



DEPARTMENT OF COMPUTER SCIENCE

Lesson Plan

Session: Jan –Jun, 2026

Semester: 4th

Name: _____

University Roll Number: _____

BUDDHA INSTITUTE OF TECHNOLOGY

CL-1 Sector - 7, GIDA, Gorakhpur - 273209 (U.P)

Phones : (0551) 2580413-415

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Time Table

Evaluation scheme

Subject1- Operating System

Subject 2- Theory of Automata and Formal Language

Subject 3- Object Oriented Programming with Java

Subject 4- Python Programming

Subject 5- Technical Communication

Subject 6- Energy Science & Engineering

CSEP - Communication Skill Enhancement Program


Techedge-

Lab 1 - Operating System Lab

Lab 2 - Object Oriented Programming with Java Lab

Lab 3 - Cyber Security Workshop

TIME TABLE

	BUDDHA INSTITUTE OF TECHNOLOGY, GIDA, GORAKHPUR									
Department of Computer Science & Allied										
CLASS TIME TABLE (2025-26 EVEN SEMESTER)										
Program: COMPUTER SCIENCE (CS)				w.e.f: 02 FEBRUARY 2026		SEMESTER: 4-E		ROOM NO: 124 (Block-3)		
Day / Time	9:10-10:05 AM	10:05-11:00 AM	SHORT BREAK (15 Min.)	11:15-12:10 PM	12:10-01:05PM	LUNCH BREAK (45 Min.)	01:45-2:40 PM	2:40-3:35 PM	3:35-4:30 PM	
MON	OS (SV)	OOPS (RR)		PP (SKS)	TAFL (SKP)		TC (AS)	Techedge-VM-L-307		
TUES	OOPS Lab-E1-RR-L-310			ESE (Mr. NT)	OOPS (RR)		TAFL (SKP)	OS Lab-E1-SV-L-306		
	PP Lab-E2-SKS-L-311			OOPS (RR)	PP (SKS)		ESE (Mr. NT)	Techedge-VM-L-307		
WED	OS (SV)	TAFL (SKP)		TAFL (SKP)	OOPS (RR)		PP (SKS)	ESE (Mr. NT)	ESE (Mr. NT)	OS (SV)
THU	PP Lab-E1-SKS--L-310			OOPS (RR)	CSEP (SV)		ESE (Mr. NT)	CSW Lab-E1-SKH-L-301		
	OS Lab-E2-SV-L-311			OS (SV)	ESE (Mr. NT)			OOPS Lab-E2-RR-L-302		
FRI	TAFL (SKP)	OS (SV)								
SAT	TC (AS)	PP (SKS)								

EVALUATION SCHEME

Subject Code	Subject	Sessional Marks	Exam Marks	Total Marks
THEORY SUBJECTS				
BCS-401	Operating System	30	70	100
BCS-402	Theory of Automata and Formal Language	30	70	100
BCS-403	Object Oriented Programming with Java	30	70	100
BCC-402	Python Programming	30	70	100
BAS-401	Technical Communication	30	70	100
BOE-403	Energy Science & Engineering	30	70	100
PRACTICAL/DESIGN/DRAWING				
BCS-451	Operating System Lab	50	50	100
BCS-452	Object Oriented Programming with Java Lab	50	50	100
BCS-453	Cyber Security Workshop	50	50	100



BUDDHA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ALLIED
PROGRAM- COMPUTER SCIENCE & INFORMATION TECHNOLOGY
ACADEMIC YEAR 2025-26 (Even Semester)

LESSON PLAN DETAILS

Semester: IV	Section: E	Subject Code: BCS401	Contact Hours /week: 5
Course Name: B.Tech			# of credits: 4
Faculty name: Ms. Susheela verma			Designation: Assistant Professor
Sessional Marks: 30		End Semester Examination Marks:100	University Exam Hours: 3

Prerequisites if any:

Operating System

Content delivery methods:	By Face to face delivery, Presentation, Tutorial etc.
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COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	Introduction : Operating system and functions, Classification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multiprocess Systems, Multithreaded Systems, Operating System Structure- Layered structure, System Components, Operating System services, Reentrant Kernels, Monolithic and Microkernel Systems.	11	C01
2	Concurrent Processes : Process Concept, Principle of Concurrency, Producer / Consumer Problem, Mutual Exclusion, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Test and Set operation; Classical Problem in Concurrency- Dining Philosopher Problem, Sleeping Barber Problem; Inter Process Communication models and Schemes, Process generation.	12	C02
3	CPU Scheduling : Scheduling Concepts, Performance Criteria, Process States, Process Transition Diagram, Schedulers, Process Control Block (PCB), Process address space, Process identification information, Threads and their management, Scheduling Algorithms, Multiprocessor Scheduling. Deadlock : System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock.	15	C03
4	Memory Management : Basic bare machine, Resident monitor, Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Protection schemes, Paging, Segmentation, Paged segmentation, Virtual memory concepts, Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Cache memory organization, Locality of reference.	14	C04
5	I/O Management and Disk Scheduling : I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System : File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File system protection and security.	10	C05

COURSE OUTCOMES: At the end of the Course, the Student will be able to:

C01	Understand the structure and functions of OS
C02	Learn about Processes, Threads and Scheduling algorithms.
C03	Understand the principles of concurrency and Deadlocks
C04	Learn various memory management scheme
C05	Study I/O management and File systems.

