Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : (type course name)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning Focus on	Assessment Tools to Measure Attainment of CO		
CO1	For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness;	3	3	2	3	2	3	0	0	0	0	1	3	3	3	1	0		MSTs, ESE, Class/Quiz Tests		

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CO2	Student will be able to handle operation like searching, insertion, deletion, traversing on various Data Structures and determine time and computational complexity	3	3	2	2	1	2	0	0	1	0	1	3	3	3	1	0			MSTs, ESE, Class/Quiz Tests		
CO3	Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity;	3	3	3	3	1	1	0	0	1	0	1	3	3	3	1	0			MSTs, ESE, Class/Quiz Tests		

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CO4	Students will be able to choose appropriate Data Structure as applied to specific problem definition	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0		
CO5	Demonstrate the reusability of Data Structures for implementing complex iterative problems	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0		

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : (type course name)

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning Focus on	Assessment Tools to Measure Attainment of CO

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CO1	Identify classes, objects, members of a class and the relationships among them needed to solve a specific problem operotors	3	3	3	3	2	3	0	0	0	0	1	3	3	3	1	0			MSTs, ESE, Class/Quiz Tests
CO2	Demonstrate the concept of constructors and destructors. And create new definitions for some of the operators	3	3	3	3	1	2	0	0	1	0	1	3	3	3	1	0			MSTs, ESE, Class/Quiz Tests
CO3	Create function templates, overload function templates	3	3	3	3	1	1	0	0	1	0	1	3	3	3	1	0			MSTs, ESE, Class/Quiz Tests
CO4	Understand and demonstrate the concept of data encapsulation, inheritance, polymorphism with virtual functions	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0			

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CO5	Demonstrate the concept of file operations, streams in C++ and various I/O manipulators	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : (type course name)

CO No.	CO Statement	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Improve practical skills in designing and implementing basic linear data structure algorithms	3	3	3	3	2	3	0	0	0	0	1	3	3	3	1	0			MSTs, ESE, Class/Quiz Tests

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CO2	Improve practical skills in designing and implementing Non-linear data structure algorithms;	3	3	3	3	1	2	0	0	1	0	1	3	3	3	1	0			MSTs, ESE, Class/Quiz Tests
CO3	Use Linear and Non-Linear data structures to solve relevant problems ;	3	3	3	3	1	1	0	0	1	0	1	3	3	3	1	0			MSTs, ESE, Class/Quiz Tests
CO4	Choose appropriate Data Structure as applied to specific problem definition;	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0			
CO5	Implement Various searching algorithms and become familiar with their design methods	3	3	3	3	2	2	0	0	3	0	3	3	3	3	1	0			

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
S(401-18) : Discrete Mathematics

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		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO State	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	To be able to express logical sentence in terms of predicates, quantifiers, and logical connectives	3	3	3	2		1	1		1				2				Understar	mployabili	MSTs, ESE, Class/Quiz Tests
CO2	To derive the solution for a given problem using deductive logic and prove the solution based on logical inference	3	3	3	3		1			2			1	2				Design	mployabili	MSTs, ESE, Class/Quiz Tests
CO3	For a given a mathematical problem, classify its algebraic structure	3	3	3	2					1				1	1			Design	mployabili	MSTs, ESE, Class/Quiz Tests

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CO4	To evaluate Boolean functions and simplify expressions using the properties of Boolean algebra	3	3	3	3		2			2	2	1	1	1				Design	mployabili	MSTs, ESE, Class/Quiz Tests
CO5	To develop the given problem as graph networks and solve with techniques of graph theory.	3	3	3	3	1	2	1	1	2	2	2	2	2	2	2	1	Design	mployabili	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
ITCS(BTES401-18) : (Computer Organisation and Architecture)

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO

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CO1	Understand functional block diagram of microprocessor	3	1	2	2	2	1			1	1		3	3		1		3	3	MSTs, ESE, Class/Quiz Tests		
CO2	Apply instruction set for Writingassembly language programs	3	2	3	3	2		1		3	2	2	3	3	1	3	1	3	3	MSTs, ESE, Class/Quiz Tests		
CO3	Design a memory module and analyze its operation by interfacing with the CPU;	3	3	3	3	2				3	2	1	3	3	3	2		3	3	MSTs, ESE, Class/Quiz Tests		
CO4	Classify hardwired and microprogrammed control units	3	1	2	2	3	1	1		1		1	3	3	1	1	1	2	2	MSTs, ESE, Class/Quiz Tests		
CO5	Understand the concept of pipelining and its performance metrics	3	3	3	3	3	1		1	3	2	1	3	3	2	3	1	3	3	MSTs, ESE, Class/Quiz Tests		

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
S(402-18) : Operating Systems

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		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO Statement	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Explain basic operating system concepts such as overall architecture, system calls, user mode and kernel mode;	3	2	2	1	1	2	1		2	1	1	2	2	2			Understar	mployabili	MSTs, ESE, Class/Quiz Tests
CO2	Distinguish concepts related to processes, threads, process scheduling, race conditions and critical sections;	3	3	3	3	3	2	2	1	2	2	2	3	3	3	2	1	Design	repreneur	MSTs, ESE, Class/Quiz Tests

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CO3	Analyze and apply CPU scheduling algorithms, deadlock detection and prevention algorithms;	3	3	3	3	3	3	2	1	2	2	2	3	3	3	2	1	Design	repreneurs	MSTs, ESE, Class/Quiz Tests
CO4	Examine and categorize various memory management techniques like caching, paging, segmentation, virtual memory, and thrashing;	3	3	3	3	3	3	1		2	2	2	3	3	2			Analyse	repreneurs	MSTs, ESE, Class/Quiz Tests
CO5	Design and implement file management system;	3	3	3	3	3	3	2		2	2	2	3	3	3	2		Design	repreneurs	MSTs, ESE, Class/Quiz Tests
CO6	Appraise high-level operating systems concepts such as file systems, disk-scheduling algorithms and various file systems.	3	3	3	3	3	3	2	1	2	2	2	3	3	3	3	1	Understan	repreneurs	MSTs, ESE, Class/Quiz Tests

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Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS 403-18 : (Design& Analysis of Algorithms)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1	For a give	3	3	1	3									3	2			Understar	Employab	MSTs, ESE, Class/Quiz Tests		
CO2	Explain wi	3	3	3	3									3	2			Analyse	Employab			
CO3	Explain m	3	3	3	3	1	1							3	2			Analyse	Employab			
CO4	Demonstr	3	3	3	3	2	1							3	2			Design	Employab			
CO5	Examine th	3	3	3	3	2	2						2	3	2			Design	Employab			

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTES(402-18) : (Computer Organisation and Architecture Lab)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1	Assembl e personal compuer	3	2	2	3	2	2	2	1	3	1	1	3	3	1	2	1	3	3	MSTs, ESE, Class/Quiz Tests		

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CO2	Implement the various assembly language problems for basic arithmetic and logical operations	3	3	3	3	2	1			3	2	3	3	3	1	1		3	3	MSTs, ESE, Class/Quiz Tests		
CO3	Demonstrate the functioning of microprocessor/microcontroller based systems with I/O interface	3	1	3	3	1	1			2	2	3	3	3	2	3	1	3	3	MSTs, ESE, Class/Quiz Tests		
CO4																						

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
S(404-18) :Operating Systems Lab

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO

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CO1	Understand and implement basic services and functionalities of the operating system;	3	3	3	3	3	2	2		3	2	3	3	3	3	2		Understar	Employat	MSTs, ESE, Practical Assignments Tests
CO2	Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority;	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3	1	Analyse	Entrepren	MSTs, ESE, Practical Assignments Tests
CO3	Implement commands for files and directories;	3	3	3	3	3	2	2		2	2	2	2	3	3	2		Design	Entrepren	MSTs, ESE, Practical Assignments Tests
CO4	Understand and implement the concepts of shell programming;	3	2	3	2	3	3	3		2	3	2	3	3	3	2		Understar	Entrepren	MSTs, ESE, Practical Assignments Tests
CO5	Simulate file allocation and organization techniques;	3	3	3	3	3	2	2		3	2	2	2	2	2	2		Understar	Entrepren	MSTs, ESE, Practical Assignments Tests

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CO6	Understand the concepts of deadlock in operating systems and implement them in multiprogramming system.	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3	1	Design	Entrepren	MSTs, ESE, Practical Assignments Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS : (DAA Lab)

CO No.	CO Statement	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Design an	3	3	3	3	3	2			2				3	3			design	Employab	
CO2	Understand	3	3	3	3	3	2			2				3	3			understan	Employab	
CO3	Implement	3	3	3	2	3	1							3	1	2		Apply	Employab	
CO4	Design and Implement heuristics for real world problems.	3	3	3	3	3	2							3	3	2		Design	Employab	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS-501-18 Database Management System

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		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values			
CO No.	CO State	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	write relational algebra expressions for a query and optimize the Developed expressions	1	3	3	2	0	0	0	0	3	3	2	2	3	2	1	0	understan	employab	MSTs, ESE, Class/Quiz Tests
CO2	design the databases using ER method and normalization.	1	3	3	2	2	1	1	1	3	3	2	2	3	3	3	1	Analyse	enterpren	MSTs, ESE, Class/Quiz Tests
CO3	construct the SQL queries for Open source and Commercial DBMS-MYSQL, ORACLE, and DB2.	1	2	2	2	2	1	1	1	2	2	2	2	3	2	3	1	design	enterpren	MSTs, ESE, Class/Quiz Tests

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CO4	determine the transaction atomicity, consistency, isolation, and durability	1	2	1	1	1	0	0	0	3	3	2	2	3	1	1	0	understan	employab	MSTs, ESE, Class/Quiz Tests
CO5	Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling	1	2	2	2	1	1	1	1	3	3	2	2	3	2	2	1	design	employab	MSTs, ESE, Class/Quiz Tests

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
S(502-18) :Formal Language & Automata Theory

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO

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CO1	Write a formal notation for strings, languages and machines.	3	2	2	1	1				1			2	1	1			Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Design finite automata to accept a set of strings of a language.	3	3	3	2	1	1	1		1		1	2	2	2			Design	Employab	MSTs, ESE, Class/Quiz Tests
CO3	For a given language determine whether the given language is regular or not.	3	3	3	3	2	2	1	1	2	1	2	2	3	3	2	1	Analyse	Entrepren	MSTs, ESE, Class/Quiz Tests
CO4	Design context free grammars to generate strings of context free language.	3	2	3	2	1		1		2		2	1	2	2	2		Design	Entrepren	MSTs, ESE, Class/Quiz Tests

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CO5	Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars	3	3	3	3	2	1	2	1	2	1	1	3	3	3	2	1	DEsign	Entrepren	MSTs, ESE, Class/Quiz Tests
CO6	Write the hierarchy of formal languages, grammars and machines.	2	1	1	1		1	1			1	1	1	1				Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO7	Distinguish between computability and non-computability and Decidability and undecidability.	2	1	1	1		1	1		1		1	1	2	1			Understar	Employab	MSTs, ESE, Class/Quiz Tests

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
S(503-18) : Software Engineering

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Students should be able to identify the need for engineering approach to software development and various processes of requirements analysis for software engineering problems.	3	2	2	2	1	2	2	2	2	3	3	3	3	2		2	Understan	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Analyze various software engineering models and apply methods for design and development of software projects.	3	3	3	2	3	3	2	1	3	2	3	3	3	2	3	1	Analyse	Entrepren	MSTs, ESE, Class/Quiz Tests

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CO3	Work with various techniques, metrics and strategies for testing software projects.	3	3	3	2	3	2	1	1	2	2	2	3	3	3	2	1	Create	Entrepren	MSTs, ESE, Class/Quiz Tests
CO4	Identify and apply the principles, processes and main knowledge areas for Software Project Management	3	3	3	3	3	3	2	1	3	1	1	3	3	3	3	1	Design	Entrepren	MSTs, ESE, Class/Quiz Tests
CO5	Proficiently apply standards, CASE tools and techniques for engineering software projects	3	3	3	3	3	3	3		2	2	2	3	3	3	3		Design	Entrepren	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS 504 -18UC (Computer Network)

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		3	3	3	2	3	3	3	2	2	3	1	3	3	2	2	2	2	2	MSTs, ESE, Class/Quiz Tests
CO2		3	2	3	2	3	3	3	2	3	3	2	3	3	3	1	1	2	2	MSTs, ESE, Class/Quiz Tests
CO3		3	3	3	3	3	3	3	2	3	3	1	3	3	2	2	1	3	3	MSTs, ESE, Class/Quiz Tests
CO4		3	3	3	3	3	3	3	3		3	1	3	3	3	2	2	2	3	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS 512-18 : (Web and Open Source Technologies Lab)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	develop web based application using suitable client side and server side web technologies	3	2	2	3	3	3	2	2	3	2	3	3	3	3	3	2	3	3	MSTs, ESE, Class/Quiz Tests

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CO2	develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management	3	3	3	3	2	1	1	1	3	2	3	3	3	3	3	2	3	3 MSTs, ESE, Class/Quiz Tests

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
12-18UC) Programming in Python Lab

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Write, Test and Debug Python Programs	3	3	3	3	3	3	2	1	1	2	2	1	2	1	2		Test and I	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Implement Conditionals and Loops for Python Programs	3	3	2	3	2	3	2	2	1	1	1	3	2	2	2		Implemen	Employab	MSTs, ESE, Class/Quiz Tests

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CO3	Use functions and represent Compound data using Lists, Tuples and Dictionaries	3	2	2	3	2	3	2	1	2	1	2	2	3	1	2	1	Apply	Employab	MSTs, ESE, Class/Quiz Tests
CO4	Read and write data from & to files in Python and develop Application using Pygame	3	3	3	3	3	3	1	2	1	2	1	2	2	2	2		Design	Employab	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS :

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Describe the	3	3	3	3	3				2				3	3			design	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Critique mo	3	3	3	3	3	2			2				3	3			understan	Entrprene	
CO3	Utilize rapi	3	3	3	2	3	1			2				3	1	2		Apply	Employab	
CO4	Program mo	3	3	3	3	3	2			2				3	3	2		Design	Employab	
CO5	Deploy appl	3	3	3	3	3	2			2				3	3	2		Design	Employab	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) Mobile Application Development Lab

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		3	3	3	3	3	2	2	1	3	3	3	3	3	3	3	2			MSTs, ESE, Class/Quiz Tests
CO2		3	3	3	3	3	3	3		3	3	2	3	3	3	3	1			MSTs, ESE, Class/Quiz Tests
CO3		2	1	1	2	1	2	1	1	3	3	1	2	1	2	1	1			MSTs, ESE, Class/Quiz Tests
CO4		3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2			MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) Internet of Things

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		1	1	1	2	1	1	1		1	3	1	3	2	1	1				MSTs, ESE, Class/Quiz Tests
CO2		3	3	3	3	3	3	2		3	3	2	3	3	2	2	1			MSTs, ESE, Class/Quiz Tests
CO3		3	3	3	3	3	3	1	1	3	3	2	3	3	3	1	1			MSTs, ESE, Class/Quiz Tests
CO4		3	2	2	3	3	3	3		3	1	2	3	3	3	3	1			MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS : (Computer Graphics Lab)

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	To impleme	3	3	3	3	3	2			2				3	3	2		design	Employab	MSTs, ESE, Class/Quiz Tests
CO2	To demonst	3	3	3	2	3				2				3	2			understan	Entrprene	
CO3	To apply the	3	3	3	3	3				2				3	3	2		Apply	Employab	
CO4	To impleme	3	3	3	3	3				2				3	2			Design	Employab	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS-505-18 Database Management System Lab

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1	retrieve data from relational databases using SQL	1	3	2	2	1	1	1	1	3	2	3	3	2	2	2	1	Analyse	employab	Practicals	Viva	Assignments

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CO2	implement generation of tables using datatypes	1	2	2	2	1	1	1	1	3	3	3	3	2	2	2	1	Design	enterpren	Practicals		Viva	Assignments
CO3	design and execute the various data manipulation queries.	1	2	2	2	1	1	1	1	3	2	3	3	2	2	2	1	Design	employab	Practicals		Viva	Assignments
CO4	execute triggers, cursors, stored procedures etc.	1	3	3	3	2	1	1	1	3	3	3	3	2	2	2	1	Design	enterpren	Practicals		Viva	Assignments

