYY	Elective –II	3	1	-	40	60	100	4
BTCSZZZ	Elective –III	3	1	-	40	60	100	4
BTCS704	Artificial Intelligence Lab	-	-	2	30	20	50	1
General Fitness					100	-	100	
Total		12	03	14	440	410	850	28

Course Code	Course Name	Marks Distribution		Total Marks	Credits
		Internal	External		
BTCS801	Software Training	150	100	250	8
BTCS802	Industry Oriented Project Training	300	200	500	10
Total		450	300	750	18

Course Name: CA (BTCS 301)

Course Outcomes

After the course completion, students will be able to:

CO301.1	Illustrate the use of number system and coding system
CO301.2	Understand the use of registers in computer organization
CO301.3	Apply various arithmetic operations
CO301.4	Identify different I/O interfaces, Distinguish different types of intercepts and DMA

CO301.5	Understand the purpose of memory hierarchy
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Course Name: M III (BTAM 302)

Course Outcomes	
After the course completion, students will be able to:	
CO302.1	Understand the functions of several variables that are essential in most branches of engineering;
CO302.2	Apply multiple integrals to deal with areas and volumes of various structures which are quite significant in real world;
CO302.3	Formulate and solve engineering problems related to convergence, infinite series, power series and Taylor series
CO302.4	Create, select and utilize the learnt techniques of first degree ordinary differential equations to model real world problems
CO302.5	Be acquainted with the knowledge required to solve higher order ordinary differential equations.

Course Name: DCLD (BTCS 303)

Course Outcomes	
After the course completion, students will be able to:	
CO303.1	Learn the various number systems, binary codes & their conversions
CO303.2	understand the truth table of different logic gates and design of combinational & sequential digital circuits using the logic gates
CO303.3	Learn the classification of memories along with their applications
CO303.4	Understand different analog to digital conversion techniques & vice versa.

Course Name: DS (BTCS 304)

Course Outcomes	
After the course completion, students will be able to:	
CO304.1	For a given algorithm student will be able to analyze the algorithms to determine the computational complexity.
CO304.2	Student will be able to implement operations like searching, insertion, deletion and traversing on various data structures and determine computational complexity.
CO304.3	Students will be able to design various tree and graph applications using non-linear data structures.
CO304.4	Student will be able to implement different sorting and searching techniques on various data structures and compare their performance in term of Space and Time complexity.
CO304.5	Students will be able to choose appropriate data structure as applied to specific problem definition;

Course Name: OOPS (BTCS 305)

Course Outcomes	
After the course completion, students will be able to:	
CO305.1	Understand the procedural and object oriented paradigms with concepts of streams, classes, functions, data and objects.
CO305.2	Recognize the concept of constructors and destructors, And create some new definitions for some of the operator.
CO305.3	Identify the concept and reusability through inheritance and virtual base class.
CO305.4	Analyze polymorphic behavior of objects, details of friend function and virtual functions.
CO305.5	Demonstrate the concept of exception handling and file operations.

Course Name: DS Lab (BTCS 306)

Course Outcomes
After the course completion, students will be able to:

CO306.1	Implement basic data structures such as arrays and linked list.
CO306.2	Programs to demonstrate the implementation of various operations on stack and queue.
CO306.3	Implement various searching and sorting algorithms.
CO306.4	Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals.

Course Name: Institutional Practical Training (BTCS 307)

Course Outcomes	
After the course completion, students will be able to:	
CO307.1	Define computational concepts
CO307.2	Explain basic programming skills python
CO307.3	Applying programming techniques to general problems using python

Course Name: DCLD Lab (BTCS 308)

Course Outcomes	
After the course completion, students will be able to:	
CO308.1	Implement combinational & sequential circuits using logic gates.
CO308.2	Demonstrate the applications of multiplexers & encoders
CO308.3	Implement variety of Flip-flops and counters

Course Name: OOPS Lab (BTCS 309)

Course Outcomes	
After the course completion, students will be able to:	

CO309.1	Demonstrate the classes integrating object oriented techniques.
CO309.2	Analyze and implement object oriented concepts of inheritance and polymorphism.
CO309.3	Describe and implement STL class of containers and need for exceptions to handle errors for object oriented programs.
CO309.4	Analyze and implement any real world based problems involving GUI interface using object oriented concept.

Course Name: OS (BTCS 401)

Course Outcomes	
After the course completion, students will be able to:	
CO401.1	Understand functions, structures and history of operating systems and design issues associated with operating systems.
CO401.2	Master various process management concepts including scheduling, synchronization and Deadlocks.
CO401.3	Insight into the concepts of memory management including virtual memory, Master system resources sharing among the users
CO401.4	Understanding issues related to file system interface and implementation, disk management.
CO401.5	Be familiar with protection and security mechanisms.

Course Name: DS (BTCS 402)

Course Outcomes	
After the course completion, students will be able to:	
CO402.1	The students will be able to use effectively algebraic techniques to analysis the basic discrete structures and algorithms.
CO402.2	Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.

CO402.3	The students will be able to deal with the "Algorithms, Complexity and Computability Theory" part of the focus more than programming language.
CO402.4	The students will be able to learn the concept of Boolean algebra. This is very useful not only for creating logical solution, but it is very useful in programming too
CO402.5	The students will be able to use effectively algebraic techniques to analysis the basic discrete structures and algorithms.

