KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
(An Autonomous Institute under Kakatiya University , Warangal)
(Approved by AICTE, New Delhi; Recognised by UGC under 2(f) & 12(B); Sponsored by EKASILA EDUCATION SOCIETY)
Opp : Yerragattu Gutta, Hasanparthy (Mandal), WARANGAL - 506 015, Telangana, INDIA.
काकतीय प्रैद्योगिकी एवं विज्ञान संस्थान, वरंगल - ५०६ ०१५
కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ – ౫౦౬ ౦౧౫
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech. CSE(AI&ML) - AUTONOMOUS –SCHEME (URR'18)

(*w.e.f. 2021-22*)

of

(III, IV, V, VI, VII & VIII SEMESTERS)

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE: WARANGAL-15

(*An Autonomous Institution under Kakatiya University*)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
KAKATIYA INSTITUTE OF TECHNOLOGY &SCIENCE:: WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTION & EVALUATION
III-SEMESTER OF 4-YEAR B.TECH DEGREE PROGRAM

[6Th+3P]

S.No	Category	Course Code	Course Title	Periods/week			Credits	Evaluation scheme				
				L	T	P	C	CIE			ESE	Total Marks
								TA	MSE	Total		
1	BSC	U18MH301	Engineering Mathematics – III	3	1	-	4	10	30	40	60	100
2	HSMC	U18MH302	Soft and Inter personal Skills	_	_	2	1	100	-	100	-	100
3	PCC	U18AI303	Object Oriented Programming through JAVA	3	1	-	4	10	30	40	60	100
4	PCC	U18AI304	Operating Systems	3	-	-	3	10	30	40	60	100
5	PCC	U18AI305	Computer Organization and Architecture	3	-	-	3	10	30	40	60	100
6	PCC	U18AI306	Advanced Data Structures	3	-	-	3	10	30	40	60	100
7	PCC	U18AI307	Formal Languages and Automata Theory	3	-	-	3	10	30	40	60	100
8	PCC	U18AI310	Object Oriented Programming through Java Laboratory	-	-	2	1	40	-	40	60	100
9	PCC	U18AI311	Advanced Data Structures Laboratory	_	_	2	1	40	-	40	60	100
			Total:	18	2	6	23	240	180	420	480	900

[L= Lecture, T = Tutorials, P = Practicals & C = Credits] Total Contact Periods/Week : 26Total Credits: 23

Stream-I: ME, CSE, IT, CSN,CSE(IOT) **Stream-II: CE, EIE, EEE, ECE, ECI,CSE(AI&ML)**

U18MH301 ENGINEERING MATHEMATICS-III

Class: B.Tech. III-Semester

Branch: Common to all branches

Teaching Scheme :

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on

LO1: Laplace transform and its use to find the solutions of certain initial and boundary value problems occur in engineering

LO2: Fourier series and its importance.

LO3: functions of complex variables and the property of analyticity of a function of complex variable and their applications.

LO4: integration of a function of complex variable, and evaluation of certain real integrals using complex analysis.

UNIT-I (9+3)

Laplace Transforms: Integral transforms, Kernel of a transform, Laplace transform of a function, Inverse Transform-Existence and uniqueness of Laplace Transforms, S- plane and regionofconvergence(ROC),LaplaceTransformofsomecommonlyusedsignals-Dirac-delta (impulse) function$[\delta(t)]$,step $[u(t)]$,ramp $[tu(t)]$,parabolic $[t^2u(t)]$,real exponential $[e^{at}u(t)]$, complex exponential$[e^{j\Omega t}u(t)]$,sine and cosine functions, damped sine and cosine functions, hyperbolic sine and cosine functions, damped hyperbolic sine and cosine functions, rectangular pulse and triangle. Properties of Laplace Transforms- Linearity, First shifting theorem (Frequency shift property), Laplace transforms of derivatives and integrals, time scaling property, time reversal property, Laplace Transform of Heaviside unit step function, Second shifting theorem (time shift property), Initial value and final value theorems, Laplace transform of periodic functions- Convolution theorem

Operational Calculus: Transfer functions, Solution of ordinary differential equations with constant coefficients and system of ordinary differential equations with constant coefficients using Laplace Transforms. Application of Laplace transforms to the first order and second order system subjected to impulse, step, periodic, rectangular, square, ramp, triangular and sinusoidal functions

UNIT-II (9+3)

Fourier Series: Periodic functions, orthogonal and orthonormal functions and systems of orthogonal functions, representation of a function as Trigonometric Fourier series (FS) in a range of length 2π, Euler formulae, Conditions for the existence of Fourier series (Dirichlet's conditions), FS for typical wave forms-square wave, pulse train, impulse train(comb function), periodic rectangular wave, triangle, saw tooth, half wave rectified signal, full wave rectified signal, plotting FS coefficients - line spectrum (magnitude and Phase spectra), Fourier series on an arbitrary period, effects of symmetry of function on FS coefficients, half range series – half range cosine and sine series expansions, exponential FS

UNIT-III (9+3)

Complex Variables: Functions of complex variables, Limit, Continuity, Differentiability, Analytic Functions, Cauchy-Riemann Equations in Cartesian and Polar coordinates. Elementary functions, Harmonic Functions, Construction of Analytic functions. Applications to find velocity potential and stream function of a flow. Conformal mapping and bilinear transformation

UNIT-IV (9+3)

Complex Integration: Line integration in complex plane, integral of a non analytic function, dependence on path of integration, *ML*-Inequality, Cauchy's integral theorem, Cauchy's integral formula, series expansion of complex functions: Taylor's series and Laurent's series, zeros and singularities, residues, Residue Theorem- Applications of Residue theorem to the properly chosen integrals around a unit circle and semicircle

Text Book:

1. Grewal, B.S., "Higher Engineering Mathematics", *Khanna Publishers,* Delhi, 43/e, 2014

Reference Books:

1. Kreyszig E., "Advanced Engineering Mathematics", *John Wiley & Sons, Inc.,* U.K 9/e,2013
2.Churchill R.V., "Complex Variable and its Applications", McGraw Hill, New York, 9/e,2013

Course Code: **U18MH301** Course Name: **ENGINEERING MATHEMATICS-III**		
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18MH301.1**	*find the Laplace transform of a given function and apply Laplace transforms to solve and certain differential equations whose solutions cannot be computed using classical methods.*
CO2	**U18MH301.2**	*describe a given function as Fourier series in an interval and understand its importance in engineering.*
CO3	**U18MH301.3**	*understand the concept of a function of complex variable and verify whether a function is analytic or not, construct analytic function when real/imaginary part of the function is known; find velocity potential and stream function of a fluid flow using complex analytical methods.*
CO4	**U18MH301.4**	*represent a given function in Taylor's and Laurent's series and evaluate certain real integrals using integral theorems.*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code:**U18 MH301** Course Name: **Engineering Mathematics-III**															
CO Code	**PO1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18MH301.1	2	2	--	--	--	--	--	--	--	--	--	1	1	--	1
U18MH301.2	2	2	--	--	--	--	--	--	--	--	--	1	1	--	1
U18MH301.3	2	2	--	--	--	--	--	--	--	--	--	1	1	--	1
U18MH301.4	2	1	--	--	--	--	--	--	--	--	--	1	1	--	1
U18MH301	**2**	**1.75**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**1**	**1**	**--**	**1**

U18TP302 SOFT AND INTERPERSONALSKILLS

Class: B. Tech IV semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	100 marks
End Semester Examination	-

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on….

LO1: logical construction of speech appropriate for the occasion and exhibiting team work LO2: acquiring spontaneity, presence of mind for effective communication

LO3: identifying, analyzing the theme of the topic and understanding presentation skills
LO4: communicating professionally and developing strategies in selecting career objectives in line with industry

LIST OF ACTIVITIES

Introduction

Activity 1	Team interaction
Activity 2	SWOT analysis
Activity 3	Debate
Activity 4	Group Discussion

Activity 5	Presentations through PPTs
Activity 6	Video Synthesis
Activity 7	Resume Writing
Activity 8	Email Etiquette

Activity9 : My interview Plan: Self Introduction &FAQs
Activity10 : "My Career Plan" Oral presentation
} Comprehensive Presentation

Text Books:

- Developing Communications Skills – Krishna Mohan & Meera Benerji
- Soft Skills -Alex.K
- Soft skills Cornerstone of Professional success – Raman &Meenakshi

References:

- https://onlinecourses.nptel.ac.in/noc19_hs20/preview
- https://onlinecourses.nptel.ac.in/noc18_hs30/preview

Course Outcomes (COs):

Course code: **U18TP302/U18TP402**		Course Name: **Soft and Interpersonal Skills**
CO	**CO code**	*Upon completion of this course, the student will be able to…*
CO1	**U18TP302.1**	*introspect to convert strengths into opportunities, identify weaknesses, bypass threats*
CO2	**U18TP302.2**	*present views on various issues confidently in a group*
CO3	**U18TP302.3**	*make effective PPT presentations, synthesize videos*
CO4	**U18TP302.4**	*prepare a professional resume, communicate effectively to attain better opportunities*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code:**U18TP302**								Course Name: **Soft and Interpersonal Skills**						
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 2**
U18TP302.1	-	-	-	-	-	-	-	-	2	3	-	-	1	1	1
U18TP302.2	-	-	-	-	-	-	-	2	3	3	-	-	1	1	1
U18TP302.3	-	-	-	-	-	-	-	-	2	3	-	-	1	1	1
U18TP302.4	-	-	-	-	-	-	-	1	2	3	-	-	1	1	1
U18TP302	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1.5**	**2.25**	**3**	**-**	**-**	**1**	**1**	**1**

U18AI303 OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Class: B.Tech. III- Semester
Branch: Computer Science and Engineering(AI & ML)

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in / on…
LO1: programming paradigms and java basics
LO2: classes, methods and strings
LO3: types of inheritance, dynamic method dispatch, interfaces and packages
LO4: streams (I/O), exception handling and multi-threading

UNIT - I (9+3)

Programming Paradigms: Procedural programming, Modular programming, Object oriented programming (OOP), Generic programming
Java Basics: History and evolution of Java, An overview of java, Data types, Variables and arrays, Operators, Control statements
Introducing Classes: Structures in C, Class fundamentals, Objects, Methods, Object reference variables

UNIT - II (9+3)

Classes and Methods: Overloading methods, *this* keyword, Passing and returning objects, Recursion, Variable length arguments, Constructors, Overloading constructors, Garbage collection, Static variables, Static blocks, Static methods, Nested and inner classes, Command line arguments, Wrapper classes
Strings: Exploring String, String Buffer, StringBuilder and String Tokenizer classes

UNIT - III (9+3)

Inheritance: Inheritance basics, Types of inheritance, *super* keyword, Method overriding, Order of constructors calling, Dynamic method dispatch, Abstract classes, *final* with inheritance, Object class
Interfaces: Defining an interface, Implementing interfaces, Nested interfaces, Interfaces can be extended
Packages: Packages, Packages and Member Access, Importing packages

UNIT - IV (9+3)

Using I/O: I/O basics, Reading, Writing and copying files using byte and character streams
Exception Handling: Fundamentals, Exception types, Uncaught exceptions, Using *try* and *catch*, Multiple catch clauses, Nested try statements, *throw*, *throws*, *finally*
Multithreading: Creating a thread, Creating multiple threads, Thread priorities, Synchronization, Inter thread communication

Text Book:

[1] Herbert Schildt, *Java The Complete Reference*, 11th ed., New Delhi: McGraw-Hill Education,2019

Reference Books:

[1] Kathy Sierra, BertBates, *HeadFirstJava*, 2nd ed., Boston: O'Reilly Publications, 2005
[2] Uttam K. Roy, *Advanced JAVA Programming*, England: Oxford Publications,2013
[3] Balaguruswamy, *Programming with Java: A Primer*, 6th ed., New Delhi: McGraw-Hill Education India Pvt. Ltd, 2019.
[4] Tanweer Alam, *Internet and Java Programming*, New Delhi: Khanna Publishing House, 2010

Course Research Papers: Research papers (Indexed Journal/Conference papers) relevant to the course content by the course faculty in Course Web page

Course Patents: Patents relevant to the course content will be posted by the course faculty in Course Web page

Course Projects: Course project is an independent project carried out by the student during the course period, the supervision of course faculty. Course faculty will post few course projects titles in Course Webpage. Students are encouraged to come up and experiment with the ideas that interest them

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1: distinguish various programming paradigms and develop java fundamental programs
CO2: develop java programs using classes, constructors and various string concepts
CO3: make use of reusability concepts like inheritance, dynamic method dispatch, interfaces and packages to build java programs
CO4: *develop java programs using streams (I/O), exception handling and multithreading concepts*