Mapping of CO v/s PO:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
C01	2	2	2	-	-	-	-	-	-	-	-	1
C02	3	1	2	2	1	-	-	-	-	-	-	
C03	3	1	2	1	1	-	-	-	-	-	-	
C04	3	2	2	1	1	-	-	-	-	-	-	
C05	2	1	2	1	1	-	-	-	-	-	-	
Average	2.6	1.4	2.00	1.00	0.8	-	-	-	-	-	-	0.2

Mapping of CO v/s PSO:

	PS01	PS02	PS03
C01	1	1	1
C02	1	2	2
C03	2	3	1
C04	1	2	1
C05	1	2	1
Average	1.2	2.00	1.2

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Topics to be covered beyond syllabus	
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LESSON PLAN

Lecture	Module	Scheduled				Conducted			
		Topic	*RBT Levels	CO Mapping	Date	Topic	Date	No. of Students	Faculty Sign
1	I	Introduction: Operating system and functions,	L1	CO1					
2		Classification of Operating systems-Batch, Interactive, Time sharing,	L1	CO1					
3		Real Time System, Multiprocessor Systems,	L1	CO1					
4		Multiuser Systems, Multiprocess Systems,	L1	CO1					
5		Multithreaded Systems	L1	CO1					
6		Tutorial-1							
7		Operating System Structure-Layered structure, System Components	L2	CO1					
8		Operating System services, Reentrant Kernels	L2	CO1					

9		Monolithic and Microkernel Systems.	L2	C01				
10		Tutorial-2	L2	C01				
11		Revision-1	L2	C01				
12	II	Concurrent Processes: Process Concept, Principle of Concurrency	L2	C02				
13		Producer / Consumer Problem	L3	C02				
14		Mutual Exclusion, Critical Section Problem	L2	C02				
15		Dekker's solution	L2	C02				
16		Peterson's solution	L3	C02				
17		Tutorial-3		C02				
18		Semaphores, Test and Set operation	L3	C02				
19		Classical Problem in Concurrency- Dining Philosopher Problem,	L3	C02				
20		Sleeping Barber Problem	L3	C02				
21		Inter Process Communication models and Schemes, Process generation	L2	C02				
22		Tutorial-4		C02				

23		Revision-2		C02					
24	III	CPU Scheduling: Scheduling Concepts,	L2	C03					
25		Performance Criteria, Process States,	L2	C03					
26		Process Transition Diagram,	L2	C03					
27		Schedulers, Process Control Block (PCB)	L2	C03					
28		Process address space, Process identification information	L1	C03					
29		Threads and their management	L1,L2	C03					
30		Tutorial-5		C03					
31		Scheduling Algorithms(cont)	L2	C03					
32		Scheduling Algorithms	L2	C03					
33		Multiprocessor Scheduling	L2	C03					
34		Deadlock: System model, Deadlock characterization,	L2	C03					
35		Prevention ,Avoidance and detection	L1	C03					
36		Recovery from deadlock.		C03					
37			Tutorial-6		C03				

38		Revision-3		C03					
39	IV	Memory Management: Basic bare machine, Resident monitor	L1	C04					
40		Multiprogramming with fixed partitions	L1	C04					
41		Multiprogramming with variable partitions	L2	C04					
42		Protection schemes, Paging	L2	C04					
43		Paging	L2	C04					
44		Tutorial-7		C04					
45		Segmentation,	L2	C04					
46		Paged segmentation	L2	C04					
47		Virtual memory concepts	L2	C04					
48		Demand paging & Performance of demand paging	L2	C04					
49		Page replacement algorithms		C04					
50		Thrashing, Cache memory organization, Locality of reference.	L1	C04					
51		Tutorial-8		C04					
52		Revision-4		C04					

53	V	I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering	L1, L2	C05				
54		Disk storage and disk scheduling	L1, L2	C05				
55		RAID		C05				
56		Tutorial-9		C05				
57		File System: File concept, File organization and access mechanism	L2	C05				
58		File directories, and File sharing	L2	C05				
59		File system implementation issues	L2	C05				
60		File system protection and security.	L2	C05				
61		Tutorial-10		C05				
62		Revision-5		C05				

Class Test	Syllabus
CT-01	Class 1-Class 29
CT-02	Class 30-Class 60
PRE-AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**

L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

Text Books:

T1. Aho, Sethi & Ullman, "Compilers: Principles, Techniques and Tools", Pearson Education.

T2. V Raghvan, "Principles of Compiler Design", TMH.

Faculty Sign

Program Head's

LESSON PLAN DETAILS

Semester: IV	Section: E	Course Code: BCS 402	Contact Hours /week: 5
Course Name: Theory of Automata and Formal Languages			# of credits: 4
Faculty name: Mr. Shrawan Kumar Pandey			Designation: Assistant Professor
Sessional Marks: 30		End Semester Examination Marks:70	University Exam Hours: 3

Prerequisites if any:
Set Theory

Content delivery methods:	By Face to face delivery, Presentation, Tutorial etc.
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COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	Basic Concepts and Automata Theory: Introduction to Theory of Computation- Automata, Computability and Complexity, Alphabet, Symbol, String, Formal Languages, Deterministic Finite Automaton (DFA)- Definition, Representation, Acceptability of a String and Language, Non Deterministic Finite Automaton (NFA), Equivalence of DFA and NFA, NFA with ϵ -Transition, Equivalence of NFA's with and without ϵ -Transition, Finite Automata with output- Moore Machine, Mealy Machine, Equivalence of Moore and Mealy Machine, Minimization of Finite Automata	14	CO1
2	Regular Expressions and Languages: Regular Expressions, Transition Graph, Kleen's Theorem, Finite Automata and Regular Expression- Arden's theorem, Algebraic Method Using Arden's Theorem, Regular and Non-Regular Languages- Closure properties of Regular Languages, Pigeonhole Principle, Pumping Lemma, Application of Pumping Lemma, Decidability- Decision properties, Finite Automata and Regular Languages	12	CO2
3	Regular and Non-Regular Grammars: Context Free Grammar(CFG)-Definition, Derivations, Languages, Derivation Trees and Ambiguity, Regular Grammars-Right Linear and Left Linear grammars, Conversion of FA into CFG and Regular grammar into FA, Simplification of CFG, Normal Forms- Chomsky Normal Form(CNF), Greibach Normal Form (GNF), Chomsky Hierarchy, Programming problems based on the properties of CFGs.	13	CO3