Course Name: CN-1 (BTCS 403)

Course Outcomes	
After the course completion, students will be able to:	
CO403.1	Understanding the basic concept of data communication and its components, various topologies, transmission mediums and layered architecture with complete structure, functions and their roles in data communication.
CO403.2	Know about the design issues of various layers and their functions, protocols and services being offered to the layer above.
CO403.3	Understanding the internet addressing scheme IPv4 and sub netting.
CO403.4	Know about the basic algorithms of routing and congestion control
CO403.5	Understanding basic concepts of security and cryptography.

Course Name: MALP (BTCS 404)

Course Outcomes	
After the course completion, students will be able to:	
CO404.1	Describe the general architecture of a microcomputer system and architecture & organization of 8085.
CO404.2	Understand the difference between 8085 and various advanced microprocessors such as 8086, Pentium and Motorola 68000.
CO404.3	Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor.
CO404.4	Thorough understanding of detailed instruction set of 8085.

CO404.1	Describe the general architecture of a microcomputer system and architecture & organization of 8085.
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Course Name: SP (BTCS 405)

Course Outcomes	
After the course completion, students will be able to:	
CO405.1	The student will be able to understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
CO405.2	Students will be able to relate LEX and YACC tool with parsers.
CO405.3	Students will be able to convert the input to intermediate code and thereby generate target code.
CO405.4	Students will be able to develop Two pass assembler.
CO405.5	The student will be able to understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.

Course Name: OS Lab (BTCS 406)

Course Outcomes	
After the course completion, students will be able to:	
CO406.1	Understand functions, structures and history of operating systems and design issues associated with operating systems.
CO406.2	Master various process management concepts including scheduling, synchronization and Deadlocks.
CO406.3	Insight into the concepts of memory management including virtual memory, Master system resources sharing among the users
CO406.4	Understanding issues related to file system interface and implementation, disk management.
CO406.5	Be familiar with protection and security mechanisms.

Course Name: CN1 Lab (BTCS 407)

Course Outcomes	
After the course completion, students will be able to:	
CO407.1	Come across the latest configurations in laptops and desktops.
CO407.2	Understand various networking components, devices and various transmission Medias and tools.
CO407.3	Prepare straight through and cross over cables for networking thereby creating various LAN topologies using various network devices, cables and computer.
CO407.4	Configure TCP/IP protocols in Windows and LINUX and will able to implement file sharing and printer sharing.
CO407.5	Design and implement Class A, B, C networks, plan and implement subnets and install FTP server and client.

Course Name: MALP Lab (BTCS 408)

Course Outcomes	
After the course completion, students will be able to:	
CO408.1	To become familiar with the architecture and Instruction set of Intel 8085 microprocessor
CO408.2	To have hands on practice using assembly language programming.
CO408.3	To improve programming logic and concepts of 8085 and 8086 microprocessor

Course Name: SP Lab (BTCS 409)

Course Outcomes	
After the course completion, students will be able to:	
CO409.1	The student will be able to design, implement, test, debug and document programs in C++.
CO409.2	The students will able to develop programs to create symbol table for assembly and high

	level language program.
CO409.3	The students will be able to implement Single Pass Assembler.
CO409.4	The students will be able to explore features of debug command.
CO409.5	The student will be able to learn the use of LEX and YACC Tools.

Course Name: CN-II (BTCS501)

Course Outcomes	
After the course completion, students will be familiar with:	
CO501.1	Fundamental of Security, need of IPV6, SKIP and IKE.
CO501.2	The concept of Adhoc network, MAC and Routing Protocol.
CO501.3	The GSM 2G architecture of cellular network and 2.5G standards.
CO501.4	3G wireless Network, Bluetooth and PAN.
CO501.5	Wireless system design and concept of improving coverage and capacity in cellular system.

Course Name: RDBMS (BTCS502)

Course Outcomes	
After the course completion, students will be able to:	
CO502.1	Describe data models and schemas in RDBMS.
CO502.2	Understand the features of database management systems and Relational database.
CO502.3	Use SQL- the standard language of relational databases.
CO502.4	Understand the functional dependencies and design of the database.
CO502.5	Understand the concept of Transaction and Query processing.

Course Name: DAA (BTCS503)

Course Outcomes	
After the course completion, students will be able to:	
CO503.1	The Asymptotic notations and use them to find the best algorithm after analysis.
CO503.2	The usage of Design techniques and to apply them to get the solution for any problem and write it in algorithmic form.
CO503.3	Graph Algorithms and their applications.
CO503.4	Sorting and searching techniques.
CO503.5	To differentiate between Class P, NP and NPC.
CO503.6	The different algorithms for string/pattern matching.

Course Name: CG (BTCS504)

Course Outcomes	
After the course completion, students will be able to:	
CO504.1	Understand the fundamental graphical operations and the implementation on computer.
CO504.2	Get a glimpse of recent advances in computer graphics
CO504.3	Understand the concepts of rendering, shading, antialiasing.

Course Name: CPI (BTCS505)

Course Outcomes	
After the course completion, students will be able to:	
CO505.1	Define various System resources, Explain needs for IDE & SCSI Interfaces
CO505.2	Understand concepts and principles Video Hardware
CO505.3	Know basics of I/O Interfaces
CO505.4	Understand Input/ Output Driver software aspects

CO505.5	Understand Design & Integration of Peripheral devices to a computer system
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Course Name: RDBMS Lab (BTCS506)

Course Outcomes	
After the course completion, students will be able to:	
CO506.1	Install SQL Server.
CO506.2	Understand and deploy DQL, DDL, DML Statements.
CO506.3	Deploy views, indexes and security and privileges.
CO506.4	Understand architecture of PL/SQL, write PL/SQL codes.
CO506.5	Understand the concept of Procedures, Exception handling, Triggers and cursor management.