Course Articulation Matrix (CAM): U18AI303 OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18AI303.1	2	1	1	1	1	1	-	1	1	1	-	2	2	1	2
CO2	U18AI303.2	2	2	2	2	1	1	-	1	1	1	-	2	2	1	2
CO3	U18AI303.3	2	2	2	2	2	1	-	1	1	1	-	2	2	2	2
CO4	U18AI303.4	2	2	2	2	2	1	-	1	1	1	-	2	2	2	2
U18AI303		2	1.75	1.75	1.75	1.5	1	-	1	1	1	-	2	2	1.5	2

U18AI304 OPERATING SYSTEMS

Class: B.Tech. III-Semester **Branch:** Computer Science and Engineering (AI&ML)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: basics of operating system, system structure and process
LO2: cpu scheduling, process synchronization and deadlocks
LO3: main memory, virtual memory and mass-storages
LO4: protection techniques and advantages of distributed system

UNIT – I (9)

Introduction: What operating systems do, Computer system architecture, Operating system operations, Process management, Memory management, Storage management, Protection and security, Computing environments

Operating System Structures: Operating system services, System calls, Types of system calls, System programs, Operating system structure, System boot

Processes: Process concept, Process scheduling, Inter process communication

Case study: The Linux System

UNIT - II (9)

CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms– First come first served, Shortest job first, Priority, Round robin, Multilevel queue, Multilevel feedback queue

Process Synchronization: Background, The critical section problem, Petersons' solution, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Monitors

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock

UNIT - III (9)

Main Memory: Background, Swapping, Contiguous memory allocation, Segmentation, Paging

Virtual Memory: Background, Demand paging, Page replacement, Allocation of frames, Thrashing

Mass-Storage Structure: Overview of mass storage structure, Disk structure, Disk scheduling

UNIT - IV (9)

File-System Interface: File concept, Access methods, Directory and Disk Structure

File-System Implementation: Allocation methods, Free-space management

Protection: Goals of protection, Principles of protection, Domain of protection, Access matrix

Distributed Systems: Advantages of distributed systems, Types of network-based operating systems, Communication structure, Robustness

Text Book:

[1] Abraham Silberschatz, Peter B Galvin, Gerg Gagne, *Operating System Concepts*, 9th ed., United States of America: Wiley, 2016

Reference Books:

[1] EktaWalia, *Operating Systems*, 2nd ed., New Delhi: Khanna Publishing House, 2019.
[2] William Stalling, *Operating Systems*, 9th ed., United States of America: Person, 2018.
[3] Dhananjay M. Dhamdhere, *Operating Systems A Concept-Based Approach*, 3rd ed., New Delhi: McGraw Hill, 2017

[4] Andrew S. Tanenbaum, Herbert BOS, *Modern Operating Systems*, 4th ed., United States of America: Person, 2016.

Course Research Papers: Research papers (Indexed journals/conference papers) relevant to the course content will be posted by the course faculty in Course Web page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in Course Web page.

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in Course Web page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1:apply the fundamental concepts of operating system and processes to solve the essential problems related to operating systems
CO2: analyze cpu scheduling, process synchronization and deadlocks for effective management of processes
CO3: analyze the page replacement and disk scheduling algorithms for effective allocation of the memory
CO4: design the secured distributed systems using the concepts of protection methods and distributed systems

Course Articulation Matrix (CAM): U18AI304 OPERATING SYSTEMS																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18AI304.1	2	2	2	2	-	-	-	1	1	1	-	2	2	2	2
CO2	U18AI304.2	2	2	2	2	-	-	-	1	1	1	-	2	2	2	2
CO3	U18AI304.3	2	2	2	2	-	-	-	1	1	1	-	2	2	2	2
CO4	U18AI304.4	2	2	2	2	-	-	-	1	1	1	-	2	2	2	2
U18AI304		2	2	2	2	-	-	-	1	1	1	-	2	2	2	2

U18AI305 COMPUTER ORGANIZATION AND ARCHITECTURE

Class: B. Tech. III – Semester **Branch:** Computer Science and Engineering (AI & ML)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Examination	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: functional units of a computer, principle components and instruction set architecture

LO2: processing unit and computation of arithmetic operations

LO3: memory unit and data transfer between processor, memory & I/O

LO4: operations of high performance computing systems and GPU Computing

UNIT-I (9)

Basic Structure of Computers: Functional units, Basic operational concepts, Performance

Instruction Set Architecture: Memory locations and addresses, Memory operations, Instructions and instruction sequencing, Instruction formats, Addressing modes, Assembly language-Assembler directives

UNIT-II (9)

Basic Processing Unit: Fundamental concepts, Instruction execution, Hardware components, Instruction fetch and execution steps, Control signals, Hard-wired control, CISC-style processors

Arithmetic: Addition and subtraction of signed numbers, Multiplication of unsigned numbers, Multiplication of signed numbers, Fast multiplication, Integer division, Floating-point numbers and operations

UNIT-III (9)

The Memory System: Basic concepts, Semiconductor RAM memories-Internal organization of memory chips, Static memories, Dynamic RAMs; Read-only memories, Memory hierarchy, Cache memories, Performance considerations, Secondary storage

Input-Output Organization: Input-output interface- I/O bus and interface modules, I/O vs. memory bus, Isolated vs. memory-mapped I/O; Asynchronous data transfer- Strobe control, Handshaking, Asynchronous serial transfer

UNIT-IV (9)

Modes of Transfer: Modes of transfer, Priority interrupt, Direct memory access, Interconnection standards

Pipeline and Vector Processing: Parallel processing, Pipelining, Arithmetic pipeline, Instruction pipeline, Vector processing

Multi Processors: Characteristics of multiprocessors, Interconnection structures

GPU Computing: History, graphics processors, graphics processing units, GPGPUs. Clock speeds, CPU vs. GPU comparisons

Text Books:

[1] Carl Hamacher, ZvonkoVranesic, SafwatZaky, NaraigManjikian, *Computer Organization and Embedded Systems*, 6th ed., New Delhi: McGraw-Hill Education, 2012. *(Chapters 1, 2, 5, 7-9)*

[2] M. Morris Mano, *Computer System Architecture*, Revised 3rd ed., New Delhi: Pearson Education, 2019. *(Chapters 9, 10, 11, 12, 14)*

[3] David B. Kirk and Wen-mei W. Hwu, *Programming Massively Parallel Processors A Hands-on Approach*, 2nd ed., USA: Morgan Kaufmann is an imprint of Elsevier, 2013. *(Chapters 1, 2)*

Reference Books:

[1] B Ram, Sanjay Kumar, *Computer Fundamentals: Architecture and Organization*, 5th ed., New Delhi: New Age International Publishers, 2018.

[2] W. Stallings, *Computer Organization and Architecture - Designing for Performance*, 7th ed., New Delhi: Pearson Education, 2009.

[3] John P. Hayes, *Computer Architecture and Organization*, 3rd ed., New Delhi: McGraw-Hill Education, 1998.

[4] Vincent P. Heuring, Harry F. Jordan, *Computer Systems Design and Architecture*, 2nd ed., United States: Pearson Education, 2004.

Course Research Papers: Research papers (Journals/conference papers) relevant to the course content will be posted by the course faculty in Course Web page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in Course Web page.

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in Course Web page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1: analyze instruction formats and addressing modes of assembly language

CO2: *classify hardwired & CISC style processors and solve arithmetic operations using signed and unsigned integers*

CO3: *categorize cache memory mapping techniques and examine data transfer between processor, memory & I/O*

CO4: *analyze different modes of data transfer, classify interconnection structures and distinguish CPU vs. GPU architectures & computations*

Course Articulation Matrix (CAM): U18AI305 COMPUTER ORGANIZATION AND ARCHITECTURE

Course Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18AI305.1	2	2	2	1	-	1	1	1	-	1	-	1	1	1	1
CO2	U18AI305.2	2	2	2	2	-	1	1	1	-	1	-	1	1	1	1
CO3	U18AI305.3	2	2	2	2	-	1	1	1	-	1	-	1	2	1	1
CO4	U18AI305.4	2	2	2	2	-	1	1	1	-	1	-	1	2	1	1
U18AI305		2	2	2	1.75	-	1	1	1	-	1	-	1	1.5	1	1

U18AI306 ADVANCED DATA STRUCTURES

Class: B.Tech III-Semester **Branch:** Computer Science & Engineering (AI & ML)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on

LO1: representing the data with stacks, queues, circular single linked list and double linked list
LO2: organizing and retrieving the data using binary tree, binary search trees and AVL trees
LO3: organizing and retrieving the data using multi way search trees, Red-black trees and Splay trees
LO4: organizing and retrieving the data using spanning trees, searching, sorting and hashing

UNIT – I (9)

Stacks and Queues Extended: Multiple stacks, Deque, Priority queues
Linked Lists: Circular linked lists, Doubly linked lists, Circular doubly linked list and its Operations (Insertion, Deletion, Searching, and Traversal)

UNIT – II (9)

Binary Tree: Construction of binary tree using tree traversal results, Applications of trees
Binary Search Tree: Binary search tree operations- Insertion, Deletion, Search, Recursive and non-recursive traversal; Introduction to Threaded binary trees
AVL Trees: AVL trees operations– Insertion, Deletion and Traversal

UNIT - III (9)

Multiway Search Trees: Introduction tom-way search trees. Operations on B-Trees- Insertion, Deletion, Search; Introduction to B+-trees
Red-Black Trees: Properties, Operations, Applications, Splay trees

UNIT – IV (9)

Minimum Spanning Trees: Prim's algorithm, Kruskal's algorithm
Searching and Internal Sorting: Fibonacci search, Insertion sort, Radix sort
External sorting: Merge sort, Heap sort
Hashing: Introduction, Hash tables, Different hash functions, Collisions

Text Books:

[1] Reema Thareja, *Data Structures Using C,* 2nd ed., New Delhi: Oxford University Press, 2014. (*Chapters 6 to 15*)
[2] Debasis Samanta, *Classic Data Structures*, 2nd ed., New Delhi: Prentice Hall India, 2009. (*Chapters 3 to 8*)

Reference Books:

[1] E Balagurusamy, *Data Structure Using C,* 1st ed., New Delhi: McGraw Hill Education, 2017.
[2] Richard F. Gilberg and Behrouz A. Forouzan, *Data Structures: A Pseudo code Approach with C*, 2nd ed., New Delhi: Cengage Learning 2007.

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Course Patents: Patents relevant to the course content will be posted by the course faculty in Course Web page

Course Projects: Course project is an independent project carried out by the student during the course period, the supervision of course faculty. Course faculty will post few course projects titles in Course Webpage. Students are encouraged to come up and experiment with the ideas that interest them

Course Learning Outcomes(COs):

On completion of this course, students' will be able to

CO1: develop programs using stacks, queues, circular single linked list and double linked list
CO2: organize the data using non linear data structures such as binary trees, binary search trees and AVL trees
CO3: utilize balanced search trees such as B-trees, B+-trees, Red black and Splay trees in solving the problems
CO4: organize and retrieve the data using different types of spanning trees, searching, sorting and hashing techniques

Course Articulation Matrix (CAM):U18AI306 ADVANCED DATA STRUCTURES																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18AI306.1	2	2	2	2	1	1	-	1	1	1	-	1	2	2	2
CO2	U18AI306.2	2	2	2	2	1	1	-	1	1	1	-	1	2	2	2
CO3	U18AI306.3	2	2	2	2	1	1	-	1	1	1	-	2	2	2	2
CO4	U18AI306.4	2	2	2	2	1	1	-	1	1	1	-	2	2	2	2
U18AI306		2	2	2	2	1	1	-	1	1	1	-	1.5	2	2	2

U18AI307 FORMAL LANGUAGES AND AUTOMATA THEORY

Class: B.Tech. III-Semester **Branch:** Computer Science and Engineering (AI & ML)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge on/in…

LO1: formal notation for languages, finite automata and regular expressions
LO2: closure properties of regular languages, types of grammars and simplification of context-free grammar
LO3: normal forms for context-free grammars and equivalence of pushdown automata
LO4: turing machine, undecidable problems about turing machines and post's correspondence problem

UNIT – I (9)

Automata Theory: Introduction to finite automata, Structural representations and the central concepts of automata theory

Finite Automata: Deterministic finite automata, Non deterministic finite automata, Finite automata with epsilon transitions, Finite automata with output

Regular Expressions and Languages: Regular expressions, Finite automata and regular expressions, Applications of regular expressions, Optimization of deterministic finite automata based pattern matchers

UNIT – II (9)

Properties of Regular Languages: Proving languages not to be regular, Closure properties of regular languages, Equivalence and minimization of automata

Context-free Grammars and Languages: Chomsky classification of languages, Writing grammars, Context free grammars, Parse trees, Construction of syntax trees, Applications of context-free grammars, Ambiguity in grammars and languages, Using ambiguity grammars, Simplification of context-free grammars

UNIT – III (9)

Properties of Context-free Languages: Normal forms for context free grammars, Pumping lemma for context free languages, Closure properties of context free languages, Decision properties of context free languages

Pushdown Automata: Definition of the pushdown automaton, Deterministic pushdown automata, Languages of pushdown automata, Equivalence of pushdown automata and context free grammar

UNIT – IV (9)

Introduction to Turing Machines: Turing machine, Programming techniques for Turing machines, Extensions to the basic Turing machine

Undecidability:A language that is not recursively enumerable, An undecidable problem that is recursively enumerable, Undecidable problems about turing machines, Post's correspondence problem

Text Book:

[1] John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, *Introduction to Automata Theory, Languages and Computation*, 3rd ed., Hong Kong: Pearson Education Asia, 2013.