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS 507 -18UC (Computer Network Lab)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		3	1	3	2	3	3	3	2	2	3	1	3	3	3	2	2	3	3	MSTs, ESE, Class/Quiz Tests
CO2		3		2	2	3	3	3	1	2	3	1	3	3	2	2	1	2	2	MSTs, ESE, Class/Quiz Tests
CO3		3	1	3	1	3	3	3	1	2	3	2	3	3	3	2	1	3	2	MSTs, ESE, Class/Quiz Tests
CO4		3		2	2	3	3	3	1	2	3	3	3	3	2		1	3	3	MSTs, ESE, Class/Quiz Tests

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
01-18UC) : Compiler Design

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Understand the major phases of compilation including front-end and back-end.	3	1	1	1	3	2	2		2	1	1	1	2	1			Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Develop the parsers and experiment the knowledge of different parsers design	3	3	3	2	3	3	2	1	3	1	2	2	3	2	3	1	Create	Entrepren	MSTs, ESE, Class/Quiz Tests
CO3	Construct the intermediate code representations and generation	3	2	2	2	2	2	1	1	2		2	2	3	2	2	1	Create	Entrepren	MSTs, ESE, Class/Quiz Tests
CO4	Convert source code for a novel language into machine code for a novel computer	3	3	3	3	3	3	2	1	3	1	1	3	3	3	3	1	Create	Entrepren	MSTs, ESE, Class/Quiz Tests

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CO5	Apply for various optimization techniques for dataflow analysis	3	2	1	2	2	3	3		2	2	2	2	2	2	3		Create	Entrepren	MSTs, ESE, Class/Quiz Tests

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
02-18UC) : Artificial Intelligence

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Understand different types of AI agents.	3	2	2	2	1	1	1		1	2	2	2	2	1			Understar	Employat	MSTs, ESE, Class/Quiz Tests
CO2	Develop different types of various AI search algorithms.	3	3	3	3	3	2	2	1	2	2	2	3	3	3	3	1	Create	Entrepren	MSTs, ESE, Class/Quiz Tests
CO3	Construct simple knowledge-based systems and to apply knowledge representation.	3	3	3	3	3	2	2		2	2	2	3	3	3	1		Design	Entrepren	MSTs, ESE, Class/Quiz Tests

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CO4	Convert intermediate representation in contest to understand learning.	3	2	2	2	3	3	2	1	2	3	3	3	3	3	3		Understar	Entrepren	MSTs, ESE, Class/Quiz Tests
CO5	Apply for various techniques for Expert Systems.	3	2	2	3	3	2	2		2	2	3	3	3	3	2		Understar	Entrepren	MSTs, ESE, Class/Quiz Tests

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
505-18UC :Artificial Intelligence Laboratory

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Explain artificial intelligence, its characteristics and its application areas.	3	2	2	1	2	2	3	2	2	2	2	3	3	3	1	2	Understar	Employab	Practical Assignments

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CO2	Formulate real-world problems as state space problems, optimization problems or constraint satisfaction problems.	3	3	3	3	3	2	2	2	3	2	2	3	3	3	3	2	Design	Entrepren	Practical Assignments
CO3	Select and apply appropriate algorithms and AI techniques to solve complex problems.	3	3	3	3	3	3	2		3	3	3	3	3	3	3		Design	Entrepren	Practical Assignments
CO4	Design and develop an expert system by using appropriate tools and techniques.	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	Design	Entrepren	Practical Assignments

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS BTCS606-18UC (Network Security and Cryptography)

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		3	3	2	2	3	3	2	1	2	3		2	3	3	2	1	2	3	MSTs, ESE, Class/Quiz Tests
CO2		3	1	3	3	3	3	3	1	2	3		3	3	2	2	1	2	3	MSTs, ESE, Class/Quiz Tests
CO3		3	2	3	3	3	3	3	1	2	3	1	3	3	3	2	1	2	3	MSTs, ESE, Class/Quiz Tests
CO4		3		3	3	3	3	3	1	2	3		3	3	2	2	1	3	3	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS BTCS609-18UC (Network Security and Cryptography Lab) (CO's of Network Security and Cryptography Lab is not provided in 2018 Syllabus)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		3	3	2	2	3	3	2	1	2	3		2	3	3	2	1	2	3	MSTs, ESE, Class/Quiz Tests
CO2		3	1	3	3	3	3	3	1	2	3		3	3	2	2	1	2	3	MSTs, ESE, Class/Quiz Tests
CO3		3	2	3	3	3	3	3	1	2	3	1	3	3	3	2	1	2	3	MSTs, ESE, Class/Quiz Tests
CO4		3		3	3	3	3	3	1	2	3		3	3	2	2	1	3	3	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS : (Data minng Lab)

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CO No.	CO State	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p			
CO1	Apply data cl	3		3	3	3				2				3		2		Apply	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Execute algori	3	3	3	3	3	3			2				3		2		Design	Employab	
CO3	Extract know	3	3	3	3	3	3		1	2				3			1	Apply	Employab	
CO4	Explore recer	3	2	3	3	3				2		1		3	2			Design	Employab	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS-612-18 Cloud Computing Lab

CO No.	CO State	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p			
CO1	Use the cloud tool kits.	1	1	2	1	3	1	1	1	1	1	1	3	3	1	1	1	Knowledg	Employab	Practicals
CO2	Implement applications on the Cloud	1	3	3	3	3	2	2	1	3	3	3	3	3	2	3	1	Apply	Enterpren	Practicals
CO3	To install cloud computing environments	1	1	2	1	3	1	1	1	2	1	2	3	3	1	1	1	Knowledg	Employab	Practicals

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CO4	To develop any one type of cloud	1	2	3	1	3	2	2	1	3	3	2	3	3	2	3	1	Apply	Enterpren	Practicals
CO5	To explore future trends of cloud computing	1	1	2	2	3	2	2	1	3	3	2	3	2	2	3	1	Understar	Enterpren	Practicals

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
12-18UC) : Information Theory and Coding

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Understand various entropies and Define the information theories.	3	2	2	2	1	1	1		1	2	2	1	2	1			Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Apply source coding techniques	3	3	3	3	3	2	2	1	2	2	2	3	3	3	2	1	Create	Entrepren	MSTs, ESE, Class/Quiz Tests
CO3	Compute the capacity of various types of channels.	3	3	3	2	3	2	2		2	1	2	2	3	2	1		Design	Entrepren	MSTs, ESE, Class/Quiz Tests

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PTU CAMPUS HOSHIARPUR

CO4	Understand and Construct codes using different error control techniques.	3	2	2	2	3	3	2	1	2	2	2	3	3	3	3		Understar	Entrepren	MSTs, ESE, Class/Quiz Tests
CO5	Apply various coding schemes for text, speech and audio.	3	2	3	3	3	2	2		2	2	3	3	3	3	2		Understar	Entrepren	MSTs, ESE, Class/Quiz Tests

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
315-18UC : Information Theory and Coding Lab

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Compare various capacity reduction based coding techniques for image and video type of data.	3	3	2	2	3	2	3		3	3	3	3	3	3	3		Understar	Employab	Practical Assignments

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CO2	Implement various error control techniques for Convolutional codes	3	3	3	3	3	2	2	2	3	2	2	3	3	3	3	2	Understar	Entrepren	Practical Assignments
CO3	Illustrate various security oriented coding techniques for Block codes	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	2	Understar	Entrepren	Practical Assignments
CO4	caicula te entropy, joint entropy, relative entropy, condition al entropy, and channel capacity of a system	3	3	3	3	3	3	3		3	3	3	3	3	3	3		Understar	Entrepren	Practical Assignments

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS-617-18 Data Science Lab

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO

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CO1	Plan the projects in the domain of data science.	1	3	2	3	2	2	1	1	3	3	3	3	3	3	3	1	Analyze	Enterpren	MSTs, ESE, Class/Quiz Tests
CO2	Use data analytics tools towards problem solving and solution analysis.	1	1	3	1	3	1	1	1	1	1	2	3	3	2	3	1	Knowledg	Employab	MSTs, ESE, Class/Quiz Tests
CO3	Apply Mathematical sciences and recent technologies in Computer Science to solve real life problems	3	3	3	3	1	2	1	1	2	3	3	3	3	3	3	1	Apply	Enterpren	MSTs, ESE, Class/Quiz Tests
CO4	Apply data science concepts and methods to solve problems in real-world context.	3	3	3	3	1	2	1	1	2	3	3	3	3	2	3	1	Apply	Employab	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS 614-18UC : (Soft Computing)

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Understan	3	2	1	3									3	1			understan	Employab	
CO2	Design su	3	2	3	3	2	1							3	2			Design	Employab	
CO3	Construct	3	2	3	3	2	2							3	2			Apply	Employab	MSTs, ESE, Class/Quiz Tests
CO4	Apply the	3	2	3	3	2	1							3	2			Apply	Employab	
CO5	Review the	3	2	3	3	2	2							3	2			Design	Employab	

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
12-18UC) Soft Computing Lab

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Reveal different applications of these models to solve engineering and other problems.	3	3	3	3	3	3	2	1	1	2	2	1	2	2			Estimate	Employab	MSTs, ESE, Class/Quiz Tests

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CO2	Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems	3	3	3	3	3	3	2	1	1	2	2	3	3	2	1	1	Apply	Employab	MSTs, ESE, Class/Quiz Tests		
CO3	Apply genetic algorithms to combinatorial optimization problems	3	3	3	3	3	3	2	1	2	1	2	2	3	2	1		Design	Employab	MSTs, ESE, Class/Quiz Tests		
CO4	Effectively use existing software tools to solve real problems using a soft computing approach	3	3	3	3	3	3	1	1	1	2	2	3	3	2	1	1	Compute	Employab	MSTs, ESE, Class/Quiz Tests		
CO5	Evaluate and compare solutions by various soft computing approaches for a given problem.	3	3	3	3	3	3	2	1	1	2	3	3	3	2	1		Evaluate	Employab	MSTs, ESE, Class/Quiz Tests		

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS-619-18 Machine Learning Lab

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	**Solve problems using** the machine learning models.	1	2	2	2	3	1	1	1	2	1	2	3	2	2	2	1	Apply	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Apply various reinforcement algorithms to solve real time complex problems.	2	3	2	2	3	1	1	1	2	2	2	3	3	3	2	1	Apply	Enterpren	MSTs, ESE, Class/Quiz Tests
CO3	Identify the core components of deep neural network model.	1	2	2	1	3	1	1	1	2	1	2	3	2	1	1	1	Knowledg	Employab	MSTs, ESE, Class/Quiz Tests
CO4	*Implement* unsupervised models through programming language.	1	2	2	2	3	1	1	1	2	1	2	3	2	2	2	1	Apply	Employab	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) Speech and Natural Language Processing

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1		3	2	3	2	3	3	1	1	3	3	2	3	2	2	3	1			MSTs, ESE, Class/Quiz Tests		
CO2		3	3	3	3	3	3	1		3	3	2	3	1	2	2	1			MSTs, ESE, Class/Quiz Tests		
CO3		2	3	3	3	3	3	1		3	3	2	2	2	3	2				MSTs, ESE, Class/Quiz Tests		
CO4		2	1	1	2	3	2	2	1	2	2	2	2	1	2	2	1			MSTs, ESE, Class/Quiz Tests		

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
'13-18UC :Block chain Technology Lab

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Interact with a blockchain system by sending and reading transactions.	3	3	2	2	3	3	3	2	3	2	2	3	3	3	2	2	Understar	Employab	Practical Assignments

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CO2	Design, build, and deploy a distributed application.	3	3	3	3	3	3	3		3	3	3	3	3	3	3		Design	Entrepren	Practical Assignments
CO3	Evaluate security, privacy, and efficiency of a given blockchain system.	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	Design	Entrepren	Practical Assignments

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS 614-18UC : (Software Defined Networks)

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	To define	3												3				understan	Employab	
CO2	To descril	3		3										3				Design	Employab	
CO3	To provid	3				1								3				Apply	Employab	MSTs, ESE, Class/Quiz Tests
CO4	To design	3	2	3		1	1					1		3	2			Design	Employab	
CO5	To develop	3	2	3		1								3	2			Design	Employab	
CO6	To identify	3	2				1		1					3			1	identify	Employab	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS712-18UC : (Digital Image Processing)

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Understand the basic concepts of DIP	2	1	2	1	1	2	3		1		1	3	3	1	1		3	3	MSTs, ESE, Class/Quiz Tests
CO2	Improve the quality of digital images	3	2	3	3	2	1			1	1	1	2	3	3	1		2	2	MSTs, ESE, Class/Quiz Tests
CO3	Understand and De-noise Digital Images	2	3	3	2	1	1	1		1			2	3	3	1	1	2	2	MSTs, ESE, Class/Quiz Tests
CO4	Segment digital images and extract various features from digital images	2	2	2	2	3	1		1	1	1	1	2	3	2	1	1	2	3	MSTs, ESE, Class/Quiz Tests

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CO5	Understand various image compression techniques and apply such techniques to compress digital images for reducing the sizes of digital images.	3	2	3	2	3	2	1		3	1	2	3	3	2	2		3	3	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS712-18UC : (Digital Image Processing)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Understand the basic concepts of DIP	2	1	2	1	1	2	3		1		1	3	3	1	1		3	3	MSTs, ESE, Class/Quiz Tests
CO2	Improve the quality of digital images	3	2	3	3	2	1			1	1	1	2	3	3	1		2	2	MSTs, ESE, Class/Quiz Tests
CO3	Understand and De-noise Digital Images	2	3	3	2	1	1	1		1			2	3	3	1	1	2	2	MSTs, ESE, Class/Quiz Tests

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CO4	Segment digital images and extract various features from digital images	2	2	2	2	3	1		1	1	1	1	2	3	2	1	1	2	3	MSTs, ESE, Class/Quiz Tests
CO5	Understand various image compression techniques and apply such techniques to compress digital images for reducing the sizes of digital images.	3	2	3	2	3	2	1		3	1	2	3	3	2	2		3	3	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS : (Adhoc & Sensor Networks lab)

CO No.	CO State	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p			
CO1	To understan	3				2				2				3				understan	Employab	
CO2	To understan	3								2				3				understan	Employab	
CO3	To understan	3		2	2	1								3				develop	Employab	

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CO4	To develop wireless sensor systems for different applications	3	2	3	2	1	1	2				1		3	2			Design	Employab	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS : (Graph theory Lab)

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Solve proble	3		3	3	3				2				3		2		Apply	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Solve proble	3	3	3	3	3				2				3		2		Apply	Employab	
CO3	Solve proble	3	3	3	3	3				2				3			1	Apply	Employab	
CO4	Model real w	3	2	3	3	3	2			2		1		3	2			Design	Employab	

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
'17-18UC : Parallel Computing

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO

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CO1	To develop an understanding of various basic concepts associated with parallel computing environments.	3	2	3	2	3	2	2	2	3	2	2	3	3	2	1	2	Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO2	To understand the effects that issues of synchronization, latency and bandwidth have on the efficiency and effectiveness of parallel computing applications.	3	3	3	3	2	2	2		2	2	2	3	3	2	2		Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO3	To gain experience in a number of different parallel computing paradigms including memory passing, memory sharing, data-parallel and other approaches.	3	3	3	3	2	3	2		2	2	2	3	3	3	3		Understar	Employab	MSTs, ESE, Class/Quiz Tests

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CO4	To earn experience in designing and testing parallel computing solutions to programming problems	3	3	3	3	3	3	3	2	3	2	3	3	3	3	3	2	Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO5	To develop improved communication and collaborative skills. Symbolic Logic & Logic Processing	3	3	3	3	3	2	3	2	3	3	2	3	3	3	3	2	Understar	Employab	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) Microprocessor & Assembly Language Programming

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		3	2	3	3	3	3	2	1	3	3	2	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests
CO2		3	2	3	3	3	3	2	1	2	3		3	3	3	2				MSTs, ESE, Class/Quiz Tests
CO3		3	3	3	3	3	3	2		2	3	1	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests
CO4		3	3	3	3	3	3	3	2	3	3	2	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests
CO5		3	1	3	3	3	3	3	1	3	3	1	3	3	3	1	1			MSTs, ESE, Class/Quiz Tests
CO6		3	1	3	3	3	3	3		3	3		3	3	3	1				MSTs, ESE, Class/Quiz Tests