4	Push Down Automata and Properties of Context Free Languages: Nondeterministic Pushdown Automata (NPDA)- Definition, Moves, A Language Accepted by NPDA, Deterministic Pushdown Automata(DPDA) and Deterministic Context free Languages(DCFL), Pushdown Automata for Context Free Languages, Context Free grammars for Pushdown Automata, Two stack Pushdown Automata, Pumping Lemma for CFL, Closure properties of CFL, Decision Problems of CFL, Programming problems based on the properties of CFLs.	14	C04
5	Turing Machines and Recursive Function Theory : Basic Turing Machine Model, Representation of Turing Machines, Language Acceptability of Turing Machines, Techniques for Turing Machine Construction, Modifications of Turing Machine, Turing Machine as Computer of Integer Functions, Universal Turing machine, Linear Bounded Automata, Church's Thesis, Recursive and Recursively Enumerable language, Halting Problem, Post's Correspondance Problem, Introduction to Recursive Function Theory.	17	C05

COURSE OUTCOMES: At the end of the Course, the Student will be able to:

C01	Make use of knowledge of basic concepts of automata theory for solving the problems of NFA, DFA, Mealy and Moore machine.
C02	Utilize concept of Arden's theorem in DFA.
C03	Apply fundamental concepts of regular grammar and CFG for solving the problems of regular language and CFL.
C04	Model PDA for context free languages.
C05	Model Turing Machine for computational problem.

Mapping of CO v/s PO:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
C01	3	3	2	2	-	2	-	-	-	1	1	1
C02	3	3	2	2	-	2	-	-	-	1	1	1
C03	3	3	2	2	-	2	-	-	-	1	1	1

C04	3	3	2	2	-	2	-	-	-	1	1	1
C05	3	3	2	2	-	2	-	-	-	1	1	1
Average	3	3	2	2	-	2	-	-	-	1	1	1

Mapping of CO v/s PSO:

	PSO1	PSO2	PSO3
C01	2	-	-
C02	2	-	-
C03	2	-	-
C04	2	-	-
C05	2	-	-
Average	2	-	-

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Topics to be covered beyond syllabus	NA
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LESSON PLAN

L	e	M	Scheduled	Conducted
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		Topic	*RBT Levels	C O Mapping	Date	Topic	Date	No. Of Students	Faculty Sign
1	I	Introduction to Theory of Computation- Automata	L2	C01					
2		Computability and Complexity,	L3	C01					
3		Alphabet, Symbol, String	L2	C01					
4		Formal Languages,	L3	C01					
5		Deterministic Finite Automaton (DFA)- Definition, Representation	L3	C01					
6		Tutorial-1	L3	C01					
7		Acceptability of a String and Language, Non Deterministic Finite Automaton (NFA) , Equivalence of DFA and NFA,	L3	C01					
8		NFA with ϵ -Transition, Equivalence of NFA's with and without ϵ -Transition	L3	C01					
9		Finite Automata with output- Moore Machine, Mealy Machine,	L3	C01					
10		Equivalence of Moore and Mealy Machine	L3	C01					
11		Minimization of Finite Automata	L3	C01					
12		Tutorial-2	L3	C01					

13	II	Regular Expressions, Transition Graph	L3	C02					
14		Kleen's Theorem,	L3	C02					
15		Finite Automata and Regular Expression-Arden's theorem,	L3	C02					
16		Finite Automata and Regular Languages	L3	C02					
17		Algebraic Method Using Arden's Theorem,	L3	C02					
18		Tutorial-3	L3	C02					
19		Regular and Non-Regular Languages-	L2	C02					
20		Closure properties of Regular Languages,	L3	C02					
21		Pigeonhole Principle, Pumping Lemma,	L3	C02					
22		Application of Pumping Lemma, Decidability- Decision properties,	L3	C02					
23		Finite Automata and Regular Languages	L3	C02					
24		Tutorial-4	L3	C02					
25		III	Context Free Grammar(CFG)-Definition,	L3	C03				
26			Derivations, Languages	L3	C03				
27	Derivation Trees and Ambiguity		L3	C03					

28		Regular Grammars-Right Linear and Left Linear grammars	L3	C03				
29		Conversion of FA into CFG	L3	C03				
30		Tutorial-5	L3	C03				
31		Regular grammar into FA	L3	C03				
32		Simplification of CFG, Normal Forms-Chomsky Normal Form(CNF)	L3	C03				
33		Greibach Normal Form (GNF),	L3	C03				
34		Chomsky Hierarchy	L3	C03				
35		Programming problems based on the properties of CFGs	L3	C03				
36		Tutorial 6	L3	C03				
37	IV	Nondeterministic Pushdown Automata (NPDA)- Definition,	L3	C04				
38		Moves, A Language Accepted by NPDA	L3	C04				
39		Deterministic Pushdown Automata(DPDA)	L3	C04				
40		Deterministic Context free Languages(DCFL)	L3	C04				
41		Pushdown Automata for Context Free Languages,	L3	C04				