Reference Books:

[1] Mishra K. L. P, Chandrasekaran N, *Theory of Computer Science: Automata, Languages and Computation*, 3rd ed., New Delhi: PHI, 2012.
[2] Harry R. Lewis, Christos H. Papadimitriou, *Elements of the Theory of Computation*, 2nd ed., Hong Kong: Pearson Education Asia, 1998.
[3] Michael Sipser, *Introduction to the Theory of Computation*, 3rd ed., Boston: Cengage Learning, 2012.
[4] John Martin, *Introduction to Languages and the Theory of Computation*, 3rd ed., New York: McGraw-Hill, 2007.

Course Research Papers: Research papers (indexed Journals/conference papers) relevant to the course content will be posted by the course faculty in Course Web page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in Course Web page.

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course project titles in Course Web page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1: design finite automata and regular expressions
CO2: distinguish the given language is not regular and construct parse tree to simplify the grammar
CO3: examine the possible ways to convert the given context-free grammar into chomsky normal form or greibach normal form and design pushdown automata for the given language
CO4: design turing machine and examine possible solution for post's correspondence problem

Course Articulation Matrix (CAM): U18AI307 FORMAL LANGUAGES AND AUTOMATA THEORY

Course Outcome		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18AI307.1	3	3	2	2	-	-	-	1	1	1	-	2	2	1	2
CO2	U18AI307.2	2	2	2	2	-	-	-	1	1	1	-	2	2	1	2
CO3	U18AI307.3	3	2	3	3	-	-	-	1	1	1	-	3	3	1	3
CO4	U18AI307.4	3	3	3	3	-	-	-	1	1	1	-	3	3	1	3
U18AI307		2.75	2.5	2.5	2.5	-	-	-	1	1	1	-	2.5	2.5	1	2.5

U18AI310 OBJECT ORIENTED PROGRAMMING THROUGH JAVA LABORATORY

Class: B.Tech. III- Semester **Branch:** Computer Science and Engineering(AI & ML)

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in / on…

LO1: fundamentals of java
LO2: classes, methods and strings concepts
LO3: inheritance, dynamic method dispatch, interface and package concepts
LO4: streams (I/O), exception handling and multi-threading concepts

List of Experiments

Experiment-I (Unit-I)

1. Write a program to demonstrate different operators in java
2. Write a program to demonstrate control structures
3. Write a program to demonstrate switch statement

Experiment-II (Unit-I)

1. Write a program to read an array and display them using for-each control. Finally display the sum of array elements
2. Write a program to read a matrix and display whether it is an identity matrix or not. Use civilized form of break statement
3. Write a program to define a two-dimensional (2D) array where each row contains different number of columns. Display the 2D-array using for-each

Experiment-III (Unit-II)

1. Write a program to demonstrate class concept
2. Write a program to demonstrate *this* keyword
3. Write a program to demonstrate object reference variable
4. Write a program to demonstrate overloading of methods
5. Write a program to demonstrate passing and returning objects

Experiment-IV (Unit-II)

1. Write a program to demonstrate variable length argument (using array and ellipsis notation)
2. Write a program to demonstrate constructors and garbage collection
3. Write a program to demonstrate nested and inner classes
4. Write a program to demonstrate static variables, static methods, and static blocks

Experiment-V (Unit-II)

1. Read at least five strings from command line argument and display them in sorted order
2. Write a program to demonstrate wrapper class by reading N number of integers from command line and display their sum
3. Write a program to demonstrate wrapper class by reading N floating point numbers from command line and display their average

Experiment-VI (Unit-II)

1. Write a program to accept a string, count number of vowels and remove all vowels
2. Write a program to accept a string, count number of vowels and remove all vowels using StringBuffer class
3. Write a program to accept a line of text, tokenize the line using StringTokenizer class and print the tokens in reverse order

Experiment-VII (Unit-III)

1. Write a program to demonstrate single level-inheritance
2. Write a program to demonstrate multilevel-inheritance using super
3. Write a program to demonstrate method overriding

Experiment-VIII (Unit-III)

1. Write program to demonstrate dynamic method dispatch
2. Write a program to demonstrate use of abstract class
3. Write a program to demonstrate the use of overriding equals() method of an Object class

Experiment-IX (Unit-III)

1. Write a program to implement interfaces
2. Write a program to extend the interfaces
3. Write a program to demonstrate implementation of nested interfaces

Experiment-X (Unit-III)

1. Write a program to create a package, and demonstrate to import the package into any java program (Consider the behavior of all access specifiers)

Experiment-XI (Unit-IV)

1. Write a program to demonstrate try-catch-finally block
2. Write a program to demonstrate throw clause
3. Write a program to demonstrate throws clause
4. Write a program to demonstrate re-throw an exception, and finally block

Experiment-XII (Unit-IV)

1. Write a program to demonstrate read/write/copy a file using byte stream
2. Write a program to demonstrate read/write/copy a file using character stream
3. Write a program to create a thread (using Thread class or Runnable interface)
4. Write a program to demonstrate synchronization of threads
5. Write a program to demonstrate Inter thread communication

Laboratory Manual:

[5] *Object Oriented Programming through Java Laboratory Manual*, Dept. of CSE (AI & ML), KITSW.

Text Book:

[1] HerbertSchildt, *Java The Complete Reference*, 11th ed., New Delhi: McGraw-Hill Education,2019.

Reference Book:

[1] Kathy Sierra, BertBates, *HeadFirstJava*, 2nd ed., Boston: O'Reilly Publications, 2005.
[2] Uttam K. Roy, *Advanced JAVA Programming*, England: Oxford Publications,2013.
[3] Balaguruswamy, *Programming with Java: A Primer*, 6th ed., New Delhi: McGraw-Hill Education India Pvt. Ltd, 2019.
[4] TanweerAlam, *Internet and Java Programming*, New Delhi: Khanna Publishing House, 2010.

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1: develop java fundamental programs using operators, control structures and arrays
CO2: develop java programs using classes, constructors and various string concepts
CO3: make use of reusability concepts like inheritance, dynamic method dispatch, interfaces and packages to build java programs
CO4: *develop java programs using, streams (I/O), exception handling and multithreading concepts*

Course Articulation Matrix (CAM): U18AI310 OBJECT ORIENTED PROGRAMMING THROUGH JAVA LABORATORY

Course Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18AI310.1	2	1	1	1	1	1	-	1	2	1	-	2	2	1	2
CO2	U18AI310.2	2	2	2	2	1	1	-	1	2	1	-	2	2	1	2
CO3	U18AI310.3	2	2	2	2	2	1	-	1	2	1	-	2	2	2	2
CO4	U18AI310.4	2	2	2	2	2	1	-	1	2	1	-	2	2	2	2
U18AI310		2	1.75	1.75	1.75	1.5	1	-	1	2	1	-	2	2	1.5	2

U18AI311 ADVANCED DATA STRUCTURES LABORATORY

Class: B.Tech III-Semester **Branch:** Computer Science & Engineering (AI & ML)

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop student's knowledge in/on

LO1: representing the data with Multiple stacks, queues, circular single linked list and double linked list
LO2: organizing and retrieving the data using binary tree, binary search trees and AVL trees
LO3: organizing and retrieving the data using multiway search trees, B-trees
LO4: organizing and retrieving the data using DFS, BFS, searching and sorting techniques

List of Experiments

Experiment-I(UNIT-I)

1. Program to implement Multiple stack.

Experiment-II(UNIT-I)

2. Program to create circular single linked list and implement its operations
   i) insert ii) delete iii) traversal.

Experiment-III (UNIT-I)

3. Program to create double linked list and implement its operations
   i) insert ii) delete iii) traversal
4. Program to create circular double linked list and implement its operations
   i) insert ii) delete iii) traversal.

Experiment-IV (UNIT-II)

5. Program to perform following binary search tree operations.
   i) creation ii) insertion of a node iii) traversal using recursion.

Experiment-V(UNIT-II)

6. Program to perform following binary search tree operations.
   i) creation ii) deletion of a node iii) traversal using recursion.

Experiment-VI(UNIT-II)

7. Program to create a binary search tree operations
   i) creation ii) insertion of a node iii) traversal using non-recursion.

Experiment-VII (UNIT-II)

8. Program to implement AVL tree construction.

Experiment-VIII(UNIT-III)

9. Program to implement B-tree construction.

Experiment-IX(UNIT-IV)

10. Program to implement the following graph traversal techniques.
    a) Depth first search b) Breadth first search

Experiment-X(UNIT-IV)

11. Program to implement Fibonacci search.
12. Program to implement insertion sort.

Experiment-XI(UNIT-IV)

13. Program to implement Merge sort.
14. Program to implement radix sort.

Experiment-XII(UNIT-IV)

15. Program to implement heap sort.

Laboratory Manual:

[1] *Advanced Data Structures* laboratory manual, prepared by faculty of Dept. of Computer Science & Engineering.

Reference Books:

[1] Reema Thareja, *Data Structures Using C,* 2nd ed., New Delhi: Oxford University Press, 2014.
[2] E Balagurusamy, *Data Structure Using C*, 1st ed., New Delhi: McGraw Hill Education, 2017.

Course Research Papers: Research papers (Indexed Journal/Conference papers) relevant to the course content by the course faculty in Course Web page

Course Patents: Patents relevant to the course content will be posted by the course faculty in Course Web page

Course Projects: Course project is an independent project carried out by the student during the course period, the supervision of course faculty. Course faculty will post few course projects titles in Course Webpage. Students are encouraged to come up and experiment with the ideas that interest them

Course Learning Outcomes(COs):

On completion of this course, student's will be able to

CO1: develop multiple stack and various linked list programs
CO2: make use of the binary tree, binary search tree and AVL tree concepts in developing the programs
CO3: implement programs to manage the data using non-linear data structures concepts such as B-trees
CO4: develop applications using different methods of graph traversal, searching and sorting techniques

Course Articulation Matrix (CAM): U18AI311ADVANCE DATA STRUCTURES LABORATORY																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18AI311.1	2	2	2	2	2	1	-	1	2	1	-	1	2	2	2
CO2	U18AI311.2	3	3	3	2	2	1	-	1	2	1	-	1	2	2	2
CO3	U18AI311.3	3	2	3	2	2	1	-	1	2	1	-	1	2	2	2
CO4	U18AI311.4	2	3	2	2	2	1	-	1	2	1	-	1	2	2	2
U18AI311		2.5	2.5	2.5	2	2	1		1	2	1		1	2	2	2

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
KAKATIYA INSTITUTE OF TECHNOLOGY &SCIENCE:: WARANGAL – 15
(An Autonomous Institute under Kakatiya University, Warangal)

SCHEME OF INSTRUCTION & EVALUATION
IV-SEMESTER OF 4-YEAR B.TECH DEGREE PROGRAM

[5Th+4P+2MC]

Sl. No	Category	Course Code	Course Title	Periods/week			Credits	Evaluation scheme				
				L	T	P	C	CIE			ESE	Total Marks
								TA	MSE	Total		
1	OE	U18OE401	Open Elective-II	3	1	-	4	10	30	40	60	100
2	HSMC	U18TP402	Professional English	-	-	2	1	100	-	100	-	100
3	OE	U18OE403	Open Elective-I	3	-	-	3	10	30	40	60	100
4	PCC	U18AI404	Artificial Intelligence	3	-	-	3	10	30	40	60	100
5	PCC	U18AI405	Database Management Systems	3	1	-	4	10	30	40	60	100
6	PCC	U18AI406	Python Programming	3	-	-	3	10	30	40	60	100
7	PCC	U18AI407	Database Management Systems Laboratory	-	-	2	1	40	-	40	60	100
8	PCC	U18AI408	Python Programming Laboratory	-	-	2	1	40	-	40	60	100
9	OE	U18OE411	Open Elective-I based Laboratory	_	_	2	1	40	-	40	60	100
10	MC	U18MH415	Essence of Indian Traditional Knowledge	2	-	-	-	10	30	40	60	100
			Total:	17	2	8	21	280	180	460	540	1000
11	MC	U18CH416	Environmental Studies*	2	_	_	_	10	30	40	60	100

[L= Lecture, T = Tutorials, P = Practicals & C = Credits] **Total Contact Periods/Week: 27** **Total Credits: 21**