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IKGPTU CAMPUS HOSHIARPUR

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) Microprocessor & Assembly Language Programming Lab

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		3	2	3	3	3	3	2		3	3	1	3	3	2	1				MSTs, ESE, Class/Quiz Tests
CO2		3		3	3	3	3	1		3	3		3	3	2	2				MSTs, ESE, Class/Quiz Tests
CO3		3	1	3	3	3	3	1		3	3		3	3	3	1				MSTs, ESE, Class/Quiz Tests
CO4		3	1	3	3	3	3	3	1	3	1		3	3	3	1				MSTs, ESE, Class/Quiz Tests
CO5		3	1	3	3	3	3	1		2	3		3	3	2	1				MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) BTCS 705-18 (Deep Learning Lab)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1		3	2	3	3	3	3	3	1	3	3		3	3	2	2	1			MSTs, ESE, Class/Quiz Tests		
CO2		3	3	3	3	3	3	3	2	3	3		3	3	2	2	1			MSTs, ESE, Class/Quiz Tests		

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) BTCS 709-18 (Computer Vision Lab)

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1		3	2	3	3	3	3	3	2	3	3	1	3	3	3	2	2			MSTs, ESE, Class/Quiz Tests		
CO2		3	3	3	3	3	3	3	1	3	3		3	3	3	3	1			MSTs, ESE, Class/Quiz Tests		
CO3		3	2	3	3	3	3	3	1	3	3	1	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests		

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : (type course name)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	To know the basics of ERP	3	3	3	2	2	2	3			2	2	2	2	2	2		2	2	MSTs, ESE, Class/Quiz Tests
CO2	To understand the key implementation issues of ERP	3	3	3	2	2	2	3			2	2	2	2	2	2		2	2	MSTs, ESE, Class/Quiz Tests
CO3	To know the business modules of ERP	3	3	3	2	2	2	3			2	2	2	2	2	2		2	2	MSTs, ESE, Class/Quiz Tests

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CO4	To be aware of some popular products in the area of ERP	3	3	3	2	2	2	3			2	2	2	2	2	2		2	2	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS 607) : (Simulation and Modeling Lab)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1	Students will learn to simulate the models for the purpose of optimum control by using software	3	2	2	2	2	2	2	1	3	1	1	3	3	1	2	1	3	3	MSTs, ESE, Class/Quiz Tests		

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CO2	The student will be able to appreciate the utility of the tools like ANSYS or FLUENT in solving real time problems and day to day problems.	3	3	3	3	2	1	2	2	3	2	3	3	3	1	1	2	3	3	MSTs, ESE, Class/Quiz Tests		
CO3	Use of these tools for any engineering and real time applications.	3	3	3	3	3	2	2	2	2	2	3	3	3	2	3	2	3	3	MSTs, ESE, Class/Quiz Tests		
CO4	Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their employment.	3	2	2	3	3	3	2	2	3	2	3	3	3	3	3	32	3	3			

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Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : BTCS 523-18 (Computational Biology Lab)

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1		3	2	1	2	3	3	2	1	3	3		2	3	2	2	1			MSTs, ESE, Class/Quiz Tests		
CO2		3	2	2	3	3	3	3	1	3	3		3	3	2	2	2			MSTs, ESE, Class/Quiz Tests		
CO3		3	3	3	3	3	3	3	2	3	3		3	3	3	3	1			MSTs, ESE, Class/Quiz Tests		
CO4		3	3	3	3	3	3	3	1	3	3	1	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests		

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
12-18UC) **Data Warehousing and Data Mining**

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1	Understand the functionality of the various data mining and data warehousing component	3	3	3	3	3	3	2	1	1	2	2	1	2	1	2		Understar	Employab	MSTs, ESE, Class/Quiz Tests		

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CO2	Appreciate the strengths and limitations of various data mining and data warehousing models	3	3	2	3	2	3	2	2	1	1	1	3	2	2	2		Understar	Employab	MSTs, ESE, Class/Quiz Tests		
CO3	Explain the analyzing techniques of various data	3	2	2	3	2	3	2	1	2	1	2	2	3	1	2	1	Design	Entrepren	MSTs, ESE, Class/Quiz Tests		
CO4	Describe different methodologies used in data mining and data ware housing.	3	3	3	3	3	3	1	2	1	2	1	2	2	2	2		Understar	Entrepren	MSTs, ESE, Class/Quiz Tests		
CO5	Compare different approaches of data ware housing and data mining with various technologies.	3	3	2	2	3	2	3	2	1	1	2	1	2	1	1	1	Compare	Entrepren	MSTs, ESE, Class/Quiz Tests		

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS : (Graph Theory)

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CO No.	CO State	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p			
CO1	Identify indu	3			3									3				understan	Employab	
CO2	Reason from	3	3	3	3									3				Design	Employab	MSTs, ESE, Class/Quiz Tests
CO3	Apply theore	3	3	3	3	2	1							3				Apply	Employab	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) BTCS 709-18 (Computer Vision Lab)

CO No.	CO State	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p					
CO1		3	2	3	3	3	3	3	2	3	3	1	3	3	3	2	2			MSTs, ESE, Class/Quiz Tests		
CO2		3	3	3	3	3	3	3	1	3	3		3	3	3	3	1			MSTs, ESE, Class/Quiz Tests		
CO3		3	2	3	3	3	3	3	1	3	3	1	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests		

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Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS : (Adhoc & Sensor Networks lab)

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	To understan	3				2				2				3				understan	Employab	MSTs, ESE, Class/Quiz Tests
CO2	To understan	3								2				3				understan	Employab	
CO3	To understan	3		2	2	1								3				develop	Employab	
CO4	To develop wireless sensor systems for different applicatio ns	3	2	3	2	1	1	2				1		3	2			Design	Employab	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS : (Graph theory Lab)

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Solve proble	3		3	3	3				2				3		2		Apply	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Solve proble	3	3	3	3	3				2				3		2		Apply	Employab	
CO3	Solve proble	3	3	3	3	3				2				3			1	Apply	Employab	
CO4	Model real w	3	2	3	3	3	2			2		1		3	2			Design	Employab	

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partment Computer Science and Engineering
Program : B Tech. (Computer Science and Engineering)
'17-18UC : Parallel Computing

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	To develop an understanding of various basic concepts associated with parallel computing environments.	3	2	3	2	3	2	2	2	3	2	2	3	3	2	1	2	Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO2	To understand the effects that issues of synchronization, latency and bandwidth have on the efficiency and effectiveness of parallel computing applications.	3	3	3	3	2	2	2		2	2	2	3	3	2	2		Understar	Employab	MSTs, ESE, Class/Quiz Tests

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CO3	To gain experience in a number of different parallel computing paradigms including memory passing, memory sharing, data-parallel and other approaches	3	3	3	3	2	3	2		2	2	2	3	3	3	3		Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO4	To earn experience in designing and testing parallel computing solutions to programming problems.	3	3	3	3	3	3	3	2	3	2	3	3	3	3	3	2	Understar	Employab	MSTs, ESE, Class/Quiz Tests
CO5	To develop improved communication and collaborative skills. Symbolic Logic & Logic Processing	3	3	3	3	3	2	3	2	3	3	2	3	3	3	3	2	Understar	Employab	MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) Microprocessor & Assembly Language Programming

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CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		3	2	3	3	3	3	2	1	3	3	2	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests
CO2		3	2	3	3	3	3	2	1	2	3		3	3	3	2				MSTs, ESE, Class/Quiz Tests
CO3		3	3	3	3	3	3	2		2	3	1	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests
CO4		3	3	3	3	3	3	3	2	3	3	2	3	3	3	2	1	1		MSTs, ESE, Class/Quiz Tests
CO5		3	1	3	3	3	3	3	1	3	3	1	3	3	3	1	1			MSTs, ESE, Class/Quiz Tests
CO6		3	1	3	3	3	3	3		3	3		3	3	3	1				MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) Microprocessor & Assembly Language Programming Lab

CO No.	CO State	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Honing Domain Knowledge PSO-m	Innovation and design PSO-n	Entrepreneurship Skills PSO-o	Ethical values PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1		3	2	3	3	3	3	2		3	3	1	3	3	2	1				MSTs, ESE, Class/Quiz Tests
CO2		3		3	3	3	3	1		3	3		3	3	2	2				MSTs, ESE, Class/Quiz Tests
CO3		3	1	3	3	3	3	1		3	3		3	3	3	1				MSTs, ESE, Class/Quiz Tests
CO4		3	1	3	3	3	3	3	1	3	1		3	3	3	1				MSTs, ESE, Class/Quiz Tests
CO5		3	1	3	3	3	3	1		2	3		3	3	2	1				MSTs, ESE, Class/Quiz Tests

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) BTCS 705-18 (Deep Learning Lab)

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CO No.	CO State	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values				
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO	
CO1		3	2	3	3	3	3	3	1	3	3		3	3	2	2	1			MSTs, ESE, Class/Quiz Tests	
CO2		3	3	3	3	3	3	3	2	3	3		3	3	2	2	1			MSTs, ESE, Class/Quiz Tests	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) BTCS 709-18 (Computer Vision Lab)

CO No.	CO State	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values				
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO	
CO1		3	2	3	3	3	3	3	2	3	3	1	3	3	3	2	2			MSTs, ESE, Class/Quiz Tests	
CO2		3	3	3	3	3	3	3	1	3	3		3	3	3	3	1			MSTs, ESE, Class/Quiz Tests	
CO3		3	2	3	3	3	3	3	1	3	3	1	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) : (type course name)

Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values

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CO No.	CO State	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	To know the basics of ERP	3	3	3	2	2	2	3			2	2	2	2	2	2		2	2	MSTs, ESE, Class/Quiz Tests
CO2	To understand the key implementation issues of ERP	3	3	3	2	2	2	3			2	2	2	2	2	2		2	2	MSTs, ESE, Class/Quiz Tests
CO3	To know the business modules of ERP	3	3	3	2	2	2	3			2	2	2	2	2	2		2	2	MSTs, ESE, Class/Quiz Tests
CO4	To be aware of some popular products in the area of ERP	3	3	3	2	2	2	3			2	2	2	2	2	2		2	2	

Department Computer Science and Engineering
Program B.Tech. (Computer Science and Engineering)
BTCS 607) (Simulation and Modeling Lab)

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Students will learn to simulate the models for the purpose of optimum control by using software	3	2	2	2	2	2	2	1	3	1	1	3	3	1	2	1	3	3	MSTs, ESE, Class/Quiz Tests

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CO2	The student will be able to appreciate the utility of the tools like ANSYS or FLUENT in solving real time problems and day to day problems.	3	3	3	3	2	1	2	2	3	2	3	3	3	1	1	2	3	3	MSTs, ESE, Class/Quiz Tests	
CO3	Use of these tools for any engineering and real time applications	3	3	3	3	3	2	2	2	2	2	3	3	3	2	3	2	3	3	MSTs, ESE, Class/Quiz Tests	
CO4	Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their employment.	3	2	2	3	3	3	2	2	3	2	3	3	3	3	3	32	3	3		

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BTCS(type code) : BTCS 523-18 (Computational Biology Lab)

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1		3	2	1	2	3	3	2	1	3	3		2	3	2	2	1			MSTs, ESE, Class/Quiz Tests		
CO2		3	2	2	3	3	3	3	1	3	3		3	3	2	2	2			MSTs, ESE, Class/Quiz Tests		
CO3		3	3	3	3	3	3	3	2	3	3		3	3	3	3	1			MSTs, ESE, Class/Quiz Tests		
CO4		3	3	3	3	3	3	3	1	3	3	1	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests		

partment Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
12-18UC) **Data Warehousing and Data Mining**

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1	Understand the functionality of the various data mining and data warehousing component	3	3	3	3	3	3	2	1	1	2	2	1	2	1	2		Understar	Employab	MSTs, ESE, Class/Quiz Tests		

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CO2	Appreciate the strengths and limitations of various data mining and data warehousing models	3	3	2	3	2	3	2	2	1	1	1	3	2	2	2		Understar	Employab	MSTs, ESE, Class/Quiz Tests		
CO3	Explain the analyzing techniques of various data	3	2	2	3	2	3	2	1	2	1	2	2	3	1	2	1	Design	Entrepren	MSTs, ESE, Class/Quiz Tests		
CO4	Describe different methodologies used in data mining and data ware housing	3	3	3	3	3	3	1	2	1	2	1	2	2	2	2		Understar	Entrepren	MSTs, ESE, Class/Quiz Tests		
CO5	Compare different approaches of data ware housing and data mining with various technologies	3	3	2	2	3	2	3	2	1	1	2	1	2	1	1	1	Compare	Entrepren	MSTs, ESE, Class/Quiz Tests		

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS : (Graph Theory)

Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Honing Domain Knowledge	Innovation and design	Entrepreneurship Skills	Ethical values

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PTU CAMPUS HOSHIARPUR

CO No.	CO State	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	PSO-p	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1	Identify indu	3			3									3				understan	Employab	MSTs, ESE, Class/Quiz Tests
CO2	Reason from	3	3	3	3									3				Design	Employab	
CO3	Apply theore	3	3	3	3	2	1							3				Apply	Employab	

Department Computer Science and Engineering
Program : B.Tech. (Computer Science and Engineering)
BTCS(type code) BTCS 709-18 (Computer Vision Lab)

CO No.	CO State	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Honing Domain Knowledge	PSO-n Innovation and design	PSO-o Entrepreneurship Skills	PSO-p Ethical values	Learning	Focus on	Assessment Tools to Measure Attainment of CO		
CO1		3	2	3	3	3	3	3	2	3	3	1	3	3	3	2	2			MSTs, ESE, Class/Quiz Tests		
CO2		3	3	3	3	3	3	3	1	3	3		3	3	3	3	1			MSTs, ESE, Class/Quiz Tests		
CO3		3	2	3	3	3	3	3	1	3	3	1	3	3	3	2	1			MSTs, ESE, Class/Quiz Tests		

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Department : Civil Engineering

Program : B.Tech. (Civil Engineering)

BTCH101-18 : Chemistry-I (Theory)

		Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning			
CO No.	**CO Statements (BTCH101-18: Chemistry-I)**	**PO-a**	**PO-b**	**PO-c**	**PO-d**	**PO-e**	**PO-f**	**PO-g**	**PO-h**	**PO-i**	**PO-j**	**PO-k**	**PO-l**	**Learning Level**	**Focus on Employability / Entrepreneurship**	**Assessment Tools to Measure Attainment of CO**
CO1	Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.	√	√	√	√	√		√						Understand & Analyze	yes	Class, Quiz, Tests and viva
CO2	Rationalise bulk properties and processes using thermodynamic considerations.	√	√	√	√	√								Understand & Analyze	yes	Class, Quiz, Tests and viva

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CO3	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.	√	√	√	√	√								Understand & Analyze	yes	Class, Quiz, Tests and viva
CO4	Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity	√	√	√	√	√		√						Understand & Analyze	yes	Class, Quiz, Tests and viva
CO5	List major chemical reactions that are used in the synthesis of molecules.	√	√	√	√	√		√						Understand & Analyze	yes	Class, Quiz, Tests and viva

Name of the Department: Civil Engg.