Course Name: CN-II Lab (BTCS507)

Course Outcomes	
After the course completion, students will be able to:	
CO507.1	Understand and implement the basic concepts of IPV6 using Packet tracer 6.2.
CO507.2	Develop and analyze programs for implementing / simulating routing algorithms for Adhoc networks using open source packet capture software like wire-shark, packet trace etc.
CO507.3	Configure Wireless Local Loop and Personal Area Network.
CO507.4	Understand and configure personal Adhoc networks.
CO507.5	Install and configure wireless access points using D-linkwifi router.

Course Name: DAA Lab (BTCS508)

Course Outcomes	
After the course completion, students will be able to:	

CO508.1	Implement algorithms of GCD, Median and Majority element in high level language.
CO508.2	Implement sorting algorithms in high level language.
CO508.3	Implement algorithms based on dynamic algorithm design technique.
CO508.4	Implement graph algorithms and their applications.
CO508.5	Implement string/pattern matching algorithms.
CO508.6	Implement algorithms in computational geometry.

Course Name: CG Lab (BTCS509)

Course Outcomes	
After the course completion, students will be able to:	
CO509.1	Understand the basic concepts of computer graphics.
CO509.2	Design scan conversion problems using C++ programming.
CO509.3	Apply clipping and filling techniques for modifying an object.
CO509.4	Understand the concepts of different type of geometric transformation of objects in 2D.
CO509.5	Understand the practical implementation of modeling, viewing of objects in 2D

Course Name: Simulation and Modeling (BTCS 601)

Course Outcomes	
After the course completion, students will be able to:	
CO601.1	The student will be able to tell the role of important elements of discrete event simulation and modeling paradigm.
CO601.2	The student will be able to conceptualize real world situations related to systems

	development decisions, originating from source requirements and goals.
CO601.3	The student will be able to develop skills to apply simulation software to construct and execute goal-driven system models.
CO601.4	The student will be able interpret the model and apply the results to resolve critical issues in a real world environment.
CO601.5	The student will be able to tell the role of important elements of discrete event simulation and modeling paradigm.

Course Name: RDBMS-II (BTCS 602)

Course Outcomes	
After the course completion, students will be able to:	
CO602.1	Design Databases for applications and apply concurrency control and recovery mechanisms for practical problems.
CO602.2	To analyze various query processing and evaluation techniques and apply them for query optimization in real time applications.
CO602.3	Understand the concept of object oriented database and have experience with object oriented modeling, design and implementation
CO602.4	Familiar with the techniques used for distributed database design process and evaluate simple strategies for executing a distributed query.
CO602.5	To know the working of various real time database applications focusing on data mining and data warehouse.

Course Name: SE (BTCS 603)

Course Outcomes	
After the course completion, students will be able to:	
CO603.1	Define various software application domains and remember different process model used in

	software development.
CO603.2	Explain needs for software specifications also they can classify different types of software requirements and their gathering techniques.
CO603.3	Convert the requirements model into the design model and demonstrate use of software and user interface design principles
CO604.4	Distinguish among SCM and SQA and can classify different testing strategies and tactics and compare them.
CO605.5	Justify role of SDLC in Software Project Development and they can evaluate importance of Software Engineering.

Course Name: Web Technologies Elective I (BTCS 901)

Course Outcomes	
After the course completion, students will be able to:	
CO901.1	Understand the basics of Internet, Internet addressing, web browsers, servers and various web applications.
CO901.2	Develop webpages using HTML, DHTML and CSS
CO901.3	Create webpages using PHP and establish connectivity with SQL
CO901.4	Working with AJAX and demonstrate its advantage over other technologies.
CO901.5	Learn the structure and importance of XML objects and their applications in real-time web processing

Course Name: HRM Open Elective (BTCS251)

Course Outcomes	
After the course completion, students will be able to:	
CO251.1	Understand various laws and regulations pertaining to employees and organizational functions.
CO251.2	Understand job analysis, design, description and specification and process of promotions and appraisals.

CO251.3	Understand job satisfaction, job evaluations bonus, incentives and various motivational theories concerned with it.
CO251.4	Understand the compensation functions like wages, job evaluation, bonus and incentives; and various acts corresponding to these.
CO251.5	Understand the bridging of relationship between human resources and organizational resources for win-win situation and the fringe benefits, importance of work place safety and various acts and regulations related to these.

Course Name: RDBMS-II LAB (BTCS 604)

Course Outcomes	
After the course completion, students will be able to:	
CO604.1	To understand the concepts of normalization and design a database model and schema using SQL.
CO604.2	To analyze various query processing and evaluation techniques and apply them for query optimization in real time applications
CO604.3	To apply backup and recovery techniques in case of failure in huge databases and industry related applications.
CO604.4	To understand the basic implementation of object oriented and web databases.
CO604.5	To know the working of data mining tool “WEKA” and compare various classification algorithms for simple databases.

Course Name: Web Technologies (BTCS605)

Course Outcomes	
After the course completion, students will be able to:	
CO605.1	Understand the basics of Internet, Internet addressing, web browsers, servers and various web applications.
CO605.2	Develop webpages using HTML, DHTML and CSS
CO605.3	create webpages using PHP and establish connectivity with SQL
CO605.4	Working with AJAX and demonstrate its advantage over other technologies.

CO605.5	Learn the structure and importance of XML objects and their applications in real-time web processing
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Course Name: SE Lab (BTCS 606)

Course Outcomes	
After the course completion, students will be able to:	
CO606.1	The Student will able to draft and also track the progress of interim project.
CO606.2	Student comprehends software requirement specification documents and able to Design documents for same.
CO606.3	After completion student will be able to apprehend Design phase CASE Tool.
CO606.4	After completion of course student will be able to embrace testing of any website, unit and integration testing. Student will also able to comprehend some Techniques such as White and black testing.