Open Elective-I:	Open Elective-II:	Open Elective-I based Lab:
U18OE403A: Object Oriented Programming (CSE) U18OE403B: Fluid Mechanics & Hydraulic Machines(CE) U18OE403C: Mechatronics (ME) U18OE403D: Web Programming (IT) U18OE403E: Microprocessors (ECE) U18OE403F: Strength of Materials (ME)	U18OE401A: Applicable Mathematics (MH) U18OE401B: Basic Electronics Engineering (ECE) U18OE401C: Elements of Mechanical Engineering (ME) U18OE401D: Measurements & Instrumentation (EIE) U18OE401E: Fundamentals of Computer Networks (CSE) U18OE401F: Renewable Energy Sources (EEE) U18OE401G: Essential Mathematics and Statistics for Machine Learning (MH)	U18OE411A: Object Oriented Programming Laboratory (CSE) U18OE411B: Fluid Mechanics & Hydraulic Machines Laboratory (CE) U18OE411C: Mechatronics Laboratory (ME) U18OE411D: Web Programming Laboratory (IT) U18OE411E: Microprocessors Laboratory (ECE) U18OE411F: Strength of Materials Laboratory (CE)

U18OE401A APPLICABLE MATHEMATICS

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme : **Examination Scheme:**

L	T	P	C
3	1	-	4

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in /on
LO1*: application of Fourier series to solve wave equation, heat conduction equation and Laplace equation*
LO2**:** *the methods of fitting curves by the method of least squares, statistical methods and probability distributions with applications to engineering disciplines.*
LO3**:** *finite difference operators; the concept of interpolation and numerical integration.*
LO4**:** *numerical methods and application to find numerical solutions of differential equations.*

UNIT-I (9+3)

Applications of Partial Differential Equations: Basic concepts of partial differential equations, classification of second order partial differential equations, solution of a partial differential equation, solution through the method of separation of variables.
Vibrating String: Wave equation and its solution by the method of separation of variables, D'Alembert's solution of wave equation, solutions of various boundary value problems based on vibrating string.
One Dimensional Heat Flow: Transient heat flow equation, heat flow through a bar of finite length with homogeneous and non homogeneous boundary conditions, heat flow through a bar with insulated ends.
Two Dimensional Heat Flow: Equation of two dimensional heat flow (Laplace's equation) under steady state / the electrostatic potential of electrical charges in any region that is free of these charges (problems based on Trigonometric FS only),solution of Laplace's equation in Cartesian and polar form, heat flow through infinite rectangular plates, finite square plate and semi circular and circular plates.

UNIT-II (9+3)

Statistics: Statistical data: Review of measures of central tendency and measures of dispersion, correlation coefficient, rank correlation, regression – Linear regression equations.
Curve Fitting: Method of least squares –fitting of (i) Straight line (ii) Second degree parabola
(iii) Exponential curves, most plausible solution of a system of linear algebraic equations.
Probability: Review of the concepts of probability, random variables, Discrete and continuous probability distributions, mean and variance of a distribution, Binomial distribution, Poisson distribution, and Normal distribution, fitting of these probability distributions to the given data.

UNIT-III (9+3)

Numerical Analysis: Finite differences and difference operators.
Interpolation: Newton's forward and backward interpolation formulae. Lagrange interpolation
Numerical Differentiation: First and second derivatives using forward and backward interpolation polynomials at the tabulated points.
Numerical Integration: Gaussian quadrature formula, Trapezoidal rule, Simpson's $1/3^{rd}$rule and Simpson's $3/8^{th}$ rule.

UNIT-IV (9+3)

Solution to System of Linear Equations: Gaussian elimination method, Jacobi Method and Guass-Siedel Iteration Method.

Numerical Solution of Algebraic and Transcendental Equations: Bisection method, Regula-Falsi method and Newton Raphson's method.

Numerical Solution of Ordinary Differential Equations: Taylor's method, Picard's method, Euler's method and Runge - Kutta methods of second and fourth order**.**

Text Book:

1. Grewal, B.S., "Higher Engineering Mathematics", *Khanna Publishers,* Delhi, 43/e,2014.

Reference Books:

1. Gupta and Kapoor, "Fundamentals of Mathematical Statistics", *Sulthan Chand and & sons,* New Delhi, 11thedition, 2010.
2. KreyszigE.,"AdvancedEngineeringMathematics",*JohnWiley&sons,Inc.,U.K.,*9th edition,2013.
3. Sastry S.S, "Introduction to numerical Analysis", *Prentice Hall of India Private Limited*, New Delhi.4thedition,2005.

Course Outcomes (COs):

Course Code: **U18OE401A** Course Name: **APPLICABLEMATHEMATICS**		
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18OE401A.1**	*solve wave equation, heat conduction equation and Laplace equation using Fourier series*
CO2	**U18OE401A.2**	*find correlation regression coefficients, fit curves using method of least squares for given data and apply theoretical probability distributions in decision making*
CO3	**U18OE401A.3**	*estimate value of a function by applying interpolation formulae*
CO4	**U18OE401A.4**	*apply numerical methods to solve simultaneous algebraic equations, differential equations, find roots of algebraic and transcendental equations*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code: **U18OE401A**															
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE401A.1	2	2	--	--	--	--	--	--	--	--	--	1	2	2	2
U18OE401A.2	2	2	--	--	--	--	--	--	--	--	--	1	2	2	2
U18OE401A.3	2	2	--	--	--	--	--	--	--	--	--	1	2	2	2
U18OE401A.4	2	2	--	--	--	--	--	--	--	--	--	1	2	2	2
U18OE401A	**2**	**2**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**1**	**2**	**2**	**2**

U18OE401B BASIC ELECTRONICS ENGINEERING

Class: B.Tech. IV Semester

Branch: Common to all branches

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives:

This course will develop student's knowledge on/in…

LO1: to *introduce the basic concepts of semiconductors and conductivity in semiconductors*

LO2: to *impart the knowledge on working of semiconductor diode as Rectifier*

LO3: to *make the students to understand the basic concepts of BJT &DC biasing concepts*

LO4: to *introduce the fundamental concepts and basic principles of special semiconductor devices.*

UNIT-I(9+3)

Introduction to Electronics:

Analog Signals (DC & AC), Sources (DC & AC), Digital Signals

Semiconductors:

Energy bands in solids, Concept of forbidden gap, Insulator, Metals and Semiconductors, Transport phenomenon in semiconductors: Mobility and conductivity, Intrinsic semiconductor, Donor and Acceptor impurities, Fermi level, Drift currents and Diffusion currents, Temperature dependence of conductivity, Hall Effect

UNIT-II(9+3)

Semiconductor Diode:

Junction, Band diagram, Depletion layer, V-I characteristics of P-N Diode, Diode resistance and capacitance, Avalanche and Zener breakdown mechanisms

Diode Circuits:

Rectifier circuits – Half wave, Full wave & Bridge rectifiers, Ripple factor with and without filters, Voltage regulation using Zener diode, Block diagram of DC adapter.

UNIT-III(9+3)

Bipolar Junction Transistor:

Physical structure, Transistor current components, CE, CB & CC configurations and their Input & Output characteristics

DC Analysis of BJT Circuits:

DC load line, Need for biasing, Transistor biasing techniques for CE configuration, Basic transistor applications: Switch and Amplifier.

UNIT-IV(9+3)

Field Effect Transistor:

Physical **s**tructure, Operation and Characteristics of a Junction Field Effect Transistor (JFET), MOSFET, DMOSFET,EMOSFET.

Special Semiconductor Devices:

Operation and Characteristics- Tunnel Diode, Schottky diode, Photo Diode, Photo Transistor, PIN Diode, LED, LASER, UJT.

Text Books:

1. Bhargava and Kulashresta, "Basic Electronics and Linear Circuits", *TTTI, TMH, India.*
2. S. Salivahanan and N. Suresh Kumar, "Electronic Devices and Circuits", *Tata McGraw Hill Education (India) Private* Ltd, 2nd Edition,2009.

Reference Books:

1. Jacob Millman, Christos C Halkias, "Electronic Devices and Circuits", 3/e, *TMH,* India.
2. David. A. Bell, "Electronic Devices and Circuits", *Oxford University Press,* New Delhi, India.
3. Neil storey, "Electronics: A systems Approach", *4/e-Pearson Education Publishing company Pvt. Ltd*, India

Course Outcomes (COs)

Course Code:**U18EC401B**		Course Name: **BASIC ELECTRONICSENGINEERING**
CO	**CO Code**	Upon completion of this course, the student will be able to..
CO1	**U18EC401B.1**	*Analyze the behavior of semiconductor devices*
CO2	**U18EC401B.2**	*Design half wave and full wave rectifier circuits with filters*
CO3	**U18EC401B.3**	*Characterize BJT configurations with input output characteristics and biasing techniques*
CO4	**U18EC401B.4**	*Acquire knowledge of new emerging areas of science and technology in differentiating semiconductor devices..*

Course Articulation Matrix (Mapping of COs with POs and PSOs)

Course Code:**U18EC401B**	Course Name: **BASIC ELECTRONICSENGINEERING**														
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18EC401B.1	2	2	1	2	-	-	-	-	-	-	-	-	2	-	1
U18EC401B.2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-
U18EC401B.3	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-
U18EC401B.4	2	2	1	2	-	-	-	-	-	-	-	2	2	-	1
U18EC401B	**2**	**2**	**1.5**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**-**	**1**

U18OE401C ELEMENTS OF MECHANICAL ENGINEERING

Class: B.Tech., IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation :	40 marks
End Semester Exam :	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on

LO1*: types of materials, design methodology and elements of power transmission*

LO2: *different manufacturing processes and their applications.*

LO3: *laws of thermodynamics and types of systems*

LO4: *principle and applications of SI & CIengines.*

UNIT- I (12)

Engineering Materials: Classification, properties and applications
Design Criterion: Discrete steps in engineering design process
Power Transmission: Classification; flat belt drives - length of open and cross belts, belt tensions and power transmitted; Gears-types and applications; spur gear-nomenclature
Bearings: Types – sliding& rolling contact bearings and applications;

UNIT- II (12)

Manufacturing Processes: Classification; Foundry- steps in sand casting process; pattern-types, materials and allowances, mould cross section, moulding sand-composition and properties; Machining: lathe machine-line diagram and operations; Welding-classification; principle of arc welding- AC and DC welding, principle of gas welding, principle of brazing and soldering;
Metal forming process: forging, rolling, extrusion.

UNIT- III (12)

Thermodynamics: System-types, state, property, process and cycle; Energy-property; Zeroth law, thermodynamic equilibrium, laws of perfect gases.
Law of Thermodynamics: First law- applied to a cycle, change of state, Internal energy, Enthalpy; Work and Heat in closed systems- Isobaric, Isochoric, Isothermal, Adiabatic and Polytropic; PMM-I, limitations of first law of thermodynamics.

UNIT- IV (12)

Second Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their equivalence; Carnot cycle, Carnot theorem, heat engine, heat pump and refrigerator; working principle of domestic air conditioner-line diagram.
IC Engines: Classification; working principle of four and two stroke SI and CI engines.

Text Book:

1. Mathur, Mehta and Tiwari, "Elements of Mechanical Engineering", *Jain Brothers*, New Delhi,2017.

Reference Books:

1. Hazra Chowdary. S. K and Bose, "Basic Mechanical Engineering", *Media Promoters and Publishers Pvt. Ltd,* India,2010.
2. P. K. Nag, "Engineering Thermodynamics", *Tata McGraw Hill*, NewDelhi.
3. Hazra Chowdary. S. K and Bose, "Workshop Technology, Vol. I & II", *Media Promoters and publishers Pvt Ltd,* India.