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Paper BTPH111-18 Mechanics of Solids Lab

Course C	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning Level	Focus on Employa	Assessment Tools to
CO1: Able to verify the theoretical concepts/ laws learnt in theory courses.	√	√	√	√	√	√			√	√		√	√	√		understan	yes	Minor Exams, Quiz, End Term Exams
CO 2: Trained in carrying out precise measurements and handling sensitive equipment.	√	√	√	√	√	√			√	√		√	√	√		understan	yes	Minor Exams, Quiz, End Term Exams

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CO 3: Understand the methods used for estimating and dealing with experimental uncertainties and systematic "errors".	√	√	√	√	√	√			√	√		√	√	√	√			Minor Exams, Quiz, End Term Exams
CO 4: Learn to draw conclusions from data and develop skills in experimental design.	√	√	√	√	√	√			√	√		√	√	√		apply	yes	Minor Exams, Quiz, End Term Exams
CO 5: Document a technical report which communicates scientific information in a clear and concise manner.	√	√	√	√	√	√			√	√		√	√	√		apply	yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTPH101-18 Mechanics of Solids

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Course C	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Analysis and Design Skill PSO-m	Research and Innovation PSO-n	Sustainable Outlook PSO-o	Learning Level	Focus on Employa	Assessment Tools to
Understand the vector mechanics for a classical system.	√	√	√	√	√	√		√	√	√		√	√	√	√	understan	yes	Minor Exams, Quiz, End Term Exams
Identify various types of forces in nature, frames of references, and conservation laws.	√	√	√	√	√	√		√	√	√		√	√	√	√	apply	yes	Minor Exams, Quiz, End Term Exams
Know the simple harmonic, damped, and forced simple harmonic oscillator for a mechanical system.	√	√	√	√	√	√		√	√	√		√	√	√	√	apply	yes	Minor Exams, Quiz, End Term Exams

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Analyze the planar rigid body dynamics for a mechanical system.	√	√	√	√	√	√		√	√	√		√	√	√	√	apply	yes	Minor Exams, Quiz, End Term Exams
Apply the knowledge obtained in this course to the related problems.	√	√	√	√	√	√		√	√	√		√	√	√	√	apply	yes	Minor Exams, Quiz, End Term Exams

Department : Civil Engineering
Program : B.Tech. (Civil Engineering)
BTCH102-18 : Chemistry-I (Lab)

CO No.	CO Statements (BTCH102-18: Chemistry-I (Lab))	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Learning Level	Focus on Employability / Entrepreneurship	Assessment Tools to Measure Attainment of CO
		PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l			

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CO1	Estimate rate constants of reactions from concentration of reactants/ products as a function of time	√	√	√	√	√		√		√				Understand & Analyze	yes	Practical Exam, Class/Quiz Tests
CO2	Measure molecular /system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc	√	√	√	√	√		√		√				Understand & Analyze	yes	Practical Exam, Class/Quiz Tests, ViVa
CO3	Synthesize a small drug molecule and analyse a salt sample	√	√	√	√	√		√		√				Understand & Analyze	yes	Practical Exam, Class/Quiz Tests, ViVa

Name of the Department: Civil Engg.

Paper BTAM101-18Mathematics-I (Calculsand Linear algebra

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Course C	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Analysis and Design Skill PSO-m	Research and Innovation PSO-n	Sustainable Outlook PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: The fallouts of Rolle's theorem that is fundamental to application of analysis to engineering	√	√	√			√												Minor Exams, Quiz, End Term Exams
CO 2: To apply differential and integral calculus to evaluate definite, improper integrals and its applications.	√	√	√	√		√												Minor Exams, Quiz, End Term Exams
CO 3: The convergence of sequence and series and to apply different tests of convergence.	√	√	√			√												Minor Exams, Quiz, End Term Exams

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CO 4: To deal with functions of several variables that are essential in most branches of engineering.	√	√	√			√												Minor Exams, Quiz, End Term Exams
CO 5: The essential tool of matrices and linear algebra in a comprehensive manner.	√	√	√	√		√												Minor Exams, Quiz, End Term Exams

Name of the Department: Mechanical Engineering

Paper BTME101-18 Engineering Graphics & Design

Course O	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	Skill	Focus on	Assessment Tools to Measure Attainment of CO

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CO1: design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	√	√	√	√	√	√	√	√	√	√	√	√	Design	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO 2: to prepare to communicate effectively.	√	√	√	√	√	√	√	√	√	√	√	√	Communic	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO 3: to prepare to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√	√	√	√	√	√	√	√	√	√	√	√	Apply	Yes	Minor Exams, Quiz, Assignments, End Term Exams

Paper BTMP 101-18 Workshop/Manufacturing Practices

Course C	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	Skill	Focus on	Assessment Tools to Measure Attainment of CO

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CO1: gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.	√	√	√	√	√	√	√	√	√	√	Understan	Yes	Exams, Project based learning, Assignments,End Term
CO 2: able to fabricate components with their own hands.	√	√	√	√	√	√	√	√	√	√	Apply	Yes	Exams, Project based learning, Assignments,End Term
CO 3: Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.	√	√	√	√	√	√	√	√	√	√	Understan	Yes	Exams, Project based learning, Assignments,End Term

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CO 4: By assembling different components, they will be able to produce small devices of their interest.	√	√	√	√	√	√	√		√		√	Apply	Yes	Exams, Project based learning, Assignments,End Term E				

Name of the Department: Civil Engg.

Paper BTHU-101-18 (English) & Paper BTHU-102-18 (English lab)

Course C	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: To help the students become the independent users of English language	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			Mid Semester Exams, Assignment, End Term Exams

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CO 2: Students will acquire basic proficiency in listening and speaking skills.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			Mid Semester Exams, Assignment, End Term Exams
CO 3: Students will be able to understand spoken English language, particularly the language of their chosen technical field.	√	√	√	√	√	√	√	√	√	√	√	√	√	√				Mid Semester Exams, Assignment, End Term Exams
CO 4: They will be able to converse fluently	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			Mid Semester Exams, Assignment, End Term Exams
CO 5: They will be able to produce on their own clear and coherent texts.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			Mid Semester Exams, Assignment, End Term Exams
																		Mid Semester Exams, Assignment, End Term Exams

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Name of the Department: Civil Engg.

Paper BTAM201-18Mathematics-II (Differential Equations)

Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: The mathematical tools needed in evaluating multiple integrals and their usages.	√	√	√	√	√	√												Minor Exams, Quiz, End Term Exams
CO 2: The effective mathematical tools for the solutions of differential equations that model physical processes.	√	√	√	√	√	√												Minor Exams, Quiz, End Term Exams

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CO 3: The tools of differentiation and integration of functions that are used in various techniques dealing engineering problems.	√	√	√	√	√	√												Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE- 301-18 Surveying & Geomatics

Course C	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			
CO1: Understand the concept, various methods and techniques of surveying	√				√				Both			√				Understan	yes	Minor Exams, Quiz, End Term Exams

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CO 2: Compute angles, distances and levels for given area	√	√	√	√					Both			√	√			Analyse an	yes	Minor Exams, Quiz, End Term Exams
CO 3: Apply the concept of tachometry survey in difficult and hilly terrain.	√	√	√	√		√			Individual			√	√			Application	yes	Minor Exams, Quiz, End Term Exams
CO 4: Select appropriate instruments for data collection and survey purpose	√	√				√			Both			√				Understan	yes	Minor Exams, Quiz, End Term Exams
CO 5: Analyze and retrieve the information from remotely sensed data and interpret the data for survey.	√	√	√	√	√	√			Individual		√	√	√			Analyse an	yes	Minor Exams, Quiz, End Term Exams
CO 6: Understand the concepts related to GIS and GPS and analyze the geographical data.	√	√	√	√	√	√	√		Individual		√	√	√	√		Analyse	yes	Minor Exams, Quiz, End Term Exams

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Name of the Department: Civil Engg.

Paper BTCE- 302-18 Solid Mechanics

Course C	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Understand the concept of static equilibrium, deformations, and material constitutive behaviour.	√	√						Individual				√				Understar	Yes	Minor Exams, Quiz, End Term Exams

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CO 2: Describe the concepts of stress, strain and elastic behaviour of materials including Hooke's law relationships to analyze structural members subjected to tension, compression and torsion.	√	√	√	√					both			√	√	√		Understar	Yes	Minor Exams, Quiz, End Term Exams
CO 3: Apply the concept of Mohr's circle in the stress/strain calculations.	√	√		√		√			both			√	√	√	√	Understar	Yes	Minor Exams, Quiz, End Term Exams
CO 4: Develop SFD and BMD for different type of beams subjected to different types of loads	√	√	√	√		√			both			√	√	√	√	Analyse a	Yes	Minor Exams, Quiz, End Term Exams

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CO 5: Plot elastic curves for beams undergoing displacements under different loadings	√	√	√	√		√	√	√	both			√	√	√	√	Analyse	yes	Minor Exams, Quiz, End Term Exams
CO 6: Understand the behaviour of columns and struts under axial loading.	√	√	√	√		√	v		individual			√	√	√	√	Undestan	Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE- 303-18 Fluid Mechanics

Course C	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			

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CO1: Understand the basic terms used in fluid mechanics and its broad principles	√					√			√	√						Understan	yes	Minor Exams, Quiz, End Term Exams
CO 2: Estimate the forces induced on a plane/ submerged bodies	√	√							√	√						Apply	yes	Minor Exams, Quiz, End Term Exams
CO 3: Formulate expressions using dimensionless approach and able to determine design parameters by creating replica of prototype at appropriate scale.	√	√	√		√		√		√	√				√		Analyze	Yes	Minor Exams, Quiz, End Term Exams

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CO 4: Apply the continuity , momentum and energy principles and design the pipelines used for water supply or sewage under different situation.	√	√		√					√	√		√	√	√		Evaluate	yes	Minor Exams, Quiz, End Term Exams
CO 5: Calculate drag force exerted by fluid on the body of varying shapes and able to minimize them.	√		√						√	√			√			Apply	Yes	Minor Exams, Quiz, End Term Exams
CO 6: Design and addressing problems in open channel (lined/ unlined) of different shapes and size optimally as per site condition.	√		√	√					√	√	√		√		√	Create	Yes	Minor Exams, Quiz, End Term Exams

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Name of the Department: Civil Engg.

Paper BTAM- 301-18MathematicsIII (Transform & Discrete

Course C	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			
CO1: Understand the basic results on vector function, their properties and fields so as to apply them for solving problems of engineering.	√	√	√			√												Minor Exams, Quiz, End Term Exams
CO 2: Find length, area and volume using integral calculus that is an important application in engineering.	√	√	√	√		√												Minor Exams, Quiz, End Term Exams

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CO 3: Solve some real problems in engineering using Gauss Divergence and Stokes' theorem	√	√	√			√												Minor Exams, Quiz, End Term Exams
CO 4: To formulate Laplace transform of functions and its applications to solve differential equations that form real life problems in engineering.	√	√	√		√	√												Minor Exams, Quiz, End Term Exams
CO 5: To formulate Fourier Series, its properties and its applications to solve problems in engineering.	√	√	√	√	√	√												Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

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Paper BTEC- 305 18 Basic Electronics & applications in Civil Engineering

Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Understand construction of diodes and their rectifier applications.	3	3		1									3	2		Analyze	No	MSTs, ESE, Class/Quiz Tests
CO 2: Appreciate the construction and working bipolar junction transistors and MOSFETs.	3	3		1									3	2		Understar	No	MSTs, ESE, Class/Quiz Tests

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CO 3: Design Op-Amp IC based fundamental applications.	3	3	2	3	3								3	2	1	Analyze	No	MSTs, ESE, Class/Quiz Tests
CO 4: Comprehend working of basic elements of digital electronics and circuits.	3	3	1	2										2		Understar	No	MSTs, ESE, Class/Quiz Tests
To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.	3	3												2		Understar	No	MSTs, ESE, Class/Quiz Tests
To acquire the basic knowledge of electrical machines and transformers.	3	3												2		Understar	No	MSTs, ESE, Class/Quiz Tests

Name of the Department: Civil Engg.

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Paper HSMC-132-18 Civil Engineering Introduction, Societal & Global Impact

Course C	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Introduction to what constitutes Civil Engineering	√															Understand		Minor Exams, Quiz, End Term Exams
CO 2: Understanding the vast interfaces this field has with the society at large						√						√	√			Understand		Minor Exams, Quiz, End Term Exams

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CO 3: Providing inspiration for doing creative and innovative work for the benefit of the society			√			√								√		Application	yes	Minor Exams, Quiz, End Term Exams
CO 4: Need to think innovatively to ensure Sustainability							√								√	Application		Minor Exams, Quiz, End Term Exams
CO 5: Highlighting the depth of engagement possible within civil engineering and exploration of various possibilities of a career in this field	√													√		Application	yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-306-18 Surveying & Geomatics Lab

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Course O	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Analysis and Design Skill PSO-m	Research and Innovation PSO-n	Sustainable Outlook PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Assess horizontal & vertical angles by Theodolite.	√	√	√					Team work				√	√			Applicatio	Yes	Minor Exams, Quiz, End Term Exams
CO 2: Survey the area using different methods of plane tabling and compass survey and to adjust the compass traverse graphically.	√	√	√	√				Team work				√	√			Applicatio	Yes	Minor Exams, Quiz, End Term Exams
CO 3: Compute the reduce levels using various methods of leveling.	√		√	√				Team work				√	√			Applicatio	Yes	Minor Exams, Quiz, End Term Exams

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CO 4: Predict the location of any point horizontally and vertically using Tachometry	√		√	√				Team work		√	√			Applicatio	Yes	Minor Exams, Quiz, End Term Exams
CO 5: Setting out curves in the field	√		√	√				Team work		√	√			Applicatio	Yes	Minor Exams, Quiz, End Term Exams
CO 6: Use electronic survey instrument	√			√	√			Team work		√	√			Applicatio	Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-307-18 Fluid Mechanics Lab

	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			
Course C	**PO-a**	**PO-b**	**PO-c**	**PO-d**	**PO-e**	**PO-f**	**PO-g**	**PO-h**	**PO-i**	**PO-j**	**PO-k**	**PO-l**	**PSO-m**	**PSO-n**	**PSO-o**	**Learning**	**Focus or**	**Assessment Tools to Measure Attainment of CO**

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CO1: Select appropriate pressure measuring device under different condition of flow.	√		√			√			√	√		√			√	Create	Yes	Minor Exams, Quiz, End Term Exams
CO 2: Determine the stability of a floating body	√	√					√		√	√		√				Understar	Yes	Minor Exams, Quiz, End Term Exams
CO 3: Und	√						√		√	√	√	√	√	√		Applicatio	Yes	Minor Exams, Quiz, End Term Exams
CO 4: Find discharge of fluid through pipe, orifices and in open channel	√		√	√					√	√	√	√				Applicatior	Yes	Minor Exams, Quiz, End Term Exams
CO 5: Estimate the major and minor losses in pipe.	√	√				√			√	√	√	√				Create	Yes	Minor Exams, Quiz, End Term Exams
CO 6: Estimate the various elements and energy losses in hydraulic jump.	√	√		√					√	√	√	√	√		√	Evaluate	Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-308-18 Solid Mechanics Lab

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Course O	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Analysis and Design Skill PSO-m	Research and Innovation PSO-n	Sustainable Outlook PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Understand the importance of physical properties of steel.	√	√				√	√		Individual			√			√	Applicatio	Yes	Minor Exams, Quiz, End Term Exams
CO 2: Identify and comprehend code provisions for testing different properties of steel	√	√	√	√		√	√		Individual			√	√	√	√	Applicatio	Yes	Minor Exams, Quiz, End Term Exams
CO 3: Develop stress-strain curve for axial compression, axial tension and shear.	√	√	√	√		√	√		Both			√	√	√	√	Applicatio	Yes	Minor Exams, Quiz, End Term Exams
CO 4: Assess hardness and impact strength of steel.	√	√	√	√		√	√		Both			√	√	√	√	Applicatio	Yes	Minor Exams, Quiz, End Term Exams

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CO 5: Assess flexural strength of a given material.	√	√	√	√		√	√		Both			√	√	√	√	Applicatio	Yes	Minor Exams, Quiz, End Term Exams
CO 6 : Eva	√	√	√	√		√	√		Both			√	√	√	√	Applicatio	Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-401 Concrete Technology

Course C	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Analysis and Design Skill PSO-m	Research and Innovation PSO-n	Sustainable Outlook PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Understand the relevance of different properties of constituent materials on properties of concrete.	√				√		v	√	Both	√	√	√				Understar	YES	Minor Exams, Quiz, End Term Exams

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CO 2: Understand the behaviour and durability aspects of concrete under different loading and exposure conditions.	√				√			√	Individual	√	√	√		√	√		YES	Minor Exams, Quiz, End Term Exams
CO 3: Understand the issues involved in production and use of concrete	√				√			√	Both	√	√	√				Analyse and design	YES	Minor Exams, Quiz, End Term Exams
CO 4:Design of concrete mixes as per BIS specifications.	√	√	√	√	√			√	Both	√	√	√			√	Analyse and design	YES	Minor Exams, Quiz, End Term Exams
CO 5: Understand various testing methods for concrete and their applicability	√				√	√	√	√	Individual	√	√	√		√	√		YES	Minor Exams, Quiz, End Term Exams
CO 6: Knowledge of special type of non-conventional concretes.	√				√	v	v	√	Both	√	√	√		√	√	Understa	YES	Minor Exams, Quiz, End Term Exams

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Name of the Department: Civil Engg.