Course Name: Simulation and Modeling Lab (BTCS 607)

Course Outcomes	
After the course completion, students will be able to:	
CO607.1	The student will be able to implement queuing model using C++
CO607.2	The student will be able to use network simulators to analyze various network parameters
CO607.3	The student will be able to understand how to use MATLAB and its Functionality.
CO607.4	The student will be able to use the concepts like branching statements, loops, functions and additional datatypes.

Course Name: AI(BTCS 701)

Course Outcomes
After the course completion, students will be able to:

CO701.1	Understand the historical perspective of AI, its foundations and analyze problem solving and state space search strategies.
CO701.2	Analyze problem using informed search strategies and select amongst different game based techniques to solve them.
CO701.3	Understand reasoning in AI using propositional logic, predicate logic (first order logic), logical reasoning, forward and backward chaining and attain knowledge in AI languages and tools - Lisp, Prolog, CLIPS.
CO701.4	Analyze and solve problems with uncertain information using Bayesian approaches, fuzzy sets and fuzzy logic, decision making, planning and representation of resource constraints.
CO701.5	Understand learning methods: Inductive learning, neural networks, reinforcement learning, genetic algorithms, and communication among agents, parsing of grammar, natural language processing.

Course Name:TOC(BTCS-702)

Course Outcomes	
After the course completion, students will be able to:	
CO702.1	To use basic concepts of formal languages of finite automata techniques with strings and alphabets.
CO702.2	Design Finite Automata's for different Regular Expressions and Languages
CO702.3	Construct context free grammar for various languages.
CO702.4	Apply rigorously formal mathematical methods to prove properties of languages, grammars and automata.
CO702.5	To solve various problems of applying normal form techniques, push down automata and Turing Machines

Course Name: Elective-II; SPM (BTCS-907)

Course Outcomes

After the course completion, students will be able to:	
CO907.1	Plan and evaluate the software projects along with risk management.
CO907.2	Monitor the progress and control the cost of the software project.
CO907.3	Implement the desired changes and manage the contracts.
CO907.4	Do quality management and personnel management.

Course Name: Elective III CC (BTCS 912)

Course Outcomes	
After the course completion, students will be able to:	
CO 912.1	Explain overview of cloud computing, concepts such as virtualization, hypervisors, Multi-tenancy, automation and management tooling.
CO 912.2	Distinguish concepts related to cloud service delivery, cloud service model architecture, tradeoff in cost and common cloud management platform.
CO 912.3	Analyze various cloud deployment models, public and hybrid clouds community. Comprehend Migration path for cloud and selection criteria for cloud deployment.
CO 912.4	Examine and categorize various security risks, internal security breaches, service hijacking, Steps to reduce cloud security breaches.
CO 912.5	Appraise detection and forensic in cloud computing, Identity Management, encryption technique, key encryption, Digital Signature and SSL. Also Comparison of cloud computing platform and common building blocks.

Course Name: AI Lab (BTCS 704)

Course Outcomes	
After the course completion, students will be able to:	
CO704.1	Apply various uninformed and informed AI search algorithms.
CO704.2	Apply AI search algorithms using Heuristic function and select amongst different search or game based techniques to solve them.

CO704.3	Ability to apply knowledge representation and machine learning techniques to real-world problems (production system, search problems of 3 x 3 puzzle)
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Scheme: 2018

Third Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTES 301-18	Engineering Science Course	Digital Electronics	3	0	0	40	60	100	3
BTCS 301-18	Professional Core Courses	Data structure & Algorithms	3	0	0	40	60	100	3
BTCS 302-18	Professional Core Courses	Object Oriented Programming	3	0	0	40	60	100	3
BTAM 304-18	Basic Science Course	Mathematics-III	3	0	0	40	60	100	3
HSMC 101/102-18	Humanities & Social Sciences Including Management Courses	Foundation Course in Humanities (Development of Societies OR Philosophy)	2	1	0	40	60	100	3
BTES 302-18	Engineering Science Course	Digital Electronics Lab	0	0	2	30	20	50	1
BTCS 303-18	Professional Core Courses	Data structure & Algorithms Lab	0	0	4	30	20	50	2
BTCS 304-18	Professional Core Courses	Object Oriented Programming lab.	0	0	4	30	20	50	2
BTCS 305-18	Professional Core	IT Workshop	0	0	2	30	20	50	1

	Courses								
		Summer Institutional Training	0	0	0	0	0	0	Satisfactory/Unsatisfactory
Total			14	1	12	320	380	700	21

IK Gujral Punjab Technical University, Kapurthala
B. Tech, Computer Science & Engineering

Fourth Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCS 401-18	Professional Core Courses	Discrete Mathematics	3	1	0	40	60	100	4
BTES 401-18	Engineering Science Course	Computer Organization & Architecture	3	0	0	40	60	100	3
BTCS 402-18	Professional Core Courses	Operating Systems	3	0	0	40	60	100	3
BTCS 403-18	Professional Core Courses	Design & Analysis of Algorithms	3	0	0	40	60	100	3
HSMC 122-18	Humanities & Social Sciences including Management Courses	Universal Human Values	2	1	0	40	60	100	3
EVS101-18	Mandatory Courses	Environmental Sciences	2	-	-	100	-	100	S/US
BTES 402-18	Engineering Science Course	Computer Organization & Architecture Lab	0	0	2	30	20	50	1
BTCS 404-18	Professional Core Courses	Operating Systems Lab	0	0	4	30	20	50	2
BTCS 405-18	Professional Core Courses	Design & Analysis of Algorithms Lab	0	0	4	30	20	50	2
Total			14	2	10	290	360	650	24