Course Outcomes (COs):

CourseCode:**U18OE401C** Course Name: **Elements of Mechanical Engineering**		
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18OE401C.1**	*explain mechanical properties of an engineering materials and learn the steps in design methodology.*
CO2	**U18OE401C.2**	*describe the principles of manufacturing processes*
CO3	**U18OE401C.3**	*apply first law of thermodynamics to various processes to calculate work and heat for a closed system.*
CO4	**U18OE401C.4**	define *second law of thermodynamics and demonstrate the working principle of IC engines.*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code:**U18OE401C**Course Name: **Elements of Mechanical Engineering**															
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE401C.1	2	2	-	-	-	-	-	-	-	-	-	-	1	1	1
U18OE401C.2	2	-	-	-	-	-	-	-	-	-	-	-	1	-	-
U18OE401C.3	2	2	-	-	-	-	-	-	-	-	-	-	1	1	-
U18OE401C.4	2	2	-	-	-	-	-	-	-	-	-	-	1	1	-
U18OE401C	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**

U18OE401D FUNDAMENTALS OF MEASUREMENTS & INSTRUMENTATION

Class: B.Tech. IV–Semester **Branch**: Common to all Branches

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge on /in
LO1: working principle of DC measuring instruments; DC, AC bridge circuits and their applications
LO2: principle of operation of Q meter, DVM, DMM, CRO, DSO and display devices
LO3: working principle of various transducers and their applications
LO4: working principle of seismic transducers, piezoelectric accelerometer, sound level meter, level transducer, flow meter and data acquisition system

UNIT–I (9+3)

DC measuring instruments (principle of operation): Measurement system – block diagram and example; performance characteristics – accuracy, precision, resolution, threshold, span, % error and fidelity; DC meters (working principle) – PMMC mechanism, shunt type ammeter, series type voltmeter, shunt type ohmmeter; DC potentiometers - Crompton's DC potentiometer, calibration of meters (ammeter, voltmeter & wattmeter) using DC potentiometer
DC & AC bridges: General bridge balance equation, bridge calibration, applications of bridges, Wheatstone bridge, Maxwell bridge, Schering bridge, Wien's bridge

UNIT – II (9+3)

Electronic instruments (principle of operation): Q-meter – basic Q-meter circuit; digital meter – characteristics (resolution & count), DC & AC attenuators, block diagram of dual slope type digital voltmeter, block diagram of digital multimeter (DMM); oscilloscopes – working principle of cathode ray tube (CRT), block diagram of cathode ray oscilloscope (CRO) , block diagram of digital storage oscilloscope (DSO); display devices – working principle of LED & LCD types

UNIT – III (9+3)

Transducers (principle of operation): Transducer - classification, examples and ideal requirements; sensors – cantilever beam & proving ring types of load cells, bourdon tube & diaphragm type pressure sensors; resistive transducers – piezo-resistive effect of strain gauge (SG), gauge factor, SG type force transducer, SG type pressure transducer and RTD; thermocouple type temperature transducer, LVDT type inductive transducer, differential type capacitive transducer, piezoelectric type transducer; photoelectric type transducer

UNIT – IV (9+3)

Transducers (principle of operation): Seismic transducers – displacement transducer, velocity pickup and accelerometer, piezoelectric accelerometer, sound level meter (block diagram), capacitive microphone, capacitive type level transducer (double electrode type), ultrasonic flow meter and electromagnetic flow meter; introduction to data acquisition (DAQ)system

Text Books:

1 P. Pruthviraj, B. Bhudaditya, S. Das and K. Chiranjib, "Electrical and Electronic Measurement and Instrumentation", McGraw-Hill Education, 2nd edition, 2013, New Delhi. (*Chapters 1 to 3, 8 to 10 and 13 to 15*)

2 Arun K. Ghosh, "Introduction to Transducers", *PHI*, 4th edition, 2015, New Delhi. (*Chapters 1 to7*)

Reference Books:

1 A.K. Sawhney, "Electrical and Electronics Measurements and Instrumentation", *Dhanpatrai*& Co., 2015, New Delhi.

2 Helfrick. A.D and Cooper W.D., "Modern Electronic Instrumentation and Measurement Techniques", *Pearson India Edn.*, 2nd edition, 2016, New Delhi.

3 B.C. Nakra, K.K Choudhry, "Instrumentation Measurement and Analysis", *TMH,* 4th edition, 2008, New Delhi.

4 D.V.S. Murthy, "Transducers and Instrumentation", *Prentice Hall of India,* 2nd edition, 2012, New Delhi.

Course Outcomes (COs):

Course Code: **U18EI401D** Course Name: **FUNDAMENTALS OF MEASUREMENTS & INSTRUMENTATION**		
CO	**CO Code**	*Upon completion of this course, students will be able to…*
CO1	**U18EI401D.1**	explain about working principle of measurement system, PMMC based meters and applications of DC & AC bridge circuits
CO2	**U18EI401D.2**	describe the principle of operation of Q-meter, DVM, DMM, CRO, DSO and display devices
CO3	**U18EI401D.3**	elaborate on the working principle of resistive, inductive, capacitive and piezoelectric transducers and their applications
CO4	**U18EI401D.4**	explain about seismic transducers, sound level meter, level transducer, flow meters and block diagram of data acquisition system

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code: **U18EI401D** Course Name: **FUNDAMENTALS OF MEASUREMENTS &INSTRUMENTATION**															
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18EI401D.1	2	1	1	1	-	-	1	-	-	-	-	1	1	1	1
U18EI401D.2	2	1	1	1	-	-	1	-	-	-	-	1	1	1	-
U18EI401D.3	2	1	1	1	-	-	1	-	-	-	-	1	1	1	-
U18EI401D.4	2	1	1	1	-	-	1	-	-	-	-	1	1	1	-
U18EI401D	**2**	**1**	**1**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**1**

U18OE401E FUNDAMENTALS OF COMPUTERNETWORKS

Class: B.Tech. IV- Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LO) :

This course will develop students' knowledge in/on

LO1: network topologies, network reference models, network architecture and data transmission

LO2: design issues and protocols of data link layer, error detection and correction, MAC protocols and ethernet standards

LO3: principles and design issues of network layer and internet protocols

LO4: transport layer design issues, protocols and application layer services

UNIT - I (9)

Introduction: History of Computer Networks and The Internet, Principles of Computer Network Design, Network Architecture, Network Types.

Physical Layer: Factors Affecting Data Transmission, Data Transmission, Data Transmission Codes: Non-return to Zero, Manchester Encoding, Digital modulation & Modems, Transmission Media.

UNIT- II (9)

Data Link Layer: Functions of Data Link Layer, Framing Techniques, Error Detection and Correction, Elementary Data Link Layer Protocols for Flow Control.

Local Area Networks: Medium Access Protocols, LAN Protocol Stack, Ethernet Protocols, IEEE 802.11 LAN Standard: IEEE 802.11 Protocol Stack, Wireless LAN Topologies, Frames in IEEE 802.11.

UNIT - III (9)

The Network Layer: Network Layer Services, Packet Switching Networks, The Internet Protocol(IP): IP Header in IPv4, IP Addressing in IPv4, Subnet addressing and Classless Inter-Domain Routing (CIDR), Address Resolution Protocol, Dynamic Host Configuration Protocol, Internet Layer Protocols, Fragmentation and Reassembly, IP Version 6: Motivation for IPv6 Development, Features of IPv6, IPv6 Address Representation.

Routing Protocols: Elements of Routing Protocol Performance, Flooding, Distance-Vector and Link State Routing Protocols, Hierarchical Routing.

UNIT - IV (9)

The Transport Layer: User Datagram Protocol, Transmission Control Protocol, TCP State Transition Diagram, Other TCP Timers, TCP Congestion Control.

The Application Layer: World Wide Web, Domain Name System, Electronic Mail.

Network Security: Threats and Vulnerabilities in Computer Networks, Cryptographic Algorithms, Data Encryption Standard.

Text Book:

1. Mayank Dave, "Computer Networks", Second Edition, Cengage Learning, ISBN-13:978-81-315-0986-9, 2014.

Reference Books:

1. Forouzan, "Data Communication and Networking", Fifth Edition, *TMH*, *ISBN*978-0-07-296775-3, 2012.
2. William Stallings, "Data and Computer Communications", Ninth Edition, *Prentice-Hall India*, ISBN-81-203-1240-6,2011.

3. Andrew S.Tanenbaum , David J. Wetherall, "Computer Networks", Fifth Edition, *Pearson Education*, ISBN-13: 978-0-13-212695-3,2011.

Course Outcomes (COs):

Course Code: **U18OE401E**		Course Name: **Fundamentals of Computer Networks**
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18OE401E.1**	*describe various network topologies, architecture and techniques for data transmission modes*
CO2	**U18OE401E.2**	*outline various design issues in data link layer and develop protocols to handle data link layer operation*
CO3	**U18OE401E.3**	*describe various design issues and develop protocols for network Layer.*
CO4	**U18OE401E.4**	*explain various design issues , protocols of transport layer & application layer services*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Coursecode:**U18OE401E**					Course Name: **Fundamentals of Computer Networks**									
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE401E.1	2	1	-	1	-	1	-	-	-	-	-	1	2	3	1
U18OE401E.2	3	3	2	1	1	1	-	-	-	-	-	1	3	3	1
U18OE401E.3	3	3	2	2	1	1	-	-	-	-	-	1	3	3	1
U18OE401E.4	3	3	2	2	1	1	-	-	-	-	-	1	3	3	1
U18OE401E	**2.75**	**2.5**	**2**	**1.5**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**1**	**2.75**	**3**	**1**

U18OE401F RENEWABLE ENERGY SOURCES

Class: B.Tech, IV Semester **Branch:** Common to all branches

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs) :

This course will develop student's knowledge in/on

LO1 *different renewable energy sources and principle of solar energy systems*
LO2 *wind energy, geothermal energy and MHD power generation systems*
LO3 *harnessing energy from oceans and biomass*
LO4 *working of fuel cells and different energy storage systems*

UNIT-I (9)

Introduction: Conventional and non-conventional sources of energy – Brief Description of different Renewable energy sources

Solar Energy: Introduction to prospects of solar photovoltaic (SPV) systems, principle of a PV cell, large scale SPV systems, economic considerations of SPV systems, PV cell technology, merits and limits of SPV systems, applications of SPV systems-street lighting, domestic lighting, Battery charging, SPV pumping systems

UNIT-II (9)

Wind Energy: Principles of wind power- Operation of a wind turbine- Site Characteristics.

Geothermal Energy: Origin and types of geothermal energy- Operational Difficulties- Vapor dominated systems- Liquid dominated systems- Petro- thermal systems.

Magneto-Hydro Dynamic (Mhd) Power Generation: MHD system- Open and Closed systems- Advantages of MHD systems.

UNIT-III (9)

Energy from Oceans: Ocean temperature differences, ocean waves-Wave motions and tides-Energy from the waves; Introduction of tidal power, basic principle of tidal power, components of tidal power plants, advantages and disadvantages

Bio-Energy: Introduction-bio-mass conversion, technologies-wet process, dry process, photo synthesis; Biogas generation- biogas from power plant wastes, methods of maintaining biogas production, utilization of biogas, biogas gasification, applications of gasifiers

UNIT-IV (9)

Chemical Energy Sources: Introduction of fuel cells, Principle of Operation of fuel cell, Classification of Fuel cells, Advantages and disadvantages of fuel cells.

Types of Energy Storage Systems: Introduction, Different types of Batteries, Ultra Capacitors, Flywheels, Super Conducting Magnetic storage

TEXT BOOKS:

1. Rai G.D "*Non-Conventional Energy Sources*", Khanna Publishers, New Delhi
2. Felix A. Farret, M. Godoy Simoes, —Integration of Alternative Sources of Energy, John Wiley & Sons, 2006
3. Bansal N.K, Kaleeman and M. Miller, "Renewable *Energy Sources and Conversion Technology*", TATA Mc Graw-Hill, New Delhi

REFERENCE BOOKS:

2. EL-Wakil M.M, "Power Plant Technology", Mc Graw-Hill, New York
3. Duffie and Beckman, "Solar Energy Thermal Process", John Wiley & Sons, New York

Coursecode:**U18OE401F**		Course Name: **Renewable Energy Sources**
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18OE401F.1**	*compare conventional and non-conventional energy resources; explain the working principle of solar energy harnessing and its applications*
CO2	**U18OE401F.2**	*explain the working principles of wind energy, geothermal energy and MHD power generation systems*
CO3	**U18OE401F.3**	*describe the harnessing of electric power from oceans and biomass*
CO4	**U18OE401F.4**	*explain the principle of operation of fuel cells and different types of energy storage systems*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Coursecode:**U18OE401F**				Course Name: **Renewable Energy Sources**										
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE401F.1	3	-	-	-	-	-	1	-	-	-	-	-	3	-	-
U18OE401F.2	3	-	-	-	-	-	1	-	-	-	-	-	3	-	-
U18OE401F.3	3	-	-	-	-	-	1	-	-	-	-	-	3	-	-
U18OE401F.4	3	-	-	-	-	-	1	-	-	-	-	-	3	-	-
U18OE401F	**3**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**

U18OE401G ESSENTIAL MATHEMATICS AND STATISTICS FOR MACHINE LEARNING

Class: B.Tech. IV-Semester **Branch:** Computer Science and Engineering(AI&ML)

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1:linear algebra, matrix decompositions, multivariate calculus and its applications

LO2:Baye's theorem, random variables and theoretical probability distributions

LO3: various statistical measures, fitting of curves using method of least squares, applications of sampling distributions in testing of hypothesis

LO4: dimensionality reduction with principal component analysis (PCA), unconstrained and constrained optimization Techniques

UNIT-I(9+3)

Linear algebra: Introduction to vectors, Vector space and subspace, linear combination and span, linear independence and dependence, basis vectors, linear transformations, null space and range of linear map and Rank-nullity theorem.

Matrix decompositions: LU decomposition, Gram Schmidt process, QR decomposition, Singular value decomposition and properties, Norms and Matrix approximations.

Multivariate calculus: Partial differentiation and gradient, Jacobian matrix, gradients of matrices, Hessian matrix, convex sets, convex functions and multivariate Taylor series.