Paper BTCE-402 Material, Testing & Evaluation

Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Appraisal about the role of materials in civil engineering	√					√	√	Individual				√		√	√	Understar	Yes	Minor Exams, Quiz, End Term Exams
CO 2: Introduce common measurement instruments, equipments and devices to capture the material response under loading	√	√		√	√	√	√		Both			√	√	√	√	Understar	Yes	Minor Exams, Quiz, End Term Exams

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CO 3: Exposure to a variety of established material testing procedures/techniques and the relevant codes of practice	√	√	√	√	√	√	√		Both			√	√	√	√	Understar	Yes	Minor Exams, Quiz, End Term Exams
CO 4:Ability to write a technical laboratory report.	√	√	√	√		√	√		Individual			√			√	Understar	Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-403 Hydrology & Water Resources

Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Understand the interaction among various processes in the hydrologic cycle.	√									√		√				Understand		Minor Exams, Quiz, End Term Exams

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CO 2: Calculate the average annual rainfall of any area using the rain gauge data and inter-relations of various parameters as infiltration, evapotranspiration etc	√	√	√	√		√			√	√		√	√	√	√	Analyse	Yes	Minor Exams, Quiz, End Term Exams
CO 3: Understand the various component of hydro graphs and able to estimate the run off	√	√	√	√		√			√	√		√	√	√	√	Analyse &	Yes	Minor Exams, Quiz, End Term Exams
CO 4: Find the water requirement for different crops and able to proposed appropriate method of applying water.	√	√	√	√		√	√	√	√	√		√	√	√	√	Design	Yes	Minor Exams, Quiz, End Term Exams

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CO 5: Understand the distribution system of canal and various components of irrigation system	√					√	√	√		√	√	√		√	√	Understan	Yes	Minor Exams, Quiz, End Term Exams
CO6: Classify dams and spillways, their problems and able to determine forces exerted by fluid on dams.	√	√	√	√		√	√	√	√	√	√	√	√	√	√		Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-404 Transportation Engineering

Course C	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			

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CO1: Appreciate the importance of different modes of transportation and characterize the road transportation.	√					√												Minor Exams, Quiz, End Term Exams
CO 2: Alignment and geometry of pavement as per Indian Standards according to topography.		√																Minor Exams, Quiz, End Term Exams
CO 3: Assess the properties of highway materials in laboratory		√		√														Minor Exams, Quiz, End Term Exams
CO 4: Understand the importance of railway infrastructure planning and design.	√					√												Minor Exams, Quiz, End Term Exams

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CO 5: Identify the functions of different component of railway track	√					√											Minor Exams, Quiz, End Term Exams
CO 6: Outl	√					√											Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-405 Disaster Preparedness

Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Identify various types of disasters, their causes, effects & mitigation measures.	√	√	√				√	√	√			√				Understand		Minor Exams, Quiz, End Term Exams

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CO 2: Demonstrate the understanding of various phases of disaster management cycle and create vulnerability and risk maps.					√		√			√						Understar		Minor Exams, Quiz, End Term Exams
CO 3: Understand the use of emergency management system to tackle the problems						√	√	√	√		√	√				Analyse		Minor Exams, Quiz, End Term Exams
CO 4: Discuss the role of media, various agencies and organisations for effective disaster management.								√	√	√					Understand			Minor Exams, Quiz, End Term Exams

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CO 5:Design early warning system and understand the utilization of advanced technologies in disaster management.	√				√	√		√			√	√	√	√		Design	Yes	Minor Exams, Quiz, End Term Exams
CO 6:Compare different models for disaster management and plan & design of infrastructure for effective disaster management.	√		√	√	√	√	√	√					√	√		Analyse and D	Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

PaperEVS-101-18 Environment Science (Non- credit)

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	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			
Course C	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Students will enable to understand environmental problems at local and national level through literature and general awareness.							√					√			√	Understand		Minor Exams, Quiz, End Term Exams

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CO 2: The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various environmental Issues.							√					√			√	Understand		Minor Exams, Quiz, End Term Exams
CO 3:The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore the possibilities to mitigate these problems.							√					√	√		√	Analyse		Minor Exams, Quiz, End Term Exams

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CO 4: Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.							√					√			√	Apply		Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-406-18 Concrete Testing Lab

Course O	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Analysis and Design Skill PSO-m	Research and Innovation PSO-n	Sustainable Outlook PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Evaluate properties of building materials, such as cement and aggregates	√			√	√	√	√	√	Both	√	√	√	√	√		Understar	YES	Minor Exams, Quiz, End Term Exams

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CO 2: Conduct experiments and check the acceptance criteria (if any).	√			√	√	√	√	√	Individual	√						YES	Minor Exams, Quiz, End Term Exams
CO 3: Design concrete mixes as per BIS provisions.	√	√	√	√	√	√	√	√	Both		√	√	√	√		Analyse and design	YES	Minor Exams, Quiz, End Term Exams
CO 4: Analyze the properties of concrete in fresh and hardened state.	√			√	√	√		√	Both	√	√	√	√	√		Analyse and design	YES	Minor Exams, Quiz, End Term Exams
CO 5: Create a well organized document and present the results appropriately.	√			√	√	√	√	√	Individual	√							YES	Minor Exams, Quiz, End Term Exams
CO 6: Understand and apply non destructive testing (NDT) for evaluating concrete quality.	√	√		√	√	√	√	√	Both	√	√	√	√	√		Understar	YES	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-407-18 Transportation Lab

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Course C	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Analysis and Design Skill PSO-m	Research and Innovation PSO-n	Sustainable Outlook PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Characterize the pavement materials as per the Indian Standard guidelines	√								√									Minor Exams, Quiz, End Term Exams
CO 2: Evaluate the strength of subgrade soil by CBR test.		√							√									Minor Exams, Quiz, End Term Exams
CO 3: Conduct experiments to evaluate aggregate properties.	√			√					√									Minor Exams, Quiz, End Term Exams
CO 4:Determine properties of bitumen material and mixes	√			√					√									Minor Exams, Quiz, End Term Exams

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CO 5: Evaluate the pavement condition by rough meter and Benkelman beam test.	√			√					√								Minor Exams, Quiz, End Term Exams
CO 6: .Create a well organized report and present the results appropriately			√						√								Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-501-18 Engineering Geology

Course O	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			

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CO1: The basic concepts of geological processes and their importance in civil Engineering	√	√														Understand		Minor Exams, Quiz, End Term Exams
CO 2: Identification of rocks and minerals and their characteristics	√	√														Understand		Minor Exams, Quiz, End Term Exams
CO 3: Significance of geological structures in civil engineering proj	√	√				√			√			√				Analysis	Yes	Minor Exams, Quiz, End Term Exams
CO 4: Site characterization and geologic considerations in construction	√	√	√	√	√	√	√	√	√	√		√	√		√	ysis and D	Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

PaperBTCE-502-18 Elements of Earthquake Engineering

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	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			
Course C	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Understand the phenomenon of occurrence and history of earthquakes and classify their kinds and effects.	√											√				understand	No	Minor Exams, Quiz, End Term Exams
CO 2Appreciate the role of earthquake forces in structural design of building.	√			√		√						√	√	√		understand	No	Minor Exams, Quiz, End Term Exams

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CO 3: Evaluate and analyze Degree of Freedom, Spring action, Damping, Equations of motions, Lateral Force analysis, Floor Diaphragm action, Moment resisting frames and Shear walls.	√	√		√								√	√	√		Analyse	Yes	Minor Exams, Quiz, End Term Exams
CO 4: Apply various codal provisions related to seismic design of buildings.	√		√			√						√	√			Design	Yes	Minor Exams, Quiz, End Term Exams
CO 5: Acquire new basic knowledge in earthquake engineering	√											√				Understan	No	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-503-18 Construction Engineering &Management

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	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			
Course C	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: An understanding of modern construction practices																		Minor Exams, Quiz, End Term Exams
CO 2:A good idea of basic construction dynamics-various stakeholders, project objectives, processes, resources required and project economics																		Minor Exams, Quiz, End Term Exams

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CO 3: A basic ability to plan, control and monitor construction projects with respect to time and cost																		Minor Exams, Quiz, End Term Exams
CO 4: An idea of how to optimise construction projects based on costs																		Minor Exams, Quiz, End Term Exams
CO 5:An idea how construction projects are administered with respect to contract structures and issues																		Minor Exams, Quiz, End Term Exams
CO 6: An ability to put forward ideas and understandings to others with effective communication processes																		Minor Exams, Quiz, End Term Exams

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Name of the Department: Civil Engg.

Paper BTCE-504-18 Environmental Engineering

Course C	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Analysis and Design Skill PSO-m	Research and Innovation PSO-n	Sustainable Outlook PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Understand the impact of humans on environment and environment on humans	√					√	√		√	√		√			√	Understar	Yes	Minor Exams, Quiz, End Term Exams
CO 2: Be able to identify and value the effect of the pollutants on the environment: atmosphere, water and soil.	√	√	√			√	√		√	√	√	√	√	√	√	Evaluate	Yes	Minor Exams, Quiz, End Term Exams
CO 3:Be able to plan strategies to control, reduce and monitor pollution	√			√		√	√		√	√		√		√		Create	Yes	Minor Exams, Quiz, End Term Exams

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CO 4: Be able to select the most appropriate technique for the treatment of water, wastewater ,solid waste and contaminated air.	√	√	√	√			√		√	√	√	√	√	√		Create	Yes	Minor Exams, Quiz, End Term Exams
CO 5: Be conversant with basic environmental legislation	√						√		√	√		√			√	Understan	Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-505-18 Structural Engineering

Course O	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			

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CO1: The students will be able to apply their knowledge of structural mechanics in addressing design problems of structural engineering	√	√	√	√				√	Individual			√			Analyse and design	YES	Minor Exams, Quiz, End Term Exams
CO 2: Ability to understand difference between Working stress and Limit State Philosophy by calculating various design parameters.	√	√	√	√				√	Individual			√			Analyse and design	YES	Minor Exams, Quiz, End Term Exams
CO 3: Design the reinforced concrete beams and slabs using limit state design guidelines of Indian standards.	√	√	√	√			√	√	Individual	√		√			Analyse and design	YES	Minor Exams, Quiz, End Term Exams

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CO 4: They will possess the skills to analyse and design steel structure members	√	√	√	√		√	√	√	Individual	√		√			Analyse and design	YES		Minor Exams, Quiz, End Term Exams
CO 5: They will have knowledge of structural engineering	√							√	Individual							YES		Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-506-18 Geotechnical Engineering

Course C	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			

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CO1: Comprehend the various geotechnical field challenges and understand their fundamental, index and engineering properties and then use (apply) the soil as an engineering material.	√	√							√									Minor Exams, Quiz, End Term Exams
CO 2:Investigate and write the laboratory reports for soil design properties and parameters by apply the concept of permeability, total and effective stress approaches in soil strength determination		√		√					√									Minor Exams, Quiz, End Term Exams

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CO 3: Apply the various specifications of compaction of soils in the construction of highways and earthen dams.		√	√															Minor Exams, Quiz, End Term Exams
CO 4: Able to apply the knowledge of consolidation, soil deformation parameters, and calculate settlement magnitude and rate of settlement.		√		√														Minor Exams, Quiz, End Term Exams
CO 5: Design the embankment slopes and check the stability of finite slopes.		√																Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-507-18 Geotechnical Lab

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Course O	Engineering Knowledge PO-a	Problem Analysis PO-b	Design/development of solutions PO-c	Conduct investigations of complex problems PO-d	Modern tool usage PO-e	The engineer and society PO-f	Environment and sustainability PO-g	Ethics PO-h	Individual and team work PO-i	Communication PO-j	Project management and finance PO-k	Life-long Learning PO-l	Analysis and Design Skill PSO-m	Research and Innovation PSO-n	Sustainable Outlook PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
co1 Interpret the results of compaction test for relative compaction in the field.	√	√																Minor Exams, Quiz, End Term Exams
co2 Evaluate the index properties of soil.	√	√																Minor Exams, Quiz, End Term Exams
co3 Understand the procedure for classifying coarse grained and fine grained soils.		√																Minor Exams, Quiz, End Term Exams

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CO4 Determine the engineering properties of soil	v	v																Minor Exams, Quiz, End Term Exams
CO5 Conduct experiment to evaluating Shear Strength of Soil																		Minor Exams, Quiz, End Term Exams
CO6 Apply modern engineering tools effectively and efficiently for geotechnical engineering analysis	v																	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-508-18 Environmental Engineering Lab

Course O	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			

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CO1: Conduct experiments as per standard methods of sampling and analysis.	3	3	3	0	1	3	3	1	0	1	0	0	Understand & Analyze	yes	Practical Exam, Class/Quiz Tests
CO 2: Demonstrate the expertise to characterize water and wastewater samples.	0	0	0	2	2	1	3	2	2	2	2	3	Understand & Analyze	yes	Practical Exam, Class/Quiz Tests, ViVa
CO 3: Understand the importance of laboratory analysis as a controlling factor in the treatment of water and wastewater.	0	0	0	2	2	1	2	3	2	2	2	3	Understand & Analyze	yes	Practical Exam, Class/Quiz Tests, ViVa

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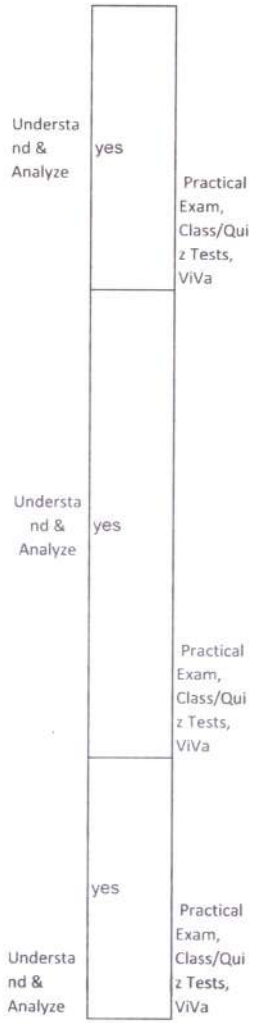
CO 4: Record the experimental observations and interpret the analysis results.	3	2	2	2	2	1	2	3	2	2	2	3
CO 5: Use the analysis results for making informed decisions about the drinkability of water and disposal of wastewater.	1	0	0	3	1	1	1	2	0	0	1	3
CO 6: Evaluate and compare different techniques of experimental analysis	2	3	3	1	2	0	0	2	1	1	3	1



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	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			
Course O	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Describe fundamental concepts and principles and practices of Management																		Minor Exams, Quiz, End Term Exams
CO 2: Explain the role and responsibilities of managers and adapt to the various styles of management across organizations.																		Minor Exams, Quiz, End Term Exams
CO 3: Develop analytical abilities to face the business situations																		Minor Exams, Quiz, End Term Exams

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CO 4: Apply various tools that would facilitate the decision making process in the business.																		
CO 5: Develop peer based learning and working in groups and teams.																		