Fifth Semester

Course Code	Course Name	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
BTCS501	Computer Networks –II	3	1	-	40	60		4

							10 0	
BTCS502	Relational Database Management System	3	1	-	40	60	100	4
BTCS503	Design & Analysis of Algorithms	3	1	-	40	60	100	4
BTCS504	Computer Graphics	3	1	-	40	60	100	4
BTCS505	Computer Peripherals & Interfaces	3	0	-	40	60	100	3
BTCS506	RDBMS Lab	-	-	4	30	20	50	2
BTCS507	Computer Networks –II Lab	-	-	2	30	20	50	1
BTCS508	Design & Analysis of Algorithms Lab	-	-	2	30	20	50	1
BTCS509	Computer Graphics Lab	-	-	2	30	20	50	1
BTCS510	Industrial Training*	-	-	-	60	40	100	1
Total		15	4	10	380	420	800	25

**IK Gujral Punjab Technical University,
Kapurthala**

Sixth Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCS 601-18	Professional Core Courses	Compiler Design	3	0	0	40	60	100	3
BTCS 602-18	Professional Core Courses	Artificial Intelligence	3	0	0	40	60	100	3
BTCS UUU-18	Professional Elective Courses	Elective-II	3	0	0	40	60	100	3
BTCS YYY-18	Professional Elective Courses	Elective-III	3	0	0	40	60	100	3
BTOE ***	Open Elective Courses	Open Elective-I	3	0	0	40	60	100	3
BTCS 603-18	Project	Project-1	0	0	6	60	40	100	3
BTCS 604-18	Professional Core Courses	Compiler Design Lab	0	0	2	30	20	50	1
BTCS 605-18	Professional Core Courses	Artificial Intelligence Lab	0	0	2	30	20	50	1
BTCS UUU-18	Professional Elective Courses	Elective-II lab	0	0	2	30	20	50	1
BTCS YYY-18	Professional Elective Courses	Elective-III lab	0	0	2	30	20	50	1
Total			15	0	14	380	420	800	22

**IK Gujral Punjab Technical University,
Kapurthala**

Seventh Semester / Eighth Semester

Course Code	Type of Course	Course Title	Hours per Week			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCS 701-18	Professional Core Courses	Network Security and Cryptography	3	0	0	40	60	100	3
BTCS 702-18	Professional Core Courses	Data Mining and Data Warehousing	3	0	0	40	60	100	3
BTOE ***	Open Elective Courses	Open Elective-II	3	0	0	40	60	100	3
BTCS ZZZ-18	Professional Elective	Elective- IV	3	0	0	40	60	100	3
BTCS TTT-18	Professional Elective Courses	Elective-V	3	0	0	40	60	100	3
BTCS 703-18	Project	Project-II	0	0	12	120	80	200	6
BTCS ZZZ-18	Professional Elective	Elective- IV lab	0	0	2	30	20	50	1
BTCS TTT-18	Professional Elective	Elective- V lab	0	0	2	30	20	50	1
Total			15	0	14	380	420	800	23

Seventh Semester / Eighth Semester

Course Code	Course Title	Marks Distribution		Total Marks	Credits
		Internal	External		
BTCS 801-18	Semester Training	300	200	500	16

Course Name: DE (BTES301-18)

Course Outcomes	
After the course completion, students will be able to:	
BTES301-18.1	Learn the various number systems, binary codes & their conversions
BTES301-18.2	understand the truth table of different logic gates and design of combinational & sequential digital circuits using the logic gates
BTES301-18.3	Learn the classification of memories along with their applications
BTES301-18.4	Understand different analog to digital conversion techniques & vice versa.

Course Name: DSA (BTCS301-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS301-18.1	For a given algorithm student will be able to analyze the algorithms to determine the computational complexity.
BTCS 301-18.2	Student will be able to implement operations like searching, insertion, deletion and traversing on various data structures and determine computational complexity.
BTCS 301-18.3	Students will be able to design various tree and graph applications using non-linear data structures.
BTCS 301-18.4	Student will be able to implement different sorting and searching techniques on various data structures and compare their performance in term of Space and Time complexity.
BTCS 301-18.5	Students will be able to choose appropriate data structure as applied to specific problem definition;

Course Name: OOP (BTCS302-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS 302-18.1	Understand the procedural and object oriented paradigms with concepts of streams, classes, functions, data and objects.
BTCS 302-18.2	Recognize the concept of constructors and destructors, And create some new definitions for some of the operator.
BTCS 302-18.3	Identify the concept and reusability through inheritance and virtual base class.
BTCS 302-18.4	Analyze polymorphic behavior of objects, details of friend function and virtual functions.
BTCS 302-18.5	Demonstrate the concept of exception handling and file operations.

Course Name: M-III (BTAM304-18)

Course Outcomes	
After the course completion, students will be able to:	
BTAM 304-18.1	Understand the functions of several variables that are essential in most branches of engineering
BTAM 304-18.2	Apply multiple integrals to deal with areas and volumes of various structures which are quite significant in real world.
BTAM 304-18.3	Formulate and solve engineering problems related to convergence, infinite series, power series and Taylor series
BTAM 304-18.4	Create, select and utilize the learnt techniques of first degree ordinary differential equations to model real world problems.
BTAM 304-18.5	Be acquainted with the knowledge required to solve higher order ordinary differential equations

Course Name: FCH (HSMC101-18)

Course Outcomes
After the course completion:

HSMC101-18.1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature).
HSMC101-18.2	Students shall be able to relate philosophy to literature, culture, society and lived experience can be considered.
HSMC101-18.3	Students will develop strong natural familiarity with humanities along with right understanding enabling them to eliminate conflict and strife in the individual and society.