UNIT-II(9+3)

Probability: Basic rules and axioms, dependent and independent events, conditional probability, Baye's theorem.

Random variables: Discrete and continuous random variables, expectation and variance

Distributions: Binomial, Poisson and Normal distributions.

Joint probability distributions: Joint probability mass and density functions, Marginal probability mass and density functions and Covariance.

UNIT-III(9+3)

Statistics: Measures of Central tendency, Measures of dispersion, Skewness, Kurtosis, Correlation-Coefficient of correlation, Linear Regression, Curve fitting and Method of least squares.

Sampling: Types of Sampling, Population, Sample, Parameter, statistics, Sampling distribution of means (σ-known) and **E**stimation.

Test of hypothesis: Procedure for testing of hypothesis, Test of significance of a single mean and difference of means- Large samples, Test of significance of a single Mean and difference of means- Small samples, Paired Sample t-test, F-test, F-test for equality of population variances, chi square test, Chi-square test for goodness of fit and One-way ANOVA.

UNIT-IV(9+3)

Dimensionality Reduction with Principal Component Analysis: Problem setting, Maximum Variance Perspective, Projection Perspective, Eigenvector Computation and Low-Rank Approximations, PCA in High Dimensions, Key Steps of PCA in Practice and Latent Variable Perspective.

Optimization: Optimization problem, unconstrained optimization and constrained optimization. **Unconstrained optimization:** Gradient Descent method, Conjugate gradient method, Newton's method and Penalty function method.

Constrained optimization: Lagrange's method and Kuhn-Tucker conditions.

Text Books:

[1] Bernard Kolman and David R. Hill., *Introductory Linear Algebra: An Applied First Course*, United States: Pearson Education, 2006. (UNIT-I)

[2] S. C. Gupta V. K. Kapoor, *Fundamentals of Mathematical Statistics*, 10th ed., New Delhi: Sultan Chand & Sons Educational Publishers, 2010. *(*UNIT-II & UNIT-III*)*

[3] Marc Peter Deisenroth, A. Aldo Faisal, and Cheng Soon Ong., *Mathematics for Machine Learning*, New Delhi: Cambridge University Press, 2020. (UNIT-I & UNIT-IV)

[4] S. S. Rao, *Engineering Optimization theory and practice*, 4th ed., New Jersey: John Wiley & Sons, Inc., 1984. (UNIT-IV)

Refence text books:

[1] G. Strang, *Introduction to Linear Algebra,* 5th ed., Wellesley-Cambridge Press, 2016.

[2] S. P. Gupta, *Statistical Methods*, 46th ed., New Delhi: Sultan Chand & Sons Educational Publishers, 2019.

[3] J. C. Pant, *Introduction To Optimization (Operations Research*), 7th ed., Jain Brothers, 2015.

[4] L.S.Prakasa Rao, A first course in Probability and statistics, New Jersey: Cambridge University Press

Course Research Papers: Research papers (Journal/Conference papers) relevant to the course content will be posted by the course faculty in Course Web page

Course Patents: Patents relevant to the course content will be posted by the course faculty in Course Web page

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in Course Web page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

on completion of this course, students will be able to…

CO1:*apply linearalgebra, matrix decompositions and multivariate calculus in solving engineering problems.*

CO2: *analyzeBaye'stheorem, probabilitydistributions, marginal and conditional distributions.*

CO3: *applysamplingdistributionsintestingofhypothesis and one-way ANOVA in real world problems.*

CO4:*analyzedimensionality reduction with principal component analysis andoptimizethefunctionusingvariousmethodsofoptimization*

Course Articulation Matrix (CAM):U18OE401G: ESSENTIAL MATHEMATICS AND STATISTICS FOR MACHINE LEARNING

CO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18OE401G.1	2	2	--	-	-	-	-	-	-	1	-	1	-	-	-
CO2	U18OE401G.2	2	2	-	-	-	-	-	-	-	1	-	1	-	-	-
CO3	U18OE401G.3	2	2	-	-	-	-	-	-	-	1	-	1	-	-	-
CO4	U18OE401G.4	2	2	-	-	-	-	-	-	-	1	-	1	-	-	-
U18OE401G		2	2	-	-	-	-	-	-	-	1	-	1	-	-	-

U18MH402 PROFESSIONAL ENGLISH

Class: B.Tech III Semester
Branch: Common to all branches
Teaching Scheme:
Examination Scheme:

L	T	P	C
-	-	2	1

Continuous Internal Evaluation :	100 marks
End Semester Exam :	-

Course Learning Objectives (LOs):
This course will develop the student's knowledge in/on
LO1: reading skill and sub skills to comprehend the text
LO2: vocabulary and using it appropriately to describe situations LO3: using phrasal verbs in speech and writing
LO4: grammar and improve language ability to write effectively

Week	Topic Name
I	**I. Reading Comprehension-** Significance of Reading Skimming **II. Verbal Ability-**Synonyms **III. Grammar-**Articles
II	**I. Reading Comprehension-**Scanning **II. Verbal Ability-**Antonyms **III. Grammar-**Articles
III	**I. Reading Comprehension-** Critical Reading **II. Verbal Ability-** Sentence completion with correct alternative word/group **III. Grammar-**Prepositions
IV	**I. Reading Comprehension-** Intensive Reading **II. Verbal Ability-** Sentence completion with correct alternative word/group **III. Grammar-** Reported Speech
V	**I. Reading Comprehension-** Intensive Reading **II. Verbal Ability-** Jumbled Sentences **III. Grammar-** Error Detection
VI	**I. Reading Comprehension-** Inferential Reading **II. Verbal Ability-** Jumbled Sentences **III. Grammar-** Error Detection
VII	**I. Reading Comprehension-** Lexical Reading **II. Verbal Ability-** Phrasal Verbs **III. Grammar-** Tenses, Structures
VIII	**I. Reading Comprehension-** Read to Interpret **II. Verbal Ability-** Single Word Substitutes **III. Grammar-** Tenses, Uses
IX	**I. Reading Comprehension-** Read to Analyze **II. Verbal Ability-**Collocations **III. Grammar-** Tenses, Uses
X	**I. Reading Comprehension-** Read to Summarize **II. Verbal Ability-**Spellings **III. Grammar,** Agreement between Subject & verb(concord)

Text Book:

1. Professional English *Manual prepared by the faculty of English, KITSW*
2. Arun Sharma & Meenakshi Upadhyay, " Verbal Ability and Reading Comprehension for CAT & Other Management Examinations",8thEdition *McGraw Hill Education (India) Private Ltd*, Chennai,2018

Reference Books:

1. Nishit K. Sinha, " Verbal Ability and Reading Comprehension for the CAT", 3rdEdition Pearson India Education Services Pvt. Ltd., Chennai
2. Harper Collins, "Collins COBUILD English Grammar" Third Edition, *Harper Collins Publishers Ltd.*
3. Rosemary & Courtney, "Longman-English-Chinese Dictionary of Phrasal Verbs"

Course Outcomes (COs):

CourseCode:U18MH302/402 Course Name: Professional English		
CO	**CO Code**	*Up on completion of this course, the students will be able to…*
CO1	**U18MH302.1**	analyze the passage using skill and sub skill to solve different types of questions related to reading comprehension
CO2	**U18MH302.2**	identify grammatical errors in the given sentences and correct them
CO3	**U18MH302.3**	select correct synonyms/antonyms/phrasal verbs and complete sentences with suitable words or phrases
CO4	**U18MH302.4**	keep the given jumbled sentences in proper sequence to make a coherent paragraph

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code: U18MH302									**Course Name: Professional English**						
Course Outcomes	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PS 3**
U18MH302.1	-	-	-	-	-	-	-	-	1	2	-	1	1	1	1
U18MH302.2	-	-	-	-	-	-	-	-	1	2	-	1	1	1	1
U18MH302.3	-	-	-	-	-	-	-	-	1	2	-	1	1	1	1
U18MH302.4	-	-	-	-	-	-	-	-	1	2	-	1	1	1	1
U18MH302	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**-**	**1**	**1**	**1**	**1**

U18OE403A OBJECT ORIENTED PROGRAMMING

Class: B. Tech IV-Semester

Branch: Common to all branches

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop students' knowledge in/on…

LO1: fundamentals of object oriented and java programming.

LO2: classes, objects and inheritance for implementing object oriented concepts.

LO3: polymorphism, interfaces and packages for realizing object oriented programming.

LO4: manage Exceptional and I/O operations in application developments.

UNIT- I (9)

Fundamentals of Object Oriented Programming: Programming paradigms, Basic concepts of Object Oriented paradigm (OOP), benefits and applications of OOP.

Basics of Java Language: Java language Features, Java Programming Structure, Java Tokens, JVM, Constants, Variables, Data types, Scope of variable, Type Casting, Operators and Expressions, Branching and looping statements, Arrays.

UNIT – II (9)

Classes and Objects: Defining a class, Field declaration, Method declaration, Creating object, Accessing Class Members, Constructors, garbage collection, Static members, Nested and inner classes, Command line arguments, Wrapper classes.

Inheritance: Extending a class, Defining subclasses, Subclass constructor, Multilevel inheritance, Hierarchical inheritance, Access controls, *this* and *super* keywords.

UNIT-III (9)

Polymorphism: Overloading methods, Overloading constructors, Overriding Methods, Dynamic method dispatch, Abstract classes, Final Keyword.

Interfaces: Defining an interface, Implementing interfaces, Nested Interfaces, Variables in interfaces, Extending interfaces

Packages: Packages, java API packages, Using System Packages, Naming Conventions, Creating Packages, Accessing Packages, Adding a class to package, Hiding classes, Static Import.

UNIT – IV (9)

Exception handling: Fundamentals, Exception types, Uncaught exceptions, Using try and catch, Multiple catch clauses, Explicit exceptions with *throw, throws* and *finally* keywords.

String Handling: String constructors, String length, String operations, Character extraction, String comparison, Searching string, Modifying string, Changing string cases, Joining strings**.**

Using I/O: I/O Basics, Reading console Input, Writing console output, Reading and writing files.

Text Books:

1. Herbert Schildt,"JAVA The Complete Reference", 9th Edition, McGraw-Hill Education India Pvt.Ltd , ISBN: 9781259002465,2014.
2. E.Balgurusamy, "Programming with JAVA a primer", 5e Edition, McGraw-Hill Publication Ltd, ISBN: 9351343200,2014.

References Books:

1. P Radha Krishna, "Object Oriented Programming through JAVA", Universities Press, ISBN: 9788173715723,2011.
2. Herbert Schildt,"JAVA The Complete Reference", McGraw-Hill Education India Pvt.Ltd , 9th Edition, ISBN: 9781259002465,2011.
3. Kathy Sierra, Bert Bates, "Head First Java", O'Reilly Publications, 2nd Edition, ISBN-13: 978- 0596009205.
4. UttamK.Roy, "Advanced JAVA Programming", Oxford Publications; First edition, ISBN- 13: 978-0199455508.

Course Code: **U18OE403A** Course Name: **Object Oriented Programming**		
CO	**CO code**	*Upon completion of this course, the student will be able to…*
CO1	**U18OE403A.1**	*demonstrate object oriented concepts and java programming features.*
CO2	**U18OE403A.2**	*solve computing problems using object orientation and inheritance concepts.*
CO3	**U18OE403A.3**	*use polymorphism, interfaces and Packages for effective object oriented programming*
CO4	**U18OE403A.4**	*handle Exceptions and I/O operations in application development.*

Mapping of the Course Learning Outcomes with Program Outcomes:

Course Code: **U18OE403A** Course Name: **Object Oriented Programming**															
CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE403A.1	2	2	2	1	2	1	-	1	2	1	2	1	2	2	2
U18OE403A.2	2	2	2	1	2	1	-	-	2	1	2	1	2	2	2
U18OE403A.3	2	2	2	1	2	1	-	-	2	1	2	1	2	2	2
U18OE403A.4	2	2	2	1	2	1	1	1	2	1	2	1	2	2	2
U18OE403	**2**	**2**	**2**	**1**	**2**	**1**	**1**	**1**	**2**	**1**	**2**	**1**	**2**	**2**	**2**

U18OE403B FLUID MECHANICS AND HYDRAULIC MACHINES

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in /on
LO1*: various Properties of fluids and fluid statics*
LO2*: application of Bernoulli's equation and dimensional analysis*
LO3*: flow through pipes and working principles of hydraulic turbines*
LO4*: performance of reciprocating and centrifugal pumps*

UNIT-I(9)

Fluid fundamentals: Classification of fluids, fluid properties - density, specific weight, specific gravity, specific volume, viscosity, capillarity, vapor pressure, compressibility, surface tension, cohesion and adhesion.