Minor Exams, Quiz, End Term Exams

Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-532-18 Training – II*

Course O	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus on	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			

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CO1: Describe fundamental concepts and principles and practices of Management																		Minor Exams, Quiz, End Term Exams
CO 2: Explain the role and responsibilities of managers and adapt to the various styles of management across organizations.																		Minor Exams, Quiz, End Term Exams
CO 3: Develop analytical abilities to face the business situations.																		Minor Exams, Quiz, End Term Exams
CO 4: Apply various tools that would facilitate the decision making process in the business.																		Minor Exams, Quiz, End Term Exams

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CO 5: Develop peer based learning and working in groups and teams.																		Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE- 601-18 Engineering Economics, Estimation & Costing

Course C	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Have an idea of basic principles and elements of economics in general.						√	√	√		√	√	√				Understar	Yes	Minor Exams, Quiz, End Term Exams

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CO 2: Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.		√		√		√	√	√		√	√	√				Analyse and application	Yes	Minor Exams, Quiz, End Term Exams
CO 3: Be able to understand the technical specifications for various works to be performed for a project and how they impact the cost of a structure.	√		√	√		√	√	√		√	√	√				Analyse and application	Yes	Minor Exams, Quiz, End Term Exams

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CO 4: Be able to quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.	√		√			√	√	√		√	√	√	√			Analyse and application	Yes	Minor Exams, Quiz, End Term Exams
CO 5: Be able to understand how competitive bidding works and how to submit a competitive bid proposal			√			√	√	√		√	√	√				Understan	Yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper PECE-602A-18 Elective –I(Foundation Engineering)

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Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Understand the methods of surface and subsoil exploration and to prepare investigation report.	√			√						√	√	√						Minor Exams, Quiz, End Term Exams
CO 2:Estimate the stresses in soils and bearing capacity of soil for shallow foundation	√	√										√						Minor Exams, Quiz, End Term Exams
CO 3: Design various types of shallow foundation and to estimate settlement.	√	√	√									√						Minor Exams, Quiz, End Term Exams

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CO 4: Apply the concepts of deep foundation and solve problems related with pile foundation.	√	√	√									√						Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper PECE- 602C-18 Elective – III(Advance Soil Mechanics)

Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Do earth dam design and stability analysis for all kind of drainage conditions																		Minor Exams, Quiz, End Term Exams

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CO 2: Do stability analysis of any kind of slope and its protection																		Minor Exams, Quiz, End Term Exams
CO 3: Understand the earth pressure theories and able to calculate lateral earth pressure for different conditions																		Minor Exams, Quiz, End Term Exams
CO 4: Evaluate depth of embedment for cantilever as well as anchored sheet piles.																		Minor Exams, Quiz, End Term Exams
CO 5: Learn the concept of machine foundation																		Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

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Paper PECE - 602D-18 Open Elective-I (Geosynthetics Engineering)

Course C	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Identify the functions of geosynthetics																		Minor Exams, Quiz, End Term Exams
CO 2: Select the geosynthetic products																		Minor Exams, Quiz, End Term Exams
CO 3: Identify the testing methods for geosynthetics																		Minor Exams, Quiz, End Term Exams
CO 4: Design withgeosynthetic products																		Minor Exams, Quiz, End Term Exams

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Name of the Department: Civil Engg.

Paper BTMC-101-18Constitution of India

Course C	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: Understand the Philosophy of Indian constitution, like Sovereignty, Secular, Republic, Socialist and Democracy.								√				√				Understand		Minor Exams, Quiz, End Term Exams
CO 2: Understand the Rights and Duties of Citizens, Fundmantal Rights and Human Rights.								√				√				Understand		Minor Exams, Quiz, End Term Exams

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CO 3: Examine the Forms of government, Parliamentary form of Govt. & Presidential Form of Govt, powers and position of President and Prime Minister .								√			√				Analyse			Minor Exams, Quiz, End Term Exams
CO 4: The Course will also helpful in prepration of Competitive exams National wide and state level, like IAS, IPS and others.								√			√				understand			Minor Exams, Quiz, End Term Exams
																		Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-PECE - 603A-18(Design of Concrete Structures)

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Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: To apply the loads on building frames and analyse them using direct and indirect methods.	√	√	√					√	Individual				√			Analyse and Design	yes	Minor Exams, Quiz, End Term Exams
CO 2: To analyse the concrete components i.e. continuous beams, flat slabs, tanks and retaining walls, etc	√	√	√					√	Individual		√		√			Analyse and Design	yes	Minor Exams, Quiz, End Term Exams
CO 3: To design and detail the concrete components i.e. curved beams, flat slabs, tanks and retaining walls, etc	√	√	√					√	Individual		√		√			Analyse and Design	yes	Minor Exams, Quiz, End Term Exams

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CO 4:To analyse and design the special foundations i.e. raft, pile and machine foundations.	√	√	√					√	Individual		√		√			Analyse and Design	yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-PECE-603B-18(Design of Steel Structures)

Course C	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: To apply the knowledge for analysis and design of various components of a plate girder.	√	√	√					√	Individual		√		√			Analyse and Design	yes	Minor Exams, Quiz, End Term Exams

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CO 2: To analyse , evaluate and design the different types of beam-column connections.	√	√	√					√	Individual		√		√			Analyse and Design	yes	Minor Exams, Quiz, End Term Exams
CO 3: To design the column bases and footings for a steel structure under various loading conditions	√	√	√					√	Individual		√		√			Analyse and Design	yes	Minor Exams, Quiz, End Term Exams
CO 4:To analyse the loads and design various elements of industrial buildings.	√	√	√					√	Individual		√		√			Analyse and Design	yes	Minor Exams, Quiz, End Term Exams
CO 5: To demonstrate the basic knowledge of plastic analysis of simple steel elements.	√	√	√					√	Individual		√		√			Analyse and Design	yes	Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

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Paper BTCE-PECE-603C-18(Advanced Structural Analysis)

Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus on	Assessment Tools to Measure Attainment of CO
CO1: To evaluate the indeterminacy of different types of building frames	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams
CO 2:To develop and relate stiffness and flexibility matrices for beams and frames.	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams

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CO 3: To analyse beams and fames using flexibility and stiffness matrix method.	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams
CO 4: To apply the concept of finite element method to basic civil engineering structures.	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-PECE-603D-18(Structural Analysis and Design)

Course O	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus or	Assessment Tools to Measure Attainment of CO

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CO1: To understand and determine the indeterminacy of different types of structures	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams
CO 2: To calculate forces and moments in indeterminate structures due to static as well as moving loads.	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams
CO 3: To analyse and design concrete structures i.e. column subjected to moments, foundations, retaining walls, etc.	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams

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CO 4: To analyse and design the steel structures i.e. column bases, beam-column joints, plate girders and roof trusses.	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-PECE-603E-18(Prestressed Concrete)

Course O	PO-a	PO-b	PO-c	PO-d	PO-e	PO-f	PO-g	PO-h	PO-i	PO-j	PO-k	PO-l	PSO-m	PSO-n	PSO-o	Learning	Focus or	Assessment Tools to Measure Attainment of CO
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long Learning	Analysis and Design Skill	Research and Innovation	Sustainable Outlook			

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CO1: Recognize the materials for prestressed concrete and its properties, advantages and applications in contrast to normally reinforced concrete	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams
CO 2: Comprehend the concept of pre-tensioning and post-tensioning of prestressed concrete, types of prestressed members, prestressing systems and its components.	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams

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CO 3: Analyse the prestress, its losses, and determine the strength of a prestressed concrete sections using Indian Standards (IS) guidelines under flexure, shear and torsion.	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams
CO 4: Evaluate the strength and serviceability requirements of different prestresed concrete members i.e. beams, slab and anchor blocks.	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams

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CO 5: Develop peer based learning and working in groups and teams.Design the sections and the reinforcement for prestressed concrete beams, prestressed slabs and anchorage zones as per the IS specifications	√	√	√					√	Individual		√		√			Analyse and Design		Minor Exams, Quiz, End Term Exams

Name of the Department: Civil Engg.

Paper BTCE-PECE-604C-18(Repair and Rehabilitation of Structures Methods)

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Course C	PO-a Engineering Knowledge	PO-b Problem Analysis	PO-c Design/development of solutions	PO-d Conduct investigations of complex problems	PO-e Modern tool usage	PO-f The engineer and society	PO-g Environment and sustainability	PO-h Ethics	PO-i Individual and team work	PO-j Communication	PO-k Project management and finance	PO-l Life-long Learning	PSO-m Analysis and Design Skill	PSO-n Research and Innovation	PSO-o Sustainable Outlook	Learning	Focus or	Assessment Tools to Measure Attainment of CO
CO1: Understand the cause of deterioration of concrete structures.	√					√	√	Individual				√	√	√	√	Understar	Yes	Minor Exams, Quiz, End Term Exams
CO 2: Able to assess the damage for different types of structure.	√	√	√	√		√	√	Individual				√	√	√	√	Understar	Yes	Minor Exams, Quiz, End Term Exams
CO 3: Summarize the principles of repair and rehabilitation of structures.	√					√	√	Individual				√		√	√	Understar	Yes	Minor Exams, Quiz, End Term Exams

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CO 4: Recognize the ideal material for different repair and retrofitting techniques.	√	√	√	√	√	√	√		Both			√	√	√	√	, Analyse	Yes	Minor Exams, Quiz, End Term Exams

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Name of the Department: Mechanical Engineering

BTPHXX-18 - Physics & Physics Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: To be able to understand the basic principles of Quantum mechanics and to apply these to the complex phenomenon of matter radiation interaction	√		√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 2: To be able to understand the concept of wave packets using Heisenberg's uncertainty principle.			√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 3: To be able to apply Schrodinger's wave equations to study the complex physical phenomenon.			√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 4: To be able to understand the structure of crystalline solids by applying knowledge of crystallography.			√		√		√	√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

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CO 5: To be able to understand semiconducting materials by using the concepts of band theory of solids.	√	√	√	√	√	√	√	√	√	√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
BTAMXX-18 - Maths-1															
Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
CO1:Students will be able to remember terminologies and formulae in matrices, complex	√		√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO2: Students will be able to understand and interpret the concepts of matrices, complex			√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO3:Students will be able to compare and analyze the methods in matrices, complex numbers	√	√	√	√	√	√	√	√	√	√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
BTEE101-18 Basic Electrical Engineering															
Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**

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CO1: Have the knowledge of DC circuits, AC Circuits, basic magnetic circuits, working principles of electrical machines, and components of	√	√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 2: Be able to analyze of DC circuits, AC Circuits		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 3: Understand the basic magnetic circuits and apply it to the working of electrical machines		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 4: Be introduced to types of wiring, batteries, and LT switchgear.		√	√		√		√	√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

BTEE101-18 Basic Electrical Engineering Lab

Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
CO1: The ability to use common electrical measuring instruments and understand the fundamentals of electrical	√	√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 2: The ability to make electrical connections, and measure power, power factor using appropriate equipments.		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

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CO 3: Have the knowledge of electrical machines, components and their ratings		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 4: Understand the operation of transformers and electrical machines		√	√		√		√	√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
Paper BTME101-18 Engineering Graphics & Design															
Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
CO1: design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental,	√	√	√	√	√	√	√	√	√	√	√	√	Design	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO 2: to prepare to communicate effectively.	√	√	√	√	√	√	√	√	√	√	√	√	Communicate	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO 3: to prepare to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√	√	√	√	√	√	√	√	√	√	√	√	Apply	Yes	Minor Exams, Quiz, Assignments, End Term Exams
BMPD101-18 Mentoring and professional Development															

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Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: The student will be able to effectively communicate and present technical material.	√	√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO2: Ability to think critically and creatively to generate innovative and optimum solutions.		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO3:The student will be able to identify, evaluate and synthesise information from a range of sources to optimise process engineering design		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO4: Engage in continuous education, training and research, and take control of their own learning and overall development.		√	√		√		√	√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

BTCH101-18 - Chemistry -1

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.	√		√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

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Rationalise bulk properties and processes using thermodynamic considerations.			√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic			√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.			√		√		√	√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
List major chemical reactions that are used in the synthesis of molecules.	√	√	√	√	√	√	√	√	√	√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

BTCH102-18 - Chemistry Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
Estimate rate constants of reactions from concentration of reactants/products as a function of time	√		√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride			√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

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Synthesize a small drug molecule and analyse a salt sample			√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
BTAMXX-18 Mathematics II															
Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
CO1: The mathematical tools needed in evaluating multiple integrals and their usages.	√		√	√	√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 2: The effective mathematical tools for the solutions of differential equations that model physical processes.			√	√	√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 3: The tools of differentiation and integration of functions that are used in various techniques dealing engineering problems.			√	√	√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
BTPS101-18 Programming for Problem Solving															
Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**

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To formulate simple algorithms for arithmetic and logical problems.	√	√	√	√	√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To translate the algorithms to programs (in C language).		√	√	√	√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To test and execute the programs and correct syntax and logical errors.		√	√	√	√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To implement conditional branching, iteration and recursion.		√	√		√	√		√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To decompose a problem into functions and synthesize a complete program using divide and conquer approach.		√	√		√	√		√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To use arrays, pointers and structures to formulate algorithms and programs.		√	√		√	√		√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.		√	√		√	√		√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and		√	√		√	√		√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

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BTPS102-18 Programming for Problem Solving Lab															
Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
To formulate the algorithms for simple problems	√	√	√	√	√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To translate given algorithms to a working and correct program	√	√	√	√	√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To be able to correct syntax errors as reported by the compilers	√	√	√	√	√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To be able to identify and correct logical errors encountered at run time	√	√	√		√	√		√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To be able to write iterative as well as recursive programs	√	√	√		√	√		√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
To be able to represent data in arrays, strings and structures and manipulate them through a program	√	√	√		√	√		√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

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Paper BTHU101-18 English

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
The objective of the course is to help the students become the independent users of English language.	√	√	√	√	√	√	√			√	√	√	Understanding	Yes	Minor Exams, Project based learning, Assignments,End Term Exams
Students will acquire basic proficiency in reading & listening, comprehension, writing and speaking skills.	√	√	√	√	√	√	√			√	√	√	Apply	Yes	Minor Exams, Project based learning, Assignments,End Term Exams
Students will be able to understand spoken and written English language, particularly the language of their chosen technical field.	√	√	√	√	√	√	√			√	√	√	Understanding	Yes	Minor Exams, Project based learning, Assignments,End Term Exams
They will be able to converse fluently.	√	√	√	√	√	√	√			√		√	Apply	Yes	Minor Exams, Project based learning, Assignments,End Term Exams

Paper BTHU102-18 English Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO

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The objective of the course is to help the students become the independent users of English language.	√	√	√	√	√	√	√			√	√	√	Understanding	Yes	Minor Exams, Project based learning, Assignments,End Term Exams
Students will acquire basic proficiency in listening and speaking skills.	√	√	√	√	√	√	√			√	√	√	Apply	Yes	Minor Exams, Project based learning, Assignments,End Term Exams
Students will be able to understand spoken English language, particularly the language of their chosen technical field.	√	√	√	√	√	√	√			√	√	√	Understanding	Yes	Minor Exams, Project based learning, Assignments,End Term Exams
They will be able to converse fluently	√	√	√	√	√	√	√			√		√	Apply	Yes	Minor Exams, Project based learning, Assignments,End Term Exams

BMPD101-18 Mentoring and professional Development

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: The student will be able to effectively communicate and present technical material.	√	√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO2: Ability to think critically and creatively to generate innovative and optimum solutions.		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

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CO3:The student will be able to identify, evaluate and synthesise information from a range of sources to optimise process engineering design		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO4: Engage in continuous education, training and research, and take control of their own learning and overall development.		√	√		√		√	√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

Paper BTMF301-18 Fluid Mechanics

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Understand the concept of fluids and their properties.	√	√	√			√	√		√	√		√	Understanding	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO 2:Apply the concept to solve the problems related to statics, dynamics and kinematics	√	√	√			√	√		√	√		√	Understanding	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO3: Use and apply dimensional analysis and similitude techniques to various physical	√	√	√			√	√		√	√		√	Understanding	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO4: Distinguish various types of flows and learn flow measurement methods.	√	√	√			√	√		√	√		√	Analyse	Yes	Minor Exams, Quiz, Assignments, End Term Exams

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BTME302-18 Theory of Machines -1

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Understand constructional and working features of important machine elements.	√	√	√	√	√	√			√		√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams
CO2: Design belt, rope and chain drives for transmission of motion from one shaft to	√	√	√	√	√	√			√		√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams
CO3: Identify different Cam and follower pairs for different applications and construct cam	√	√	√	√	√	√			√		√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams
CO4: Understand the function of brakes, dynamometers, flywheel and governors.	√	√	√	√	√	√			√		√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

BTME303-18 : Machine Drawing

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO

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CO1: Read, draw and interpret the machine drawings and related parameters.	√	√	√							√	√	√	Understanding	Yes	Minor Exams, Class and Home Assignments, End Term Exams
CO2: Use standards used in machine drawings of machine components and assemblies.	√	√	√							√	√		Applying	Yes	Minor Exams, Class and Home Assignments, End Term Exams
CO3: Learn the concept of limits, fits and tolerances in various mating parts.	√	√	√							√	√		Understanding	Yes	Minor Exams, Class and Home Assignments, End Term Exams
CO4: Visualize and generate different views of a component in the assembly.	√	√	√		√					√	√	√	Applying	Yes	Minor Exams, Class and Home Assignments, End Term Exams
CO5: Use CAD tools for making drawings of machine components and assemblies.	√	√	√		√					√	√	√	Applying	Yes	Minor Exams, Class and Home Assignments, End Term Exams