42	V	Revision Class 1	L3	C04				
43		Tutorial 7	L3	C04				
44		Context Free grammars for Pushdown Automata	L3	C04				
45		Two stack Pushdown Automata	L3	C04				
46		Pumping Lemma for CFL,	L3	C04				
47		Closure properties of CFL, Decision Problems of CFL,	L3	C04				
48		Programming problems based on the properties of CFLs.	L3	C04				
49		Revision Class 2	L3	C04				
50		Tutorial-8	L3	C04				
51		Basic Turing Machine Model, Representation of Turing Machines	L3	C05				
52	Language Acceptability of Turing Machines,	L3	C05					
53	Techniques for Turing Machine Construction.	L3	C05					
54	Modifications of Turing Machine, Turing Machine as Computer of Integer Functions	L3	C05					

55	Universal Turing machine, Linear Bounded Automata	L3	C05					
56	Revision Class 3	L2	C05					
57	Tutorial-9	L2	C05					
58	Church's Thesis	L2	C05					
59	Recursive and Recursively Enumerable language	L3	C05					
60	Halting Problem	L3	C05					
61	Post's Correspondance Problem	L3	C05					
62	Introduction to Recursive Function Theory	L2	C05					
63	Revision Class 4	L3	C05					
64	Tutorial-10	L3	C05					
65	Revision Class 5							
66	Revision Class 6							
67	Revision Class 7							
68	Revision Class 8							
69	Revision Class 9							
70	Revision Class 10							

Class Test	Syllabus
CT-01	Class 1-Class 35
PRE-AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**

L1 - Remembering; L2 - Understanding; L3 - Applying; L4 - Analysing; L5 - Evaluating; L6 - Creating

Text Books:

T1 K. L. P. Mishra and N. Chandrashekar, " Theory of Computer Science: Automata, Languages and Computation ", PHI Publication.

T2. Peter Linz, "An Introduction to Formal Languages and Automata", Wordpress.

Faculty Sign

HOD's Sign

LESSON PLAN DETAILS

Semester: IV	Section: B	Course Code: BCS 403	Contact Hours /week: 5
Course name: Object Oriented Programming using JAVA			# of credits: 4
Teacher's name: Prof. (Dr.) Roop Ranjan			Designation: Professor
Sessional Marks:30		End Semester Examination Marks:70	University Exam Hours: 3

Prerequisites if any:	Basic Knowledge of Computer Programming , compilation,debugging.
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Content delivery methods:	By Face to face delivery, Presentation, Tutorial, Chalk and Board, PPT and Video Lectures, etc.
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COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	<p>Introduction: Why Java, History of Java, JVM, JRE, Java Environment, Java Source File Structure, and Compilation. Fundamental,</p> <p>Programming Structures in Java: Defining Classes in Java, Constructors, Methods, Access Specifiers, Static Members, Final Members, Comments, Data types, Variables, Operators, Control Flow, Arrays & String.</p> <p>Object Oriented Programming: Class, Object, Inheritance Super Class, Sub Class, Overriding, Overloading, Encapsulation, Polymorphism, Abstraction, Interfaces, and Abstract Class.</p> <p>Packages: Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages, Import and Static Import Naming Convention for Packages</p>	16	CO1

2	<p>Exception Handling: The Idea behind Exception, Exceptions & Errors, Types of Exception, Control Flow in Exceptions, JVM Reaction to Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Un-Checked Exceptions.</p> <p>Input /Output Basics: Byte Streams and Character Streams, Reading and Writing File in Java.</p> <p>Multithreading: Thread, Thread Life Cycle, Creating Threads, Thread Priorities, Synchronizing Threads, Inter-thread Communication.</p>	12	C02
3	<p>Java New Features: Functional Interfaces, Lambda Expression, Method References, Stream API Default Methods, Static Method, Base64 Encode and Decode, For-Each Method, Try-with resources, Type Annotations, Repeating Annotations, Java Module System, Diamond Syntax with Inner Anonymous Class, Local Variable Type Inference, Switch Expressions, Yield Keyword, TextBlocks, Records, Sealed Classes</p>	11	C03
4	<p>Java Collections Framework: Collection in Java, Collection Framework in Java, Hierarchy of Collection Framework, Iterator Interface, Collection Interface, List Interface, ArrayList, LinkedList, Vector, Stack, Queue Interface, Set Interface, HashSet, Linked HashSet, SortedSet Interface, TreeSet, Map Interface, HashMap Class, Linked HashMap Class, TreeMap Class, Hashtable Class, Sorting, Comparable Interface, Comparator Interface, Properties Class in Java.</p>	10	C04
5	<p>Spring Framework: Spring Core Basics-Spring Dependency Injection concepts, Spring Inversion of Control, AOP, Bean Scopes-Singleton, Prototype, Request, Session, Application, Web Socket, Auto wiring, Annotations, Life Cycle Call backs, Bean Configuration styles</p> <p>Spring Boot: Spring Boot Build Systems, Spring Boot Code Structure, Spring Boot Runners, Logger, BUILDING RESTFUL WEB SERVICES, Rest Controller, Request Mapping, Request Body, Path Variable, Request Parameter, GET, POST, PUT, DELETE APIs, Build Web Applications</p>	11	C05

COURSE OUTCOMES: At the end of the Course, the Student will be able to:

C01	Understand the Programming structures in JAVA, Object Oriented Programming and Packages.
C02	Implement exception handling, file handling, and multi-threading in Java
C03	Apply new java features to build java programs.
C04	Analyze java programs with Collection Framework
C05	Understand web and RESTful Web Services with Spring Boot using Spring Framework concepts

Mapping of CO v/s PO:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2	2	1	1	-	-	-	-	-	-	1
C02	3	2	2	1	1	-	-	-	-	-	-	1
C03	3	2	2	1	1	-	-	-	-	-	-	1
C04	3	2	2	1	1	-	-	-	-	-	-	1
C05	3	2	2	1	1	-	-	-	-	-	-	1
Average	3	2	2	1	1	-	-	-	-	-	-	1