Fluid statics: Pascal's Law, hydrostatic Law, measurement of pressure, manometers, Piezometer, U-tube differential manometer, inverted differential manometer, hydrostatic forces on submerged plane and curved surfaces, buoyancy, metacenter, stability of floating and submerged bodies

UNIT-II (9)

Fluid dynamics: Classification of fluid flow, continuity equation in one, two and three dimensional flow, velocity potential and stream function, forces causing motion, Euler's equation of motion, Bernoulli's Equation, applications of Bernoulli's equation, venturi meter, orifice meter, pitot tube, linear momentum equation ,application of linear momentum equation to forces on pipe bend.

Dimensional analysis: Dimensional analysis by Rayleigh's method and Buckingham π's theorem, dimensionless numbers and model laws, Reynolds law and Froude's law.

UNIT-III(9)

Flow through pipes: Loss of head in pipes, expression for head loss due to major and minor losses in pipes, HGL and TEL lines, pipes in series and parallel, equivalent pipe.

Hydraulic turbines: Concept of impact jets, classification, head, losses and various efficiencies, Pelton turbines, components, velocity triangles, power and efficiencies, reaction turbines, Francis and Kaplan turbines, efficiencies and characteristics, unit quantities, specific speed, draft tube theory.

UNIT-IV (9)

Reciprocating pumps: Working of single and double acting pumps, work done and efficiencies, slip, negative slip, performance characteristics of pumps, air vessel.

Centrifugal pumps: Principle, components, work done and efficiency, pumps in series and in parallel, multi stage pumps, characteristics, cavitation and priming.

Text Books:

1. P.N.Modi and S.M. Seth, "*Hydraulics and Fluid Mechanics Including Hydraulic Machines*", Standard Book House, Rajsons Publications Private Limited, 21thedn.,2017

Reference Books:

1. R.K.Bansal, "*Fluid Mechanics and Hydraulic Machines*", Periodicals PrivateLtd.,2018
2. Victor Streeter and E. Benjamin Wylie, "*Fluid Mechanics*", McGraw Hill, Singapore, 9thedn.,2017.
3. Frank M. White, "*Fluid Mechanics*", Special Indian Edition, Tata McGraw Hill, New Delhi,2011.
4. A.K. Jain, "*Fluid Mechanics Including Hydraulic Machines*", Khanna Publications,12thedn,2018.

Course Outcomes (COs):

Course Code:**U18OE303B** Course Name: **Fluid Mechanics and Hydraulic Machines**		
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18CE403B.1**	*summarize fluid properties using fundamental laws of fluid statics.*
CO2	**U18CE403B.2**	*analyse fluid flows using Bernoulli's equation and model laws.*
CO3	**U18CE403B.3**	*estimate losses in pipes and characterize hydraulic turbines.*
CO4	**U18CE403B.4**	*discuss the working principle and characteristics of pumps.*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

CourseCode:**U18OE303B** Course Name: **Fluid mechanics and hydraulic machines**															
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18CE403B.1	2	1	-	-	-	-	-	-	1	1	-	1	1	-	-
U18CE403B.2	2	1	-	1	-	-	-	-	1	1	-	1	1	-	-
U18CE403B.3	2	1	-	1	-	-	-	-	1	1	-	1	1	-	-
U18CE403B.4	2	1	-	1	-	1	-	-	1	1	-	1	1	-	-
U18CE403B	**2**	**1**	**-**	**1**	**-**	**1**	**-**	**-**	**1**	**1**	**-**	**1**	**1**	**-**	**-**

U18OE403C MECHATRONICS

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme : **Examination Scheme:**

L	T	P	C
3	-	-	3

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Outcomes (LOs):
This course will develop students' knowledge in /on
LO1: *role of mechatronics based technology, sensors and transducers used in industry*
LO2: *various types of actuation systems, working principles and their applications*
LO3: *mathematical models for various types of systems*
LO4: *various transfer functions and control modes*

UNIT-I (9)

Introduction to Mechatronics: Measuring system, Control systems, Microprocessor based controllers. Mechatronics approach.
Sensors and Transducers: Performance, terminology. displacement, position, proximity, velocity and motion.

UNIT-II (9)

Actuation Systems: working principles of pneumatic and hydraulic systems, directional control valves, pressure control valves, process control valves and rotary actuators.
Electrical Actuation Systems: working principles of electrical system, mechanical switches, solid-state switches solenoids, DC motors, AC motors and stepper motors.

UNIT-III (9)

Basic Models: Mathematical models, mechanical system building blocks, electrical system building blocks, fluid system building blocks and thermal system building blocks.
System Models: Engineering system, rotational-translational system and electro- mechanical systems and hydraulic-mechanical system.

UNIT-IV (9)

System Transfer functions: Transfer function, first order system, second order system, system in series and systems with feedback loops.
Closed Loop Controllers: Continuous and discrete processes. Control modes. Two step mode and proportional mode. Derivative control, integral control, PID controller, digital controllers, velocity controllers and adaptive control.

TEXT BOOK:

1. Bolton W., Mechatronics, *Pearson Publications,* 6/e, ISBN: 9788131732533, 2015.

REFERENCE BOOKS:

1. Nitaigour Premchand Mahalik, Mechatronics: Principles Concepts and Applications, *Tata McGraw Hill, 2/e,* ISBN-13: 978-0070483743,2017.
2. HMT, Mechatronics, *Tata McGraw-Hill, ISBN*9788415700272 New Delhi,2000.
3. Devdas Shetty, Richard and Kilk, Mechatronics System and Design, *Cenage Learning*, Inc. 2/e, ISBN-13: 978-1439061985,2010.

Course Outcomes (COs):

Course Code: **U18OE403C** Course Name: **MECHATRONICS**		
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18OE403C.1**	*apply the mechatronics approach ad select suitable sensors and transducers for a given application.*
CO2	**U18OE403C.2**	*explain working principles of mechanical, hydraulic, pneumatic and electrical actuators and their applications.*
CO3	**U18OE403C.3**	*develop basic building blocks for mechanical, electrical, fluid and thermal systems and build mathematical models and analyze.*
CO4	**U18OE403C.4**	*explain various system transfer functions and select an appropriate closed loop controller for a given application*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code: **U18OE403C** Course Name: **MECHATRONICS**														
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE403C.1	2	2	1	-	2	2	-	-	-	1	-	1	1	-	1
U18OE403C.2	2	2	1	-	2	-	-	-	-	1	-	1	1	-	1
U18OE403C.3	2	2	1	3	2	-	-	-	-	1	-	1	1	-	-
U18OE403C.4	2	2	1	1	2	-	-	-	-	1	-	1	1	-	1
U18OE403C	2	2	1	2	2	2	-	-	-	1	-	1	1	-	1

U18OE403D WEB PROGRAMMING

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme : **Examination Scheme :**

L	T	P	C
3		-	3

Continuous Internal Evaluation	40 marks
End Semester Exam	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on

LO1: designing static webpage using HTML Tags, CSS properties, interactivity with JavaScript

LO2: creating dynamic webpage using JSP.

UNIT-I (9)

HTML: Document Structure, Basic Tags, Creating Headings, Working with Links, Creating Paragraph, Working with Images, Tables, Frames. Introduction to Forms and Controls: Creating HTML Form, Specifying Action URL and Method to Send the Form, Using HTML Controls.

CSS: *CSS* (Cascading style sheet) rules and properties, Types: Inline, External and Internal Style Sheets, Style Classes, Multiple Styles.

JAVASCRIPT: JavaScript syntax, Embedding JavaScript in HTML Page. Usage of variables, Working with Operators, Control-Flow Statements, Functions and Array, Creating Objects, Handling Events.

UNIT-II (9)

JSP: Syntax and Semantics, JSP Development Model, Components of JSP page: Directives, Comments, Expressions, Scriptlets, Declarations, Implicit Objects, Standard Actions, Tag Extensions, A Complete JSP Example. Session and Thread Management: Session Tracking, Session API, Thread Management. Application Event Listeners.

JDBC: Database access with JDBC, Overview, JDBC drivers, connecting to database with Driver Manager, Statement Interfaces: Statement, Prepared statement, Callable statement, Result Sets.

UNIT-III (9)

Introduction to PHP: Overview of PHP, Advantages of PHP over scripting languages, Creating and running a PHP script, handling errors. Working with Variables and Constants: Variables, Data Types and Operators. Controlling Program Flow: Conditional Statements, Looping Statements, Break, Continue and Exit Statements. Working with Functions, Arrays, Files and Directories.

Working with Forms: Web Forms and Form Elements, Processing a Web Form, Validating a Web Form.

UNIT-IV (9)

Database using PHP: Exploring Relational Database Model, Records and Primary Keys. Working with SQL Statements. Using PHP and MySql: Checking Configuration, Connecting to Database, Selecting a Database, Adding and Altering a Table in a Database, Inserting and modifying Data in a Table, Retrieving Data from a Table.

XML : Introduction to XML, XML Basics: Syntax, Declaration, Elements, Attributes, Valid XML Documents, Viewing XML, XML Parser, XML Technologies, Document Object Model(DOM).

Text Books:

1. Kogent, "Web Technologies HTML, CSS, JavaScript, ASP.NET, Servlets, JSP, PHP, ADO.NET, JDBC and XML", *1st Edition, Dreamtech Press (Black Book),* ISBN-13:9789351192510,2013.
2. Phil Hanna, "JSP: The Complete Reference", *2nd Edition, McGraw-Hill,* ISBN: 007-212768-6,2001.

Reference Books:

1. Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP", *4th Edition,BPB Publications,*ISBN-13: 978-8183330084,2009,
2. UttamK.Roy, "Web Technologies", *7th Edition*, *Oxford Higher Education,* ISBN-10: 0-19-806622-8, ISBN-13: 978-0-19-806622-4,2010
3. Luke Welling, Laura Thomson,"PHP and MySQL Web Development", *3rd Edition, Sams Publications,* ISBN: 0-672-32672-8,2005
4. Jayson Falkner, Kevin Jones, "Servlets and Java Server Pages", *1st Edition, Pearson,* ISBN: 0-321- 13649-7, 2003

Course Outcomes (COs):

Course Code: **U18OE403D**		Course Name: **Web Programming**
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18OE403D.1**	*create static web pages using HTML Tags, CSS properties and Java scripts*
CO2	**U18OE403D.2**	*create dynamic web pages using java server page concepts.*
CO3	**U18OE403D.3**	*develop web server side applications using PHP concepts*
CO4	**U18OE403D.4**	*develop enterprise databases for web-based applications using PHP and MySQL.*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code: **U18OE403D**							Course Name: **Web Programming**							
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE403D.1	2	2	2	1	2	1	-	1	2	1	2	1	2	2	2
U18OE403D.2	2	2	2	1	2	1	-	1	2	1	2	1	2	2	2
U18OE403D.3	2	2	2	1	2	1	-	1	2	1	2	1	2	2	2
U18OE403D.4	2	2	2	1	2	1	1	1	2	1	2	1	2	2	2
U18OE403D	2	2	2	1	2	1	1	1	2	1	2	1	2	2	2

U18OE403E MICROPROCESSORS

Class: B.Tech., IV-Semester **Branch:** Common to all branches

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation:	40 marks
End Semester Exam:	60 marks

Course Learning Objectives:

This course will develop students' knowledge in/on

LO1*: architectural issues of 8086 Microprocessor*

LO2*: programming concepts of 8086 Microprocessor*

LO3*: interfacing of 8086 microprocessor to various I/O subsystems.*

LO4: *serial data communication types and standards like RS232, IEEE 488 Bus.*

UNIT – I(9)

Review of 8085 MPU Architecture

8086 Family Architecture: Organization of 8086 CPU, Concept of Memory Segmentation, Segment Registers, Physical and Logical Addressing, Addressing Modes and Instruction Formats, Instruction Set**.**

UNIT – II(9)

Assembly Language Programming: Assembler Directives, Simple Programming of 8086, Arithmetic, Logical and Data Processing Programs; Implementation of Control Loops, Structures, Strings, Procedures, Macros.

Pin Configuration, Minimum / Maximum Modes, Timing Diagrams, Delay Subroutines.

UNIT – III(9)

Interfacing with 8086: 8086 Interrupts, Interrupt Service Routines, Programmable Interrupt Controller 8259, Programmable Peripheral Interface 8255, Interfacing of Switches, Keyboards, LEDs, Stepper Motor, ADCs and DACs.

UNIT – IV(9)

DMA Controller 8257, Programmable Timer/Counter 8254.

Serial Data Communication through 8086: Types of Serial Communication, Synchronous and Asynchronous Communication, Serial Data Communication through USART 8251, Serial Data Communication Standards, RS-232, IEEE 488 Bus (GPIB).