BTME304-18 STRENGTH OF MATERIALS-I

Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
CO1: Understand the concepts of stress and strain at a point, in the members subjected to axial, bending, torsional loads and	√	√	√			√			√	√	√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams

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CO 2: Determine principal stresses, maximum shearing stress and their angles, and the stresses acting on any arbitrary plane within a	√	√	√			√			√	√	√	√	Understanding and Analysing	Yes	Minor Exams, Assignments, End Term Exams
CO 3: Find bending moment and shear force over the span of various beams subjected to different kinds of loads.	√	√	√		√	√			√	√	√	√	Analysing	Yes	Minor Exams, Assignments, End Term Exams
CO 4: Calculate load carrying capacity of columns and struts and their buckling strength.	√	√	√		√	√			√	√	√	√	Analysing	Yes	Minor Exams, Assignments, End Term Exams
CO 5: Evaluate the slope and deflection of beams subjected to loads.	√	√	√		√	√			√	√	√	√	Analysing	Yes	Minor Exams, Assignments, End Term Exams

BTME305-18 Basic Electronics Engineering

Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
Understand construction of diodes and their rectifier applications.	√	√	√			√			√	√	√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams
Appreciate the construction and working bipolar junction transistors and MOSFETs.	√	√	√			√			√	√	√	√	Understanding and Analysing	Yes	Minor Exams, Assignments, End Term Exams

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Design Op-Amp IC based fundamental applications.	√	√	√		√	√			√	√	√	√	Analysing	Yes	Minor Exams, Assignments, End Term Exams

Paper Basic Thermodynamics BTME 305-18

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Apply energy balance to Systems and Control Volumes in situations involving heat and work interactions.	√	√	√		√		√	√	√	√	√		Applying	Yes	Minor Exams, Quiz, demonstrations through videos/ lab, End Term Exams
CO2: Evaluate changes in thermodynamic properties of substances		√	√	√	√				√		√	√	Applying	Yes	Minor Exams, Quiz, demonstrations through videos/ lab, End Term Exams
CO3:Evaluate performance of energy conversion devices		√	√	√	√				√		√	√	Applying	Yes	Minor Exams, Quiz, demonstrations through videos/ lab, End Term Exams
CO4:Explain and apply various gas power and vapor power cycles		√	√	√	√	√			√	√	√		Understanding	Yes	Minor Exams, Quiz, demonstrations through videos/ lab, End Term Exams

BTME306-18 Strength of Material Lab

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Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Measure the various mechanical properties such as tensile and compressive strength, impact strength, torsion strength and fatigue	√	√	√	√		√			√	√	√	√	Understanding	Yes	Quiz, Viva
CO 2: Calculate load carrying capacity of long columns and their buckling strength.	√	√	√	√		√			√	√	√	√	Understanding and Analysing	Yes	Quiz, Viva

BTME307-18 Theory of Machines Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Understand constructional and working features of important machine elements.	√	√	√	√	√	√			√		√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams
CO2: Design belt, rope and chain drives for transmission of motion from one shaft to															
another	√	√	√	√	√	√			√		√	√	Designing	Yes	Minor Exams, Assignments, End Term Exams

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CO3: Identify different Cam and follower pairs for different applications and construct cam															
profile for required follower motion.	√	√	V	√	√	√			√		√	√	Designing	Yes	Minor Exams, Assignments, End Term Exams
CO4: Understand the function of brakes, dynamometers, flywheel and governors.	√	√	√	√	√	√			√		√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

Paper BTME308-18 Fluid Mechanics Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Distinguish various type of flows and flow measurement methods and concept of															
statics and dynamics of liquids.	√				√		√		√	√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 2: Determine discharge and head loss, hydraulic and friction coefficient, for different															

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types of flow in pipe and open channels.							√		√	√		√	Analyse	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

BMPD301-18 Mentoring and professional Development

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: The student will be able to effectively communicate and present technical material.	√	√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO2: Ability to think critically and creatively to generate innovative and optimum solutions.		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO3:The student will be able to identify, evaluate and synthesise information from a range of sources to optimise process engineering design		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO4: Engage in continuous education, training and research, and take control of their own learning and overall development.		√	√		√		√	√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

BTME401-18 APPLIED THERMODYNAMICS

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Course Outcome	PO 1 (Engineering Knowledge)	PO 2 (Problem Analysis)	PO 3 (Design/Develope	PO 4 (Conduct)	PO 5 (Modern Tool usage	PO 6 (The Engineer and Societ	PO 7 (Environment and sustai	PO 8 (Ethics)	PO 9 (Individual and Team	PO 10 (Communication)	PO 11 (Project Management	PO 12 (Life long Learning)	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Explain the functioning and performance evaluation of reciprocating air compressors.	√		√	√	√	√	√		√	√		√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO 2: Analyze the combustion phenomenon in boilers and I.C. engines.	√	√		√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO 3: Use of Steam Tables and MollierChart to solve vapour power cycle problems.	√	√	√	√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO 4: Demostrate the constructional features and working of steam power plants and to evaluate their performance.	√	√	√	√	√	√	√		√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

Paper BTME 402-18 Fluid Machines

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Determine discharge and head loss, hydraulic and friction coefficient, for different types of flow in pipe and open channels.	√	√	√			√	√		√	√		√	Knowledge	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.

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CO 2:Know about constructional details, working and design aspects of runner/wheel and evaluate the performance of various	√	√	√			√	√		√	√		√	Knowledge	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.
CO 3: Know about constructional details, working and evaluate the performance of centrifugal pump under different vane	√	√	√			√	√		√	√		√	Knowledge	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.
CO 4: Know about constructional details, working and evaluate the performance of reciprocating pump and evaluate the effect															
CO5: Know about constructional details and working of hydraulic devices like fluid coupling, accumulator and intensifier.													Knowledge	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.

BTME403-18 STRENGTH OF MATERIALS-II

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Understand the concepts of stress and strain at a point, in the members subjected to axial, bending, torsional loads and	√	√	√			√			√	√	√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams
CO 2: Determine principal stresses, maximum shearing stress and their angles, and the stresses acting on any arbitrary plane within a	√	√	√			√			√	√	√	√	Understanding and Analysing	Yes	Minor Exams, Assignments, End Term Exams

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CO 3: Find bending moment and shear force over the span of various beams subjected to different kinds of loads.	√	√	√		√	√			√	√	√	√	Analysing	Yes	Minor Exams, Assignments, End Term Exams
CO 4: Calculate load carrying capacity of columns and struts and their buckling strength.	√	√	√		√	√			√	√	√	√	Analysing	Yes	Minor Exams, Assignments, End Term Exams
CO 5: Evaluate the slope and deflection of beams subjected to loads.	√	√	√		√	√			√	√	√	√	Analysing	Yes	Minor Exams, Assignments, End Term Exams

BTME404-18 MATERIALS ENGINEERING

Course Outcome	PO 1 (Engineering Knowledge)	PO 2 (Problem Analysis)	PO 3 (Design/Development	PO 4 (Conduct)	PO 5 (Modern Tool usage	PO 6 (The Engineer and Societ	PO 7 (Environment and sustai	PO 8 (Ethics)	PO 9 (Individual and Team	PO 10 (Communication)	PO 11 (Project Management	PO 12 (Life long Learning)	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Illustrate the significance of structure-property-correlation for engineering materials including ferrous and	√	√		√	√	√	√		√	√	√	√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO 2: Explain the use and importance of various heat treatment processes used for engineering materials and their practical applications.	√		√	√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO 3: Identify the various structural changes occurred in metals with respect to time temperature transformations.	√	√	√	√	√	√	√		√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

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CO 4: Interpret the significance of Fe-C and TTT diagram for controlling the desired structure and properties of the materials.	√	√		√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

BTME405-18 : Theory of Machines -II

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Understand the basic concepts of inertia forces & couples applied to reciprocating parts of a machine.	√	√	√	√							√	√	Understanding & Applying	Yes	Minor Exams, Assignments, End Term Exams
CO2: Understand balancing of rotating and reciprocating parts of machines.	√	√	√	√	√						√	√	Understanding & Applying	Yes	Minor Exams, Assignments, End Term Exams
CO3: Select suitable type of gears for different application and analyse the motion of different elements of gear trains.	√	√	√	√	√						√	√	Understanding & Applying	Yes	Minor Exams, Assignments, End Term Exams
CO4: Understand the concept and application of gyroscopic effect.	√	√	√	√	√							√	Understanding & Applying	Yes	Minor Exams, Assignments, End Term Exams
CO5: Gain knowledge of kinematic synthesis.	√	√	√	√	√						√	√	Understanding & Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams

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EVS101-18 ENVIRONMENTAL SCIENCE

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
Students will enable to understand environmental problems at local and national level through literature and general awareness.	√	√	√	√							√	√	Understanding & Applying	Yes	Minor Exams, Assignments, End Term Exams
The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who	√	√	√	√	√						√	√	Understanding & Applying	Yes	Minor Exams, Assignments, End Term Exams
The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to	√	√	√	√	√						√	√	Understanding & Applying	Yes	Minor Exams, Assignments, End Term Exams
Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected	√	√	√	√	√							√	Understanding & Applying	Yes	Minor Exams, Assignments, End Term Exams

BTME406-18 APPLIED THERMODYNAMICS Lab

Course Outcome	PO 1 (Engineering Knowledge)	PO 2 (Problem Analysis)	PO 3 (Design/Development	PO 4 (Conduct)	PO 5 (Modern Tool usage	PO 6 (The Engineer and Societ	PO 7 (Environment and sustai	PO 8 (Ethics)	PO 9 (Individual and Team	PO 10 (Communication)	PO 11 (Project Management	PO 12 (Life long Learning)	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO

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CO1: Explain the functioning and performance evaluation of reciprocating air compressors.	√		√	√	√	√	√		√	√		√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO 2: Analyze the combustion phenomenon in boilers and I.C. engines.	√	√		√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO 3: Use of Steam Tables and MollierChart to solve vapour power cycle problems.	√	√	√	√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO 4: Demostrate the constructional features and working of steam power plants and to evaluate their performance.	√	√	√	√	√	√	√		√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

Paper BTME407-18 Fluid Machines Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Conduct experiments on scaled down models or on actual size hydraulic machines and evaluate results in terms of unit or specific quantities	√	√	√		√	√	√		√	√	√	√	Applying	Yes	Case Study, Group Discussions etc.
CO 2: Understand the working of various hydraulic machines (turbines and pumps) and can suggest remedial solutions for various	√	√	√		√	√	√		√	√	√	√	Understanding	Yes	Case Study, Group Discussions etc.

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Paper BTME408-18 Material Engineering Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
Analyse the microstructure of different ferrous and non-ferrous samples.	√	√	√		√	√	√		√	√	√	√	Applying	Yes	Case Study, Group Discussions etc.
Explore the effect of heat treatment on various engineering materials by analysing its microstructure and hardness	√	√	√		√	√	√		√	√	√	√	Understanding	Yes	Case Study, Group Discussions etc.

BMPD401-18 Mentoring and professional Development

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: The student will be able to effectively communicate and present technical material.	√	√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO2: Ability to think critically and creatively to generate innovative and optimum solutions.		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

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CO3:The student will be able to identify, evaluate and synthesise information from a range of sources to optimise process engineering design		√	√		√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO4: Engage in continuous education, training and research, and take control of their own learning and overall development.		√	√		√		√	√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

BTME501-18 Heat Transfer

Course Outcome	PO 1 (Engineering Knowledge)	PO 2 (Problem Analysis)	PO 3 (Design/Development	PO 4 (Conduct)	PO 5 (Modern Tool usage	PO 6 (The Engineer and Societ	PO 7 (Environment and sustai	PO 8 (Ethics)	PO 9 (Individual and Team	PO 10 (Communication)	PO 11 (Project Management	PO 12 (Life long Learning)	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
To teach students the basic principles of conduction, radiation, and convection heat transfer. Students will demonstrate an	√		√	√	√	√	√		√	√		√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
To extend the basic principle of conservation of energy to systems that involve conduction, radiation, and heat transfer. Students will	√	√		√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
To train students to identify, formulate, and solve engineering problems involving conduction heat transfer. Students will	√	√	√	√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
To train students to identify, formulate, and solve engineering problems involving forced convection heat transfer, natural	√	√	√	√	√	√	√		√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

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To train students to identify, formulate, and solve engineering problems involving radiation heat transfer among black surfaces	√	√	√	√	√	√	√		√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

BTME502-18 : Design of Machine Elements

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Demonstrate recalling and applying knowledge of Basic Sciences, Graphics & Drawing, Basic Manufacturing Processes and Material	√	√	√	√	√	√				√	√	√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO2: Comprehend the effect of different stresses and strains under various loading conditions on the mechanical components and identify the	√	√	√	√	√	√				√	√	√	Understanding and Applying	Yes	Minor Exams, Assignments, End Term Exams
CO3: Examine and solve design problems involving machine elements on the basis of various theories of failure.	√	√	V	√	√	√				√	√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO4: Synergize forces, moments and strength information to develop ability to analyze, design and/or select machine elements	√	√	√	√	√	√	√			√	√	√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams

Paper BTME 503-18 Manufacturing Processes

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Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Understand the different conventional manufacturing methods employed for making different products.	√	√	√		√	√	√			√	√	√	Understanding	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO 2: Understand the different unconventional manufacturing methods employed for making different products.	√	√	√		√	√	√			√	√	√	Understanding	Yes	Minor Exams, Quiz, Assignments, End Term Exams

Paper BTME 503-18 Management & Engineering Economics

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Explain the development of management and the role it plays at different levels in an organization.	√						√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 2: Comprehend the process and role of effective planning, organizing and staffing for the development of an organization.							√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 3: Understand the necessity of good leadership, communication and coordination for establishing effective control in an							√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

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CO 4: Understand engineering economics demand supply and its importance in economics decision making and problem							√	√		√		√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 5: Calculate present worth, annual worth and IRR for different alternatives in economic decision making.	√	√	√	√	√	√	√	√	√	√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 6: Understand the procedure involved in estimation of cost for a simple component, product costing and depreciation, its	√	√	√	√	√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

Paper BTME 503-18 Heat Transfer Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
Design and fabricate the experimental setups related to heat transfer phenomena.	√	√	√		√	√	√			√	√	√	Understanding	Yes	Minor Exams, Quiz, Assignments, End Term Exams
Measure and analyse different heat transfer parameters.	√	√	√		√	√	√			√	√	√	Understanding	Yes	Minor Exams, Quiz, Assignments, End Term Exams

Paper BTME 506-18 Manufacturing Processes Laboratory

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Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Determine/calculate the clay content, moisture content, hardness, permeability and grain fineness number of moulding	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
CO 2: Use oxy-acetylene gas welding, manual arc welding, MIG, TIG and spot-welding processes to make various joints.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
CO 3: Use machine tools such as lathe, shaper and milling machine for machining/cutting various profiles on work pieces.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
CO 4: Learn about the constructional features and working of grinding machines, hydraulic press, draw bench, rolling mills, drawing and	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams

Paper BTME 507-18 Numerical Methods Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
Understand different implementation modes of numerical methods.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams

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Use the numerical methods with the understanding of limitations of these methods for solving problems.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Develop and implement their own computer programs.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Solve problems more accurately and efficiently in low computational time.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Handle the problems conveniently which are difficult to deal with manually	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams

Paper BTMC102-18 ESSENCE OF INDIAN KNOWLEDGE TRADITION

Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
Understand the Philosophy of Indian Knowledge system and and its Basic Structure.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Understand the Ancient India Culture, Society and Religion.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams

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Examine the areas of Indian Linguistic Tradition.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Know the contrubtion of scientists of different eras.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Handle the problems conveniently which are difficult to deal with manually	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams

Paper BTME 409-18 4 weeks industrial training

Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
Capability to acquire and apply fundamental principles of engineering.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Become master in one's specialized technology	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Become updated with all the latest changes in technological world.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams

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Ability to communicate efficiently.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Knack to be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Ability to identify, formulate and model problems and find engineering solution based on a systems approach.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Capability and enthusiasm for self-improvement through continuous professional development and life-long learning	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
Awareness of the social, cultural, global and environmental responsibility as an engineer.	√	√	√	√	√	√	√			√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams

BTME601-18 REFREGERATION AND AIR CONDITIONING

Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
CO1: Understand the fundamental principles and applications of refrigeration and air conditioning system	√	√	√	√	√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams

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CO2: The students will be able to obtain cooling capacity and coefficient of performance by conducting test on refrigeration systems	√	√	√	√	√		√		√		√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO3: The students will develop ability to calculate the energy requirements of cooling and heat equipment for air conditioning	√		√	√	√	√	√		√	√	√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO4: The students will be able to Explain the properties, applications and enironmental issues of different refrigerants.	√	√		√	√	√		√	√	√		√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO5: The students can demonstrate an ability to analysis psychrometric processes and cycles of air conditioning systems.	√	√	√	√	√		√		√	√	√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams

Paper BTME602-18 Mechanical Measurements & Metrology

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: To provide a knowledge about measurement systems and their components	√	√	√	√	√	√			√	√	√	√	Knowledge	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.
CO 2: To learn about various sensors and transducers used for measurement of mechanical quantities	√	√	√	√	√	√			√	√	√	√	Understanding	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.