	PSO1	PSO2	PSO3
C01	2	2	2
C02	2	2	2
C03	2	2	2
C04	2	2	2
C05	2	2	2
Average	2	2	2

Correlation levels: 1-Slight (Low)

2-Moderate (Medium)

3-Substantial (High)

Gap in the syllabus	There is a CO-PO mapping wise gap in the curriculum.
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Topics to be covered beyond syllabus	Bridge topics which are help to solve different competitive Exam such as GATE, IES and State AE etc.
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LESSON PLAN

Lecture	Module	Scheduled			Conducted			
		Topic	*RBT Levels	C O Mapping	Date	Topic	Date	No. Of Students
1	I	Introduction: Why Java, History of Java,	L2	CO1				
2		JVM, JRE, Java Environment	L2					
3		Source File Structure and Compilation. Fundamental,	L2					
4		Programming Structures in Java: Defining Classes in Java,	L2					
5		Constructors, User defined Methods	L2					
6		Access Specifies, Static Members, Final Members,	L2					
7		Comments, Data types, Variables	L2					
8		Operators, Control Flow, Arrays & String.	L2					
9		Tutorial 1						
10		Class, Object, Inheritance Super Class, Sub Class	L2					
11		Method Overriding, Method Overloading,	L2					
12		Encapsulation, Polymorphism	L2					

13		Abstraction, Interfaces, and Abstract Class	L2					
14		Packages: Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages,	L2					
15		import and Static Import Naming Convention for Packages	L2					
16		Tutorial 2						
17	II	Exception Handling: The Idea behind Exception, Exceptions & Errors,	L2	CO2				
18		Types of Exception, Control Flow in Exceptions,	L3					
19		JVM Reaction to Exceptions, Use of try, catch, finally,	L2					
20		throw, throws in Exception Handling,	L3					
21		In-built and User Defined Exceptions Checked and Un-Checked Exceptions.	L2					
22		Tutorial 3						
23		Input /Output Basics: Byte Streams and Character Streams,	L3					
24		Reading and Writing File in Java.	L3					
25		Multithreading: Thread, Thread Life Cycle,	L3					
26		Creating Threads, Thread Priorities,	L3					
27	Synchronizing Threads, Inter-thread Communication.	L3						
28	Tutorial 4							
29		Java New Features: Functional Interfaces, Lambda Expression,	L2					

30	III	Method References, Stream API, Default Methods, Static Method,	L3	C03					
31		Base64 Encode and Decode, For-Each Method,	L3						
32		Try-with resources, Type Annotations, Repeating Annotations,	L3						
33		Java Module System,	L2						
34		Tutorial 5							
35		Diamond Syntax with Inner Anonymous Class,	L2						
36		Local Variable Type Inference,	L3						
37		Switch Expressions, Records, Sealed Classes	L3						
38		Yield Keyword, TextBlocks,	L2						
39		Tutorial 6							
40	IV	Java Collections Framework: Collection in Java, Collection Framework in Java,	L2	C04					
41		Hierarchy of Collection Framework, Iterator Interface,	L2						
42		Collection Interface, List Interface, ArrayList,	L4						
43		Vector, Stack, Queue Interface, Set Interface	L4						
44		Tutorial 7							
45		HashSet, LinkedHashSet, SortedSet Interface, TreeSet,	L4						
46		Map Interface, HashMap Class, LinkedHashMap Class,	L4						
47		TreeMap Class, Hashtable Class, Sorting,	L4						
48	Comparable Interface, Comparator Interface,	L4							

		Properties Class in Java						
49		Tutorial 8						
50	v	Spring Core Basics-Spring Dependency Injection concepts	L2	C05				
51		Spring Inversion of Control, AOP, Bean Scopes- Singleton	L2					
52		Prototype, Request, Session, Application, Web Socket,	L2					
53		Autowiring, Annotations, Life Cycle Call backs, Bean Configuration styles	L2					
54		Tutorial 9						
55		Spring Boot: Spring Boot Build Systems, Spring Boot Code Structure	L2					
56		Spring Boot Runners, Logger,	L2					
57		BUILDING RESTFUL WEB SERVICES, Rest Controller,	L2					
58		Request Mapping, Request Body, Path Variable, Request Parameter,	L2					
59		GET, POST, PUT, DELETE APIs, Build Web Applications	L2					
60	Tutorial 10							

Class Test	Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**

L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

References:

Text books : (As per University / Board syllabus)

T1. Herbert Schildt, "Java The complete reference", McGraw Hill Education.

T2. Craig Walls, "Spring Boot in Action", Manning Publication.

Faculty Sign

Program Head

LESSON PLAN DETAILS

Semester: IV	Section: E	Course Code: BCC402	Contact Hours /week: 4
Course Name: Python Programming			# of credits:2
Faculty name:Mr. Shashank Kumar Srivastav			Designation: Assistant Professor
Sessional Marks:30		End Semester Examination Marks:70	University Exam Hours: 3
Prerequisites if any:			
Program			