Course Name: DE Lab (BTES302-18)

Course Outcomes	
After the course completion, students will be able to:	
BTES302-18.1	Implement combinational & sequential circuits using logic gates.
BTES302-18.2	Demonstrate the applications of multiplexers & encoders
BTES302-18.3	Implement variety of Flip-flops and counters

Course Name: DSA Lab (BTCS303-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS303-18.1	Implement basic data structures such as arrays and linked list.
BTCS303-18.2	Programs to demonstrate the implementation of various operations on stack and queue.
BTCS303-18.3	Implement various searching and sorting algorithms.
BTCS303-18.4	Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals.

Course Name: OOP Lab (BTCS304-18)

Course Outcomes

After the course completion, students will be able to:	
BTCS304-18.1	Demonstrate the classes integrating object oriented techniques.
BTCS304-18.2	Analyze and implement object oriented concepts of inheritance and polymorphism.
BTCS304-18.3	Describe and implement STL class of containers and need for exceptions to handle errors for object oriented programs.
BTCS304-18.4	Analyze and implement any real world based problems involving GUI interface using object oriented concept.

Course Name: ITW (BTCS305-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS305-18.1	Define computational concepts
BTCS305-18.2	Explain basic programming skills python
BTCS305-18.3	Applying programming techniques to general problems using python

Course Name: DM (BTCS401-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS401-18.1	To be able to express logical sentence in terms of predicates, quantifiers, and logical connectives
BTCS401-18.2	To derive the solution for a given problem using deductive logic and prove the solution based on logical inference
BTCS401-18.3	For a given a mathematical problem, classify its algebraic structure
BTCS401-18.4	To evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
BTCS401-18.5	To develop the given problem as graph networks and solve with techniques of graph theory.

Course Name: COA (BTES-401-18)

Course Outcomes

After the course completion, students will be able to:	
BTES401.18.1	Understand fundamental computer architecture.
BTES401.18.2	Write assembly language programs for 8085 Processor.
BTES401.18.3	Interface memory & peripheral devices to processing unit.
BTES401.18.4	Design of memory module and its operation analysis.

Course Name: OS (BTCS402-18)

Course Outcomes	
After the course completion, students will be able to:	
CO402-18.1	Explain basic operating system concepts such as overall architecture, system calls, user mode and kernel mode
CO402-18.2	Distinguish concepts related to processes, threads, process scheduling, race conditions and critical sections
CO402-18.3	Analyze and apply CPU scheduling algorithms, deadlock detection and prevention algorithms
CO402-18.4	Examine and categorize various memory management techniques like caching, paging, segmentation, virtual memory, and thrashing.
CO402-18.5	Design and implement file management system
CO402-18.6	Appraise high-level operating systems concepts such as file systems, disk-scheduling algorithms and various file systems.

Course Name: DAA (BTCS403-18)

Course Outcomes	
After the course completion, students will be able to:	
CO403-18.1	Analyze the algorithms to determine the computational complexity

CO403-18.2	To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
CO403-18.3	Employ Graph and trees data structures to model Engineering problems and explain the major graph algorithms and their analysis.
CO403-18.4	Examine the necessity for NP class based problems and explain the use of heuristic techniques.
CO403-18.5	Demonstrate the ways to analyze approximation/randomized algorithms.

Course Name: UHV(HSCM 122-18)

Course Outcomes	
After the course completion, students will be able to:	
CO 122-18.1	Understand the significance to actualize a harmonious environment.
CO 122-18.2	Understand the role of human being in ensuring harmony in society and nature.
CO 122-18.3	Distinguish between values and skills and to correlate them.
CO 122-18.4	Self explore the various aspects of reality.
CO 122-18.5	Develop the right understanding of human values through the process of self exploration.

Course Name: EVS(EVS101-18)

Course Outcomes	
After the course completion, students will be able to:	
EVS101-18.1	Understand nature,the role of individual in conservation of natural resources and equitable use of resources for sustainable lifestyles.
EVS101-18.2	Undertand types ,characteristics features,structure and function of ecosystems like: a. Forest ecosystem

	b. Aquatic ecosystem(ponds, streams, lakes, rivers,oceans, estuaries).
EVS101-18.3	Understand the biodiversity at global ,national and local levels and its conservations.
EVS101-18.4	Understand social issues and the environment with public awareness.

Course Name: CAO Lab(BTES 402-18)

Course Outcomes	
After the course completion, students will be able to:	
CO402-18.1	Implement assembly language programs for various processors such as 8085, 8086
CO402-18.2	Create assembly language programs for arithmetic, logical and shift operations.
CO402-18.3	Assemble personal computer

Course Name: OS Lab(BTCS404-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS404-18.1	Understand and implement basic services and functionalities of the operating system
BTCS404-18.2	Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority
BTCS404-18.3	Implement commands for files and directories
BTCS404-18.4	Understand and implement the concepts of shell programming, Simulate file allocation and organization techniques
BTCS404-	Understand the concepts of deadlock in operating systems and implement them in

18.5	multiprogramming system
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Course Name: DAA Lab(BTCS 405-18)

Course Outcomes	
After the course completion, students will be able to:	
CO405-18.1	Design and implement complex problems with different techniques like greedy method and Dynamic Method.
CO405-18.2	Understand comparative performance of strategies and hence choose appropriate, to apply to specific problem definition
CO405-18.3	Implement Various tree and graph based algorithms
CO405-18.4	Design and Implement heuristics techniques for real world problems.