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CO 3: To learn about usage of various measuring instruments.	√	√	√	√	√	√			√	√	√	√	Understanding	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.
CO 4: To learn metrology of screw, gear and surface texture.	√	√	√	√	√	√			√	√	√	√	Understanding	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.

BTME603-18 AUTOMOBILE ENGINEERING

Course Outcome	PO 1 (Engineering Knowledge)	PO 2 (Problem Analysis)	PO 3 (Design/Development)	PO 4 (Conduct)	PO 5 (Modern Tool usage	PO 6 (The Engineer and Societ	PO 7 (Environment and sustai	PO 8 (Ethics)	PO 9 (Individual and Team	PO 10 (Communication)	PO 11 (Project Management	PO 12 (Life long Learning)	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Identify the different parts of the automobile.	√		√	√	√	√	√		√	√	√	√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO 2: Demostrate the working of various parts like engine, transmission, clutch, brakes, steering and the suspension systems.	√		√	√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO 3: Explain the need of vehicle safety systems and future developments in the automobile industry.	√	√	√	√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

Paper BTME 604-18 Introduction to Industrial Management

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Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: 1.Understand the complexities associated with management in the organizations and integrate the learning in handling these	√	√	√		√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 2: 2.Demonstrate the roles, skills and functions of management.	√	√	√		√	√	√	√	√	√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams
CO 3: 3.Understand the concepts related to industrial management.	√	√	√	√		√	√	√	√	√	√	√	Applying	Yes	Minor Exams, Buisness Quiz, Assignments,End Term Exams

BTME605-18 REFREGERATION AND AIR CONDITIONING LAB

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Understand the fundamental principles and applications of refrigeration and air conditioning system	√	√	√	√	√		√	√	√	√	√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams
CO2: The students will be able to obtain cooling capacity and coefficient of performance by conducting test on refrigeration systems	√	√	√	√	√		√		√		√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams

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CO3: The students will develop ability to calculate the energy requirements of cooling and heat equipment for air conditioning	√		√	√	√	√	√		√	√	√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO4: The students will be able to Explain the properties, applications and enironmental issues of different refrigerants.	√	√		√	√	√		√	√	√		√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO5: The students can demonstrate an ability to analysis psychrometric processes and cycles of air conditioning systems.	√	√	√	√	√		√		√	√	√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams

Paper BTME606-18 Mechanical Measurements & Metrology Lab

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Demonstrate the use of instruments for measuring linear (internal and external), angular dimensions and surface roughness.	√	√	√	√	√	√			√	√	√	√	Understanding	Yes	Case Study, Group Discussions, etc
CO 2: Identify proper measuring instrument and know requirement of calibration, errors in measurement etc.	√	√	√	√	√	√			√	√	√	√	Knowledge	Yes	Case Study, Group Discussions, etc
CO 3: Apply analytical and experimental methods to make measurements and to find and correct defects in measurement systems.	√	√	√	√	√	√			√	√	√	√	Applying	Yes	Case Study, Group Discussions, etc

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BTME603-18 AUTOMOBILE ENGINEERING LAB

Course Outcome	PO 1 (Engineering Knowledge)	PO 2 (Problem Analysis)	PO 3 (Design/Development)	PO 4 (Conduct)	PO 5 (Modern Tool usage	PO 6 (The Engineer and Societ	PO 7 (Environment and sustai	PO 8 (Ethics)	PO 9 (Individual and Team	PO 10 (Communication)	PO 11 (Project Management	PO 12 (Life long Learning)	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Identify the different parts of the automobile.	√		√	√	√	√	√		√	√	√	√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO 2: Demostrate the working of various parts like engine, transmission, clutch, brakes, steering and the suspension systems.	√		√	√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO 3: Explain the need of vehicle safety systems and future developments in the automobile industry.	√	√	√	√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

BTME–608-18 : Minor Project

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1:Identify an open ended problem in area of mechanical engineering which requires further investigation.	√		√		√	√	√	√	√	√	√	√	Understanding	Yes	Reports, Project Presentations and Final Viva

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CO2: Identify the methods and materials required for the project work.	√	√	√	√	√	√	√	√	√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
CO3: Manage the work with team members.	√		√	√	√	√	√	√	√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
CO4: . Formulate and implement innovative ideas for social and environmental benefits.	√	√	√	√	√	√	√	√	√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
CO5: Write technical report of the project apart from developing a presentation.	√	√	√	√	√	√	√		√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva

Paper: Internal Combustion Engines 609-18

Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
CO1:Knowledge about the basics of IC engines	√	√	√	√			√		√	√		√	Understanding	Yes	Minor Exams, Quiz, demonstrations through videos/ lab, End Term Exams
CO2:Ability to evaluate operational characteristics of IC Engines	√	√	√	√		√	√		√	√	√	√	Understanding	Yes	Minor Exams, Quiz, demonstrations through videos/ lab, End Term Exams

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CO3:Ability to ascertain the effects of fuel/supply systems on emission from an engine.		√	√	√	√		√				√	√	Understanding	Yes	Minor Exams, Quiz, demonstrations through videos/ lab, End Term Exams
CO4:Ability to test engine performance		√	√	√	√		√	√		√		√	Applying		

BTME-610-18 Mechatronics Systems

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Design mux, demux, flip-flops, and shift registers.		√	√	√	√		√	√	√	√	√		Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO2:Describe the block diagram, registers, ALU, bus systems, timing & control signals, instruction cycles, and interrupts of 8085	√	√			√		√	√	√	√	√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO3: Apply the concept of 8085 microprocessor instruction sets and addressing modes in writing assembly language program	√	√	√		√	√	√	√	√	√	√		Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO4: Describe the interfacing of memory, 8255 PPI, ADC, DAC, 7-segment LED system, stepper motor, 8251 and 8253 ICs with 8085	√		√	√	√		√			√		√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams

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BTME-611-18 Microprocessor in automation

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
Student is able to describe the architecture and different modes of operations of a typical microprocessor.		√	√	√	√		√	√	√	√	√		Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
Student is able to understand different addressing modes and instructions of 8086 design and develop assembly language programs using	√	√			√		√	√	√	√	√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
Student is able to interface memory, I/O devises and interrupt controller with 8086 microprocessors.	√	√	√		√	√	√	√	√	√	√		Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
Student is able to describe the internal architecture and different modes of operations of a typical microcontroller	√		√	√	√		√			√		√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
Student is able to design and develop assembly language programs using 8051 microcontroller	√		√	√	√		√			√		√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CS 305.6 Student is able to analyze and compare the features of microprocessors and microcontrollers.	√		√	√	√		√			√		√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams

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BTME612-18 COMPOSITE MATERIALS

Course Outcome	PO 1 (Engineering Knowledge)	PO 2 (Problem Analysis)	PO 3 (Design/Development)	PO 4 (Conduct)	PO 5 (Modern Tool usage	PO 6 (The Engineer and Societ	PO 7 (Environment and sustai	PO 8 (Ethics)	PO 9 (Individual and Team	PO 10 (Communication)	PO 11 (Project Management	PO 12 (Life long Learning)	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Explain the concept, need and applications of composite materials.	√	√	√	√	√	√	√		√	√		√	Understanding, Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO 2: Suggest/select optimum combination of Matrix/Reinforcement for various engineering applications.	√	√	√	√	√	√	√	√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO 3: Analyze the effects of influencing factors on the strength of composite materials.	√	√	√	√	√	√	√		√		√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams

BTME-613-18 Computer Aided Design

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Create the different wireframe primitives using parametric representations	√	√	√		√		√	√		√	√		Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams

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CO2: Create surface primitives using parametric modeling.		√		√	√		√	√	√		√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO3: Create the different solid primitives using the different representation schemes	√		√	√	√		√	√	√	√	√		Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO4: Apply geometric transformations on the created wireframe, surface and solid models.	√	√	√		√	√	√		√	√		√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams

Paper BTME 614-18 Product Design & Development

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Understand desirable design aspects considering various production processes and also understand the economic factors of design.	√	√	√	√	√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO 2: Employ engineering, scientific, and mathematical principles to execute a design from concept to finished product.	√	√	√	√	√	√	√	√	√	√	√	√	Applying	Yes	Minor Exams, Quiz, Assignments, End Term Exams
CO 3: Apply the modern approaches to product design considering concurrent design, quality function deployment and various rapid	√	√	√	√	√	√	√	√	√	√	√	√	Applying	Yes	Minor Exams, Quiz, Assignments, End Term Exams

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CO 4: Apply innovative process techniques in synthesizing information, problem-solving and critical thinking.	√	√	√	√	√	√	√	√	√	√	√	√	Applying	Yes	Minor Exams, Quiz, Assignments, End Term Exams

BTME 615-18 : Non Conventional Energy Resources

Course Outcome	PO 1	PO 2	PO3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: To Explain renewable energy sources & systems.	√	√				√						√	Understanding	Yes	Minor Exams, Buisness Quiz, End Term Exams
CO2: To Apply engineering techniques to build solar, wind, tidal, geothermal, biofuel, fuel cell, Hydrogen and sterling engine	√	√	√	√	√	√	√	√	√		√		Designing	Yes	Minor Exams, Buisness Quiz, End Term Exams
CO3: To Analyze and evaluate the implication of renewable energy. Concepts in solving numerical problems pertaining to solar radiation	√	√	√	√	√	√	√				√		Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
CO4: To Demonstrate self - learning capability to design & establish renewable energy systems.	√	√	√	√	√	√	√	√	√		√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams
CO5: To Conduct experiments to assess the performance of solar PV, solar thermal and biodiesel systems	√	√	√	√	√	√	√	√	√		√	√	Applying	Yes	Minor Exams, Buisness Quiz, End Term Exams

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BTME616-18 : OPERATION RESEARCH

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Explain various mathematical deterministic operation research models.	√	√	√	√	√			√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Class and Home Assignments, End Term Exams
CO2: Describe the problems of probabilistic and simulation models.	√	√	√	√	√			√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Class and Home Assignments, End Term Exams
CO3: Demonstrate the queuing, inventory and replacement models etc.	√	√	√	√	√			√	√	√	√	√	Applying and Designing	Yes	Minor Exams, Class and Home Assignments, End Term Exams
CO4: Formulate and analyze the network models.	√	√	√	√	√			√	√	√	√	√	Applying and Designing	Yes	Minor Exams, Class and Home Assignments, End Term Exams

BTME617-18: MAINTENANCE & RELIABILITY

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO

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CO1: Understand the concepts of reliability and maintainability	√	√	√	√	√	√	√	√	√	√	√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams
CO2: The students will be able to use statistical tools to characterise the reliability of an item and determine the reliability of a system, and will	√	√	√	√	√	√	√	√	√	√	√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams
CO3: The students will develop ability in formulating suitable maintenance strategies to enhance system reliability of a manufacturing	√	√	√	√	√	√	√	√	√	√	√	√	Applying and Designing	Yes	Minor Exams, Assignments, End Term Exams

Paper BTME701-18 Mechanical Vibrations

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO11	PO12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: Formulate mathematical models of problems in vibrations using Newton's second law or energy	√	√	√	√	√	√	√		√	√	√	√	Understanding	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.
CO 2: Understand the need and measurement of vibration in mechanical systems.	√	√	√	√	√	√	√		√	√	√	√	Understanding	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.
CO 3: Calculate principal modes of vibration.	√	√	√	√	√	√	√		√	√	√	√	Applying	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.

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CO4: Explore the suitable methods of vibration reduction and absorption.	√	√	√	√	√	√	√		√	√	√	√	Applying	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.
CO5: Ability to determine vibratory responses of SDOF and MDOF systems.	√	√	√	√	√	√	√		√	√	√	√	Analyse	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.
CO6: Ability to determine vibratory responses of SDOF and MDOF systems.	√	√	√	√	√	√	√		√	√	√	√	Analyse	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.

Paper BTME702-18 Automation in manufacturing

Course Outcome	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO7**	**PO 8**	**PO9**	**PO10**	**PO11**	**PO12**	**Skill**	**Focus on Employability / Entrepr**	**Assessment Tools to Measure Attainment of CO**
Illustrate the basic concepts of automation in machine tools.															
Analyze various automated flow lines, Explain assembly systems and line balancing methods.	√	√	√	√	√	√	√		√	√	√	√	Applying	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.
Describe the importance of automated material handling and storage systems.	√	√	√	√	√	√	√		√	√	√	√	Understanding	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.

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Interpret the importance of adaptive control systems, automated inspection systems.	√	√	√	√	√	√	√		√	√	√	√	Applying	Yes	Lectures, Tutorials, Assignments, Powerpoint Presentations, Numericals etc.

BTME703-18 Fundamentals of Management for Engineers

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: The students understand the significance of Management in their Profession	√					√		√	√	√	√	√	Understanding	Yes	Minor Exams, Assignments, End Term Exams
CO2: The various Management Functions like Planning, Organizing, Staffing, Leading, aspects are learnt in this course	√			√	√	√		√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO3: Understand the complexities associated with management in the organizations and integrate the learning in handling these	√	√	√	√	√	√		√	√	√	√	√	Understanding, Applying	Yes	Minor Exams, Assignments, End Term Exams
CO4: Demonstrate the roles, skills and functions of management.	√			√	√	√		√	√	√	√	√	Applying	Yes	Minor Exams, Assignments, End Term Exams

BTME-704-18 : Project-II

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Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO
CO1: To create an Industrial environment and culture within the institution.	√		√		√	√	√	√	√	√	√	√	Understanding	Yes	Reports, Project Presentations and Final Viva
CO2: To set up production lab utilizing the infrastructure of the institution.	√	√	√		√	√	√	√	√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
CO3: To standardize laboratories to industrial standard, thereby giving exposure to industrial housekeeping standards.	√	√	√		√	√	√	√	√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
CO4: Demonstrate an ability to present and defend their research work to a panel of experts.	√		√	√	√	√	√	√	√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
CO5: Demonstrate knowledge of contemporary issues in their chosen field of research.	√	√	√	√	√	√	√		√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva

BTME-801 Software/Industrial Training

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	Skill	Focus on Employability / Entrepr	Assessment Tools to Measure Attainment of CO

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Capability to acquire and apply fundamental principles of engineering.	√		√		√	√	√	√	√	√	√	√	Understanding	Yes	Reports, Project Presentations and Final Viva
Become master in one's specialized technology	√	√	√		√	√	√	√	√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
Become updated with all the latest changes in technological world.	√	√	√		√	√	√	√	√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
Ability to communicate efficiently.	√		√	√	√	√	√	√	√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
Knack to be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills.	√	√	√	√	√	√	√		√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
Ability to identify, formulate and model problems and find engineering solution based on a systems approach.	√	√	√	√	√	√	√		√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
Capability and enthusiasm for self-improvement through continuous professional development and life-long learning	√	√	√	√	√	√	√		√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva
Awareness of the social, cultural, global and environmental responsibility as an engineer	√	√	√	√	√	√	√		√	√	√	√	Applying and Designing	Yes	Reports, Project Presentations and Final Viva

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