Content delivery methods:	Marker and Board, PPT and Video Lectures
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COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	Introduction to Python: Python variables, Python basic Operators, Understanding python blocks. Python Data Types, Declaring and using Numeric data types: int, float etc.	07	C01
2	Python Program Flow Control Conditional blocks: if, else and else if, Simple for loops in python, For loop using ranges, string, list and dictionaries. Use of while loops in python, Loop manipulation using pass, continue, break and else. Programming using Python conditional and loop blocks.	09	C02
3	Python Complex data types: Using string data type and string operations, Defining list and list slicing, Use of Tuple data type. String, List and Dictionary, Manipulations Building blocks of python programs, string manipulation methods, List manipulation. Dictionary manipulation, Programming using string, list and dictionary in-built functions. Python Functions, Organizing python codes using functions.	20	C03
4	Python File Operations: Reading files, Writing files in python, Understanding read functions, read(), readline(), readlines(). Understanding write functions, write() and writelines() Manipulating file pointer using seek Programming, using file operations	12	C04
5	Python packages: Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. GUI Programming: Tkinter introduction, Tkinter and PythonP rogramming, Tk Widgets, Tkinter examples. Python programming with IDE.	12	C05

COURSE OUTCOMES: At the end of the Course, the Student will be able to:

C01	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
C02	Express proficiency in the handling of strings and functions
C03	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
C04	Identify the commonly used operations involving file systems and regular expressions.
C05	Develop simple Python applications using built-in functions of standard libraries such as NumPy, Pandas, and Matplotlib, and design basic GUI-based programs using Tkinter and a Python IDE.

Mapping of CO v/s PO:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
C01	2	2	2	2	-	-	-	-	-	-	-	2
C02	2	2	2	2	-	-	-	-	-	-	-	2
C03	2	2	2	2	-	-	-	-	-	-	-	2
C04	2	2	2	2	-	-	-	-	-	-	-	2
C05	2	2	2	2	-	-	-	-	-	-	-	2
Average	2	2	2	2	-	-	-	-	-	-	-	2

Mapping of CO v/s PSO:

	PS01	PS02	PS03
C01	2	2	1
C02	2	2	1
C03	2	2	1
C04	2	2	1
C05	2	2	1
Average	2	2	1

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Topics to be covered beyond syllabus	NA
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LESSON PLAN

Lecture	Module	Scheduled				Conducted			
		Topic	*RBT Levels	C O Mapping	Date	Topic	Date	No. Of Students	Faculty Sign
1	I	Introduction about COs & POs related to the course and Introduction to subject							
2		Python variables	L2						

3		Python basic Operators	L2					
4		Understanding python blocks	L2					
5		Elements of Python, Type Conversion	L2					
6		Python Data Types	L2					
7		Declaring and using Numeric data types: int, float etc	L2					
8		if, else and else if	L2					
9		Simple for loops in python	L2					
10		For loop using ranges	L2					
11		string, list and dictionaries	L2					
12		Use of while loops in python	L2					
13	II	Loop manipulation using pass	L2					
14		continue	L2					
15		break and else	L2					

16		Programming using Python conditional and loop blocks	L2					
17	III	String	L2					
18		String	L2					
19		String	L2					
20		Strings : Length of the string	L2					
21		Perform Concatenation and Repeat operations in it	L2					
22		Indexing and Slicing of Strings	L2					
23		List and Dictionary	L2					
24	Manipulations Building blocks of python programs	L2						
25	string manipulation methods.	L2						
26	List manipulation	L2						
27	Dictionary manipulation	L2						
28	Programming using string	L2						
29	list and dictionary in-built functions	L2						
30	Python Functions	L2						

31		Organizing python codes using functions	L2					
32		Reading files	L2					
33		Writing files in python, Understanding read functions	L2					
34		read(), readline(), readlines()	L2					
35	IV	Understanding write functions	L2					
36		write() and writelines() Manipulating file pointer using seek Programming	L2					
37	V	using file operations	L2					
38		Simple programs using the built-in functions of packages matplotlib	L2					
39		numpy, pandas etc	L2					
40		GUI Programming:	L2					
41		Tkinter introduction	L2					
42		Tkinter and Python Programming	L2					
43		Tk Widgets	L2					
44		Tkinter examples	L2					
45		Python programming with IDE	L2					

Class Test	Syllabus
CT-01	Class 1-Class 23
PRE-AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**

L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

TextBooks:

T1. Ashok Namdev Kamthane, Amit Ashok Kamthane- Programming and Problem Solving with PYTHON, Mc Graw Hill, 2019.

T2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Faculty Sign

Program Head's

LESSON PLAN

Semester: I	Section:	Course Code: BAS401	Contact Hours / week: 2
Course Name: Technical Communication			# of credits: 3
Teacher's Name: Mr. Ashutosh Srivastava			Designation: Assistant Professor
Sessional Marks: 30		End Semester Examination Marks: 70	University Exam Hours: 3

Prerequisites if any:
NA

Content delivery methods:	By Face to face delivery, Presentation, Tutorial etc.
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COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	Fundamentals of Technical Communication: Technical Communication: Features; Distinction between General and Technical Communication; Language as a tool of Communication; Dimensions of Communication: Reading & comprehension; Technical writing: sentences; Paragraph; Technical style: Definition, types & Methods; The flow of Communication: Downward; upward, Lateral or Horizontal; Barriers to Communication.	5	CO1
2	Forms of Technical Communication: Technical Report: Definition & importance; Thesis/Project writing: structure & importance; synopsis writing: Methods; Technical research Paper writing: Methods & style; Seminar & Conference paper writing; Expert Technical Lecture: Theme clarity; Analysis & Findings; 7 Cs of effective business writing: concreteness, completeness, clarity, conciseness, courtesy, correctness, consideration, C.V./Resume writing; Technical Proposal: Types, Structure & Draft.	6	CO2
3	Technical Presentation: Strategies & Techniques Presentation: Forms; interpersonal Communication; Class room presentation; style; method; Individual conferencing: essentials: Public Speaking: method; Techniques: Clarity of substance; emotion; Humour; Modes of Presentation; Overcoming Stage Fear; Audience Analysis & retention of	7	CO3