Course Name: ERP(BTES501-18)

Course Outcomes	
After the course completion, students will be able to:	
BTES501-18.1	To know the basics of ERP
BTES501-18.2	To understand the key implementation issues of ERP
BTES501-18.3	To know the business modules of ERP
BTES501-18.4	To be aware of some popular products in the area of ERP

Course Name: DBMS(BTCS501-18)

Course Outcomes
After the course completion, students will be able to:

BTCS501-18.1	write relational algebra expressions for a query and optimize the Developed expressions
BTCS501-18.2	Design the databases using ER method and normalization.
BTCS501-18.3	Construct the SQL queries for Open source and Commercial DBMS-MYSQL, ORACLE, and DB2.
BTCS501-18.4	Determine the transaction atomicity, consistency, isolation, and durability.
BTCS501-18.5	Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

Course Name: FOA(BTCS502-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS 502-18 .1	Write a formal notation for strings, languages and machines.
BTCS 502-18 .2	Design finite automata to accept a set of strings of a language.
BTCS 502-18 .3	Design context free grammars to generate strings of context free language .
BTCS 502-18 .4	Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars.
BTCS 502-18 .5	Distinguish between computability and non-computability and Decidability and undesirability.

Course Name: SE(BTCS503-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS503-18.1	Students should be able to identify the need for engineering approach to software development and various processes of requirements analysis for software engineering

	problems.
BTCS503-18.2	Analyse various software engineering models and apply methods for design and development of software projects.
BTCS503-18.3	Work with various techniques, metrics and strategies for Testing software projects.
BTCS503-18.4	Identify and apply the principles, processes and main knowledge areas for Software Project Management
BTCS503-18.5	Proficiently apply standards, CASE tools and techniques for engineering software projects

Course Name: CN(BTCS504-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS504-18.1	Explain the functions of the different layer of the OSI Protocol
BTCS504-18.2	Describe the function of each block of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs)
BTCS504-18.3	Develop the network programming for a given problem related TCP/IP protocol
BTCS504-18.4	Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

Course Name: Elective-I Python (BTCS 510-18)

Course Outcomes	
After the course completion, students will be able to:	
C510-18.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
C510-18.2	Demonstrate proficiency in handling Exceptions and File Systems.

C510-18.3	To Create and manipulate Python Programs using core data structures like Strings, Tuples, Lists, Dictionaries and use Regular Expressions
C510-18.4	Interpret the concepts of threading and modules as used in Python.
C510-18.5	To develop the ability to write applications related to Network Programming, Web Services and Databases in Python.

Constitution of India(BTMC101)

Course Outcomes	
After the course completion, students will be able to:	
BTMC101.1	About the historical background of COI.
BTMC101.2	About the meaning, characteristics and features of COI.
BTMC101.3	About the concepts of fundamental duties and fundamental rights.
BTMC101.4	About the DPSP's meaning, characteristics and importance.
BTMC101.5	About the Federal System of Govt. and distribution of power.
BTMC101.6	About the Parliamentary Form of Govt.

Course Name: DBMS Lab(BTCS505-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS505-18.1	To retrieve data from relational databases using SQL
BTCS505-18.2	To implement generation of tables using data types
BTCS505-18.3	To design and execute the various data manipulation queries.

BTCS505-18.4	Learn to execute triggers, cursors, stored procedures etc.
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Course Name: SE Lab(BTCS506-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS506-18.1	Use OpenProj or similar software to draft a project plan, software to track the progress of a project, Preparation of SRS Document, Design Documents and Testing
BTCS506-18.2	Preparation of Software Configuration Management and Risk Management related documents and usage of any Design phase CASE tool
BTCS506-18.3	To perform unit testing and integration testing, To perform various white box and black box testing techniques, Testing of a web site

Course Name: CN Lab(BTCS507-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS507-18.1	Know about the various networking devices, tools and also understand the implementation of network topologies
BTCS507-18.2	Create various networking cables and know how to test these cables
BTCS507-18.3	Create and configure networks in packet trace retool using various network devices and topologies.
BTCS507-18.4	Understand IP addressing and configure networks using the subnet in
BTCS507-18.5	Configure routers using various router configuration commands

Course Name: Elective-I Python Lab (BTCS 513-18)

Course Outcomes	
After the course completion, students will be able to:	
C 513-18.1	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
C 513-18.2	Demonstrate proficiency in handling Strings and File Systems.
C 513-18.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C 513-18.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C 513-18.5	Create and run python programs using modules and Implement exemplary applications related to Databases in Python.

Course Name: CD (BTCS601-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS601-18.1	Build Concepts on Lexical Analysis.
BTCS601-18.2	Understand strategies of Syntax Analysis.
BTCS601-18.3	Learn technique of intermediate code generation.
BTCS601-18.4	Understand code design issues and design code generator.
BTCS601-18.5	Design and develop optimized codes.