1	I	Technical Communication: Features; Distinction between General and Technical Communication; Language as a tool of Communication	L2	CO 1					
2		Dimensions of Communication; Reading & Comprehension	L2						
3		Technical writing: Sentences; Paragraph; Technical style: Definition, Types & Methods	L2						
4		The Flow of Communication: Downward; Upward, Lateral or Horizontal	L2						
5		Barriers to Communication	L2						
6	II	Technical Report: Definition & importance; Thesis/Project Writing: Structure & Importance	L2	CO 2					
7		Synopsis Writing: Methods; Technical Research Paper Writing: Methods & Style	L2						
8		Seminar & Conference Paper Writing	L2						
9		Key-Note Speech: Introduction & Summarization	L2						
10		Expert Technical Lecture: Theme Clarity; Analysis & Findings	L2						
11		7 Cs of Effective Business Writing: Concreteness, Completeness, Clarity, Conciseness, Courtesy, Correctness, Consideration.	L2						
12	II I	Presentation: Forms; Interpersonal Communication; Class Room Presentation; Style; Method	L2	CO 3					
13		Individual conferencing: Essentials	L2						
14		Public Speaking: Method	L2						

15		Techniques: Clarity of Substance;	L2					
16		Modes of Presentation; Overcoming Stage Fear: Confident Speaking						
17		Audience Analysis & Retention of Audience Interest; Methods of Presentation: Interpersonal	L2					
18		Methods of Presentation: Impersonal; Audience Participation: Quizzes & Interjections.	L2					
19	I V	Interview Skills	L2	CO 4				
20		Group Discussion: Objective & Method	L2					
21		Seminar/Conferences Presentation Skills: Focus; Content; Style	L2					
22		Argumentation skills: Devices: Analysis	L2					
23		Cohesion & Emphasis; Critical Thinking; Nuances: Exposition narration & Description	L2					
24		Discourse Competence: combination of expression & conclusion; Socio-linguistic Competence	L2					
25		Strategic Competence: Solution of communication problems with verbal and non verbal means	L2					
26		Kinesics: Definitions; Importance; Features of Body Language.	L2					
27	V	Voice Modulation: Quality, Pitch	L2	CO 5				
28		Rhythm; intonation; Pronunciation; Articulation	L2					

29	Stress & Accent	L2						
30	Linguistic Features Of Voice Control: Vowel & Consonant Sounds.	L2						

Class Test	Syllabus
CT - 01	Class 1 - Class 7
CT - 02	Class 8 - Class 18
PRE - AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**

L1 - Remembering; L2 - Understanding; L3 - Applying; L4 - Analysing; L5 - Evaluating; L6 - Creating

Literature

Text Books:

- T1)** Technical Communication: Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.
- T2)** Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
- T3)** Spoken English- A Manual of Speech and Phonetics by R.K.Bansal & J.B.Harrison, Orient Blackswan, 2013, New Delhi.
- T4)** Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.

Reference Books:

- R1)** Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2014, Delhi.
- R2)** Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.
- R3)** A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication, Delhi.
- R4)** Skills for Effective Business Communication by Michael Murphy, Harvard University, U.S.
- R5)** Business Communication for Managers by Payal Mehra, Pearson Publication, Delhi

**Faculty Sign
Sign**

Program Head's

LESSON PLAN

Semester: IV	Section: B	Course Code: BOE 404	Contact Hours /week: 5
Course name: Energy science & Engineering			# of credits: 3
Teacher's name: Mr. Nitin Tripathi			Designation: AP
Sessional Marks:30		End Semester Examination Marks:70	University Exam Hours: 3

Prerequisites if any:
Mathematics, Basic Thermodynamics, Fluid Mechanics

Content delivery methods:	By Face to face delivery, Presentation, Tutorial etc.
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COURSE SYLLABUS (as prescribed by University / Board)

Module No	UNIT Contents	Hours	COs
1	ENERGY AND ITS USAGE: Units and scales of energy use, Mechanical energy and transport, Heat energy: Conversion between heat and mechanical energy, Electromagnetic energy: Storage, conversion, transmission and radiation, Introduction to the quantum, energy quantization, Energy in chemical systems and processes, flow of CO ₂ , Entropy and temperature, carnot and Stirling heat engines, Phase change energy conversion, refrigeration and heat pumps, Internal combustion engines, Steam and gas power cycles, the physics of power plants. Solid-state phenomena including photo, thermal and electrical aspects	19	CO1
2	NUCLEAR ENERGY: Fundamental forces in the universe, Quantum mechanics relevant for nuclear physics, Nuclear forces, energy scales and structure, Nuclear binding energy systematic, reactions and decays, Nuclear fusion, Nuclear fission and fission reactor physics, Nuclear fission reactor design, safety, operation and fuel cycles	12	CO2
3	SOLAR ENERGY: Introduction to solar energy, fundamentals of solar radiation and its measurement aspects, Basic physics of semiconductors, Carrier transport, generation and recombination in semiconductors, Semiconductor junctions: metal-semiconductor junction & p-n junction, Essential characteristics of solar photovoltaic devices, First Generation Solar Cells, Second Generation Solar Cells, Third Generation Solar Cells	12	CO3

4	CONVENTIONAL & NON-CONVENTIONAL ENERGY SOURCE: Biological energy sources and fossil fuels, Fluid dynamics and power in the wind, available resources, fluids, viscosity, types of fluid flow, lift, Wind turbine dynamics and design, wind farms, Geothermal power and ocean thermal energy conversion, Tidal/wave/hydro power	13	C04
5	SYSTEMS AND SYNTHESIS: Overview of World Energy Scenario, Nuclear radiation, fuel cycles, waste and proliferation, Climate change, Energy storage, Energy conservation. Engineering for Energy conservation: Concept of Green Building and Green Architecture; Green building concepts, LEED ratings; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy Audit of Facilities and optimization of energy consumption	15	C05

COURSE OUTCOMES: At the end of the Course, the Student will be able to:

C01	Understand the Units and scales of energy use, Mechanical energy and transport, Heat energy and Solid-state phenomena including photo, thermal and electrical aspects
C02	Understand the Fundamental forces in the universe, Quantum mechanics relevant for nuclear science
C03	Understand the Introduction to solar energy, fundamentals of solar radiation and its measurement aspects, Basic physics of semiconductors, first Generation Solar Cells, Second Generation Solar Cells, Third Generation Solar Cells
C04	Understand the Conventional & non-conventional energy source
C05	Understand the Systems and Synthesis, concept of Green Building and Green Architecture, Energy Audit of Facilities and optimization of energy consumption

Mapping of CO v/s PO:

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
C01	3	2	3	-	-	-	-	-	-	-	2	-
C02	3	2	3	-	-	-	-	-	-	-	2	-
C03	3	2	3	-	-	-	-	-	-	-	2	-
C04	3	2	3	-	-	-	-	-	-	-	2	-
C05	3	2	3	-	-	-	-	-	-	-	2	-
Average	3	2	3					-			2	

	PS01	PS02	PS03
C01	2	1	-
C02	2	1	-

C03	2	1	-
C04	2	1	-
C05	2	1	-
Average	2	1	

Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Gap in the syllabus	NA
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Topics to be covered beyond syllabus	NA
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LESSON PLAN

Lecture	Module	Scheduled				Conducted			
		Topic	*RBT Levels	C O Mapping	Date	Topic	Date	No. Of Students	Faculty Sign
1	I	Energy and its Usage: Units and scales of energy use	L2	CO1					
2		Mechanical energy and transport	L2						
3		Heat Energy	L2						
4		Electromagnetic energy: Storage	L2						
5		conversion, transmission and radiation	L2						
6		Introduction to the quantum, energy quantization	L2						
7		Energy in chemical systems and processes	L2						
8		flow of CO ₂ , Entropy and temperature	L2						
9		Tutorial- 1							
10		Carnot and Stirling heat engines	L3						
11		Phase change energy conversion	L3						
12		refrigeration and heat pumps	L3						
13		Internal combustion engines	L3						

14		Steam and gas power cycles	L3					
15		The physics of power plants. Solid-state phenomena including photo	L2					
16		Carnot and Stirling heat engines	L3					
17		Phase change energy conversion	L2					
18		thermal and electrical aspects	L2					
19		Tutorial-2						
20	II	Nuclear Energy: Fundamental forces in the universe	L2	C02				
21		Quantum mechanics relevant for nuclear physics	L2					
22		Nuclear forces	L2					
23		energy scales and structure	L2					
24		Tutorial-3	L2					
25		Nuclear binding energy systematic	L2					
26		reactions and decays, Nuclear fusion	L2					
27		Nuclear fission and fission reactor physics	L3					
28		Nuclear fission reactor design, safety operation and fuel cycles	L2					
29		Nuclear fission reactor design	L3					

30		safety, operation and fuel cycles	L2						
31		Tutorial-4							
32	III	Solar Energy: Introduction to solar energy	L2	C03					
33		fundamentals of solar radiation and its measurement aspects	L2						
34		Basic physics of semiconductors	L2						
35		Carrier transport	L2						
36		generation and recombination in semiconductors							
37		Tutorial-5	L2						
38		Semiconductor junctions: metal-semiconductor junction & p-n junction	L2						
39		Essential characteristics of solar photovoltaic devices	L2						
40		First Generation Solar Cells	L2						
41		Second Generation Solar Cells	L2						
42		Third Generation Solar Cells	L2						
43		Tutorial-6	L2						
44	IV	Conventional & non-conventional energy source: Biological energy sources and	L2	C04					
45		Fossil fuels, Fluid dynamics	L3						
46		power in the wind	L2						
47		available resources, fluids, viscosity	L2						

48		types of fluid flow, lift	L3					
49		Tutorial-7	L2					
50		Wind turbine dynamics and design	L2					
51		wind farms, Geothermal power	L2					
52		ocean thermal energy conversion	L2					
53		Tidal/wave energy	L2					
54		hydro power	L2					
55		hydro power significance	L2					
56		Tutorial-8						
57	v	Systems and Synthesis: Overview of World Energy Scenario	L2	CO5				
58		Nuclear radiation, fuel cycles	L2					
59		Nuclear radiation, fuel cycles	L2					
60		waste and proliferation	L2					
61		Climate change	L2					
62		Energy storage	L2					
63		Energy conservation. Engineering for Energy conservation	L2					
64		Tutorial-9	L2					
65		Concept of Green Building and Green Architecture						
66		Green building concepts, LEED ratings	L2					

67	Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates	L2					
68	Embodied energy analysis	L2					
69	use as a tool for measuring sustainability	L2					
70	Energy Audit of Facilities	L2					
71	Tutorial-10	L2					

Class Test	Syllabus
CT	Class 1-Class 30
PRE-AKTU	Full Syllabus

***Revised Bloom's Taxonomy (RBT) Levels:**

L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

Text Book:

1. Energy Science and Engineering- VEI Latest Edition 2023.
2. Energy and the Challenge of Sustainability, World Energy Assessment, New York, (2000).

Reference Books: (As per University / Board syllabus)

- R1-** Energy Science and Engineering- Dr. Umesh Rathore, S.K. Kataria & Sons.
- R2-** Energy Science and Engineering- Bhukya Laxman, LAP LAMBERT Academic Publishing.

Faculty Sign

Program Head's