Course Name: AI (BTCS 602-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS602-18.1	Build intelligent agents for search and games
BTCS602-18.2	Solve AI problems by learning various algorithms and strategies

BTCS602-18.3	Understand probability as a tool to handle uncertainty
BTCS602-18.4	Learning optimization and inference algorithms for model learning
BTCS602-18.5	Design and develop programs for an reinforcement agent to learn and act in a structured environment

Course Name: Elective -II IOT (BTCS 608-18)

Course Outcomes	
After the course completion, students will be able to:	
C618-18.1	Understand internet of Things and its hardware and software components
C618-18.2	Interface I/O devices, sensors & communication modules
C618-18.3	Remotely monitor data and control devices
C618-18.4	Develop real life IoT based projects

Course Name: Elective- III ML (BTCS 618-18)

Course Outcomes	
After the course completion, students will be able to:	
C618-18.1	Analyse methods and theories in the field of machine learning
C618-18.2	Analyse and extract features of complex datasets
C618-18.3	Deploy techniques to implement Regression Algorithms and evaluate their performances
C618-18.4	Comprehend and apply different classification and clustering techniques
C618-18.5	Understand the concept of Neural Networks and Genetic Algorithm

Course Name: Open Elective –I WCS (BTEC601-18)

Course Outcomes	
After the course completion, students will be able to:	
BTEC601-18.1	Understand the basic elements of Cellular Radio Systems and its design

BTEC601-18.2	Learn about the concepts Digital communication through fading multipath channels
BTEC601-18.3	Understand various Multiple Access techniques for Wireless communication
BTEC601-18.4	Know about the Wireless standards and systems

Course Name:CD Lab(BTCS604-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS604-18.1	Improve Practical Skills by implementing various phases of compiler.
BTCS604-18.2	Learn various lexical analyzer tools such as FLEX, JLex.
BTCS604-18.3	Implement the logics of finite automata and parsing.
BTCS604-18.4	Understand the strategies to implement string recognition

Course Name: AI Lab(BTCS 605)

Course Outcomes	
After the course completion, students will be able to:	
BTCS605.1	Apply various uninformed and informed AI search algorithms.
BTCS605.2	Apply AI search algorithms using Heuristic function and select amongst different search or game based techniques to solve them.
BTCS605.3	Ability to apply knowledge representation and machine learning techniques to real-world problems (production system, search problems of 3 x 3 puzzle)

Course Name: Elective-II IOT Lab (BTCS 609-18)

Course Outcomes	
After the course completion, students will be able to:	
C608-18.1	Understand internet of Things and its hardware and software components
C608-18.2	Interface I/O devices, sensors & communication modules
C608-18.3	Remotely monitor data and control devices

C608-18.4	Develop real life IoT based projects
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Course Name: Elective- III ML Lab(BTCS 619-18)

Course Outcomes	
After the course completion, students will be able to:	
C 619-18.1	Extract features of a dataset and apply other pre-processing techniques
C 619-18.2	Comprehend and apply simple and multiple Linear Regression algorithms.
C 619-18.3	Deploy techniques to implement various classification algorithms and evaluate them.
C 619-18.4	Implement different Clustering Algorithms
C 619-18.5	Apply Artificial Neural Network and Genetic Algorithms to datasets.

Course Name: NSC (BTCS701-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS701-18.1	Understand the fundamental principles of access control models and techniques, authentication and secure system design.
BTCS701-18.2	Have a strong understanding of different cryptographic protocols and techniques and be able to use them.
BTCS701-18.3	Apply methods for authentication, access control, intrusion detection and prevention.
BTCS701-18.4	Identify and mitigate software security vulnerabilities in existing systems .

Course Name: DM (BTCS702-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS702-18.1	Understand the functionality of the various data mining and data warehousing component
BTCS702-18.2	learn the strengths and limitations of various data mining and data warehousing models
BTCS702-18.3	Describe different methodologies used in data mining and data warehousing.
BTCS702-18.4	Compare different approaches of data warehousing and data mining with various technologies.
BTCS702-18.5.	Evaluate the different models of OLAP and data preprocessing.
BTCS702-18.6	Implement classical models and algorithms in data warehousing and data mining and to characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
BTCS702-18.7	Explore recent trends in data mining such as web mining, search engine mining.

Course Name: Elective- IV Block Chain Technologies (BTCS 712-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS712.1	Understand emerging abstract models for Block chain Technology.
BTCS712.2	Identify major research challenges and technical gaps existing between theory and practice in Crypto currency domain.
BTCS712.3	It provides conceptual understanding of the function of Block chain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they Enable.
BTCS712.4	Apply hyper ledger Fabric and Ethereum platform to implement the Block chain Application.

Course Name: Elective- IV BlockChain Technologies Lab (BTCS 713-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS713.1	Understand Naïve BlockChain models and Memory hard Algorithm
BTCS713.2	Understand Applications and Solve Mining Puzzle using Block chain
BTCS713.3	Solve conceptual understanding of the of Block chain as a method of securing distributed ledgers, and addressing real time problem using data structure and Algorithms
BTCS713.4	Create all steps involved in creating Crypto Currency along open challenges with future scope.

Course Name: Open Elective- II MCN(BTEC908B-18)

Course Outcomes	
After the course completion, students will be able to:	
BTEC908B18.1	Understand the working principles of the mobile communication systems
BTEC908B18.2	Understand the relation between the user features and underlying technology.
BTEC908B18.3	Analyze mobile communication systems for improved performance

Course Name: Elective- V DD(BTCS706-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS706-18.1	Design trends in distributed systems.
BTCS706-18.2	Apply network virtualization in distributed environment.
BTCS706-18.3	Apply remote method invocation and objects.

Course Name: Elective- V DD Lab(BTCS707-18)

Course Outcomes	
After the course completion, students will be able to:	
BTCS707-18.1	Understand image detection and analysis.
BTCS707-18.2	Identify features to recognize object , scene and categorization from images.
BTCS707-18.3	Develop the skills necessary to build computer vision applications.