Text Books:

1. D.V.Hall, "Microprocessors and Interfacing: Programming & Hardware", 2nd Edition, *Tata McGraw Hill*, New Delhi, 1992. (Chapter 3 to 10)
2. Yuchang Liu, Glen A. Gibson," Microcomputer Systems. The 8086/8088 Family, Architecture, Programming and Design*", 2nd Edition, PHI*, New Delhi, 1995. (Chapter 2 to 11)

Reference Books:

1. Kenneth J. Ayala,Ayala Kenneth," The 8086 Microprocessor: Programming and Interfacing The PC", *West Pub*., 1994.
2. Barry B. Brey," The Intel Microprocessors: Architecture, Programming and Interfacing", 2nd Edition, *PHI, New Delhi,* 1998.

Course Outcomes (COs):

Course Code: **U18OE403E**		Course Name: **MICRO PROCESSORS**
CO	**CO Code**	Upon completion of this course, the student will be able to…
CO1	**U18OE 403E.1**	*describe the architecture of 8086 microprocessor and explain instructions with suitable examples*
CO2	**U18OE 403E.2**	*write Assembly Language Programs (ALPs) to perform a given task*
CO3	**U18OE 403E.3**	*design 8086 microprocessor based system for given specifications with memory mapping*
CO4	**U18OE 403E.4**	*explain serial communication modes and discuss it standards*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code:**U18OE403E**															
CO Code	**PO 1**	**PO2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE 403E.1	3	3	2	1	--	--	--	--	--	--	--	--	2	2	1
U18OE 403E.2	3	2	2	1	--	--	--	--	--	--	--	--	2	2	1
U18OE 403E.3	3	3	2	1	--	--	--	--	--	--	--	--	2	2	1
U18OE 403E.4	3	3	2	1	--	--	--	--	--	--	--	1	2	2	1
U18OE 403E	3	2.75	2	1	--	--	--	--	--	--	--	1	2	2	1

U18OE403F STRENGTH OF MATERIALS

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):
This course will develop students' knowledge in /on
LO1*: behaviour of bodies subjected to various types of stresses and strains*
LO2*: shear force and bending moment for determinate beams*
LO3*: bending and shearing stresses for beams in flexure*
LO4*: behaviour of circular shafts, springs and thin cylinders*

UNIT-I(9)

Simple stresses and strains: Types of stresses, strains, stress–strain diagram, elastic limit, Hooke's law, bars of varying sections, uniformly tapering circular and rectangular sections, elongation of bars due to self weight, temperature stresses in uniformbars.

Elastic modulii: Elastic constants, longitudinal strain, lateral strain, Poisson's ratio, complimentary shear stress, state of simple shear, modulus of elasticity (E), modulus of rigidity (N), bulk modulus (K), relation between E, N & K, strain energy, resilience, impact loading.

UNIT-II (9)

Principal stresses: Definition, normal and shear stress, principal stresses, principal planes and their graphical representation by Mohr's circle.

Shear force and bending moment: Types of supports, classification of beams, concept of shear force and bending moment, shear force diagram and bending moment diagram for simply supported, cantilever and overhanging beams, loading from shear force and bending moment diagram, principle of superposition.

UNIT-III(9)

Bending stresses in beams: Assumptions, theory of simple bending, application of bending equation and calculation of bending stresses in beams of homogeneous and flitched beam material, beams of uniform strength.

Shearing stresses in beams: Shearing stress due to bending, variation of flexural shear stress distribution across rectangular, triangular, circular, flanged section, shear resilience.

UNIT-IV (9)

Circular shafts and springs: Theory of pure torsion in solid and hollow circular shafts, shear stresses, angle of twist, power transmitted by shaft, close-coiled and open-coiled helical spring subjected to axial load and axial twist, springs in series and parallel.

Thin cylinders: Analysis of thin walled pressure vessels, hoop stress, longitudinal stress.

Text Books:

1. Rajput R.K., "*Strength of Materials*", *7th Edition,* S Chand and Company.
2. Gunneswara Rao T. D., Mudimby Andal, "*Strength of Materials", 1st edn.2018*, Cambridge University Press.

Reference Books:

1. Timoshenko and Gere, "*Mechanics of Materials", 1st Edition* Mc Graw Hill International.
2. Punmia B.C., Arun K. Jain, Ashok K. Jain, "*Mechanics of Materials", 2nd Edition,* Laxmi Publications, New Delhi.
3. Subramanian R., "*Strength of Materials*", *3rd Edition,* Oxford University Press.
4. Ramamrutham S., "*Strength of Materials", 2nd Edition,* Dhanpat Rai & Sons, NewDelhi.

Course Outcomes (COs):

Course Code:**U18OE303F**Course Name: **Strength of Materials**		
CO	**CO code**	*Upon completion of this course, the student will be able to…*
CO1	**U18CE403F.1**	*estimate various types of stresses and strains*
CO2	**U18CE403F.2**	*construct Mohr's circle, shear force and bending moment diagrams for determinate beams*
CO3	**U18CE403F.3**	*determine the bending and shearing stresses for beams subjected to pure bending*
CO4	**U18CE403F.4**	*analyze stresses in thin cylinders, circular shafts and springs by theory of pure torsion*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code: **U18OE303F** Course Name: **Strength of Materials**															
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18CE403F.1	2	2	1	1	-	-	-	-	-	1	-	2	1	-	-
U18CE403F.2	2	2	1	-	-	-	-	-	-	1	-	1	1	-	-
U18CE403F.3	2	2	1	1	-	-	-	-	-	-	-	1	-	-	-
U18CE403F.4	2	2	1	2	-	-	-	-	-	1	-	1	1	-	-
U18CE403F	**2**	**2**	**1**	**1.33**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**1.25**	**1**	**-**	**-**

U18AI404 ARTIFICIAL INTELLIGENCE

Class: B.Tech. IV- Semester **Branch:** Computer Science and Engineering(AI & ML)

Teaching Scheme:

L	T	P	C
3	-	-	3

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in/on…

LO1: *fundamentals of Artificial Intelligence, agents, problem solving approaches & searching techniques*
LO2: *local search algorithms, game playing, solution searching using min-max and CSP problems*
LO3: *prepositional logic syntax & semantics, inference procedure, first order logic, acting logically according to planning*
LO4: *decision theory, making simple & complex decisions and robot hardware, software motion and applications*

UNIT – I (9)

Introduction: Introduction to AI, The foundations & history of AI
Intelligent Agents: Agents and environments, Nature of environments, Structure of agents
Problem Solving: Problem-solving agents, Example problems searching for solutions, Uninformed and informed search strategies, Heuristic functions

UNIT – II (9)

Classical Search: Local search algorithms & optimization problems, Local search in continuous space, searching in nondeterministic actions, Partial observations
Adversarial Search: Game playing, The Mini-max search procedure, Alpha-Beta pruning, cutoffs and Additional refinements
Constraint Satisfaction Problems (CSP): Constraint propagation, Backtracking search for CSPs

UNIT – III (9)

Logical Agents: Knowledge based agents, Wumpus world, Propositional logic
First Order Logic (FOL): Syntax & Semantics, Using FOL, Knowledge engineering, Inference in FOL, Forward chaining, Backward chaining, Resolution
Planning: Definition, Algorithm for planning state space search, Planning graphs, classical planning approaches, Analysis of planning, Time schedule and resources, Hierarchical planning, Planning in non deterministic planning

UNIT – IV (9)

Quantifying Uncertainty: Acting under uncertainty, Inference using full joint distribution, Bayes' rule
Probabilistic Reasoning Over Time: Time and uncertainty, Inference in temporal models, Hidden Markov models, Kalman filters, Dynamic Bayesian networks
Making Simple and Complex Decisions: Combining beliefs and desires under uncertainty, The basis of utility theory, Utility functions, Sequential decision problems, Value iteration and Policy iteration
Robotics: Robotic hardware, Perception, Planning and control, Application domains

Text Book:

[1] Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, 3rd ed., New Delhi: Prentice Hall Series in AI, 2010. (*Chapters 1-7, 9, 11, 14, 15, 16, 17, 25*)

Reference Books:

[1] Elaine rich and Kevin knight, *Artificial Intelligence*, 2nd ed., New Delhi: Tata McGraw-Hill, 2002.

[2] Mark Stefik, *Introduction to Knowledge Systems*, San Francisco: Morgan Kaufman, 1995.

[3] Winston, Patrick Henry, *Artificial Intelligence*, 3rd ed., California: Addison Wesley, 1995.

[4] Dan W. Patterson, *Introduction to Artificial Intelligence and Expert Systems*, 2nd ed., New Delhi, Prentice Hall of India, 1997.

Course Research Papers: Research papers (Indexed journals/conference papers) relevant to the course content will be posted by the course faculty in Course Web page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in Course Web page.

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course project titles in Course Web page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1: *apply fundamentals of artificial intelligence for various engineering problem-solving approaches*

CO2: *analyze search algorithms, game playing and constraint satisfying problem & solutions for designing effective artificial intelligence solutions*

CO3: *develop effective decision making artificial intelligent systems using prepositional logic, fist order logic and planning concepts*

CO4: *apply decision theory for simple & complex problems and illustrate the software & hardware used in robotics*

Course Articulation Matrix (CAM): U18AI404 ARTIFICIAL INTELLIGENCE

Course Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	U18AI404.1	2	2	2	2	1	1	-	1	1	1	-	2	2	1	2
CO2	U18AI404.2	2	3	3	2	1	1	-	1	1	1	-	2	3	1	1
CO3	U18AI404.3	2	3	3	2	1	1	-	1	1	1	-	2	3	1	1
CO4	U18AI404.4	2	2	2	3	1	1	-	1	1	1	-	2	3	1	1
U18AI404		2	2.5	2.5	2.25	1	1	-	1	1	1	-	2	2.75	1	1.25

U18AI405 DATABASE MANAGEMENT SYSTEMS

Class: B.Tech. IV- Semester **Branch:** Computer Science and Engineering (AI &ML)

Teaching Scheme:

L	T	P	C
3	1	-	4

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives(LOs):

This course will develop student's knowledge in/on…

LO1: diverse issues involved in the design and implementation of a database management system
LO2: study the physical and logical database designs and different database models
LO3: distinct normalization techniques on database systems and query optimization techniques
LO4: database structure and build up essential DBMS concepts like database security, data integrity and concurrency control

UNIT – I (9+3)

Databases and Database Users: Introduction, Characteristics of the database approach, Actors on the scene, Workers behind the scene, Advantages of using a DBMS, When not to use a DBMS
Database System Concepts and Architecture: Data models, Schemas and instances, Three-schema architecture and data independence, Database languages and interfaces, The database system environment, Classification of database management systems
The Relational Data Model, Relational Database Constraints: Relational model concepts, Relational constraints and the relational database schemas, Update operations and dealing with constraint violations
Basic SQL: SQL Data definition and data types, Specifying constraints in SQL, Basic retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL
NOSQL Databases: Introduction to NOSQL systems

UNIT - II (9+3)

Data Modeling using the Entity-Relationship Model: Using high-level conceptual data models for database design, Entity types, Entity sets, Attributes and keys, Relationships types, Relationship sets, Roles and structural constraints, Weak entity types, ER diagrams
Enhanced Entity-Relationship: Sub classes, Super classes and Inheritance, Specialization and generalization, Constraints and characteristics of specialization and generalization hierarchies, Modeling of union types using categories
Relational Database Design by ER and EER-to-Relational Mapping: Relational database design using ER-to-Relational mapping, Mapping EER model constructs to relations

UNIT - III (9+3)

Database Design Theory and Normalization: Informal design guidelines for relation schemas, Functional dependencies, Normal forms based on primary keys, General definitions of second and third normal forms, Boyce-Codd normal form, Algorithms for relational database schema design, Multivalued dependency and fourth normal form , Join dependencies and fifth normal form
The Relational Algebra and Relational Calculus: Basic relational algebra operations, Examples of queries in relational algebra, The tuple relational calculus, The domain relational calculus
Query Processing and Optimization: Translating SQL queries into relational algebra, Using heuristics in query optimization

UNIT - IV (9+3)

Introduction to Transaction Processing Concepts and Theory: Introduction to transaction processing, Transaction and system concepts, Desirable properties of transactions, Characterizing schedules based recoverability, Characterizing schedules based on serializability

Concurrency Control Techniques: Two-Phase locking techniques for concurrency control, Concurrency control based on timestamp ordering

Database Recovery Techniques: Recovery concepts, NO-UNDO/REDO Recovery Based on Deferred Update, Recovery techniques based on immediate update, Shadow paging

Database Security and Authorization: Introduction to database security issues, Discretionary access control based on granting and revoking privileges, Mandatory access control and role-Based access control for multilevel security

Text Books:

[1] RamezElmasri, Shamkanth B. Navathe, *Fundamentals of Database Systems*, 7th ed., New Delhi: Pearson Education, 2017

Reference Books:

[1] Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*, 4th ed., New Delhi: Mc-Graw Hill, 2014

[2] Abraham Siberschatz, Henry F. Korth, and S. Sudarshan, *Database System Concepts*, 6th ed., New Delhi: McGraw-Hill, 2011

[3] R. P. Mahapatra, Govind Verma, *Database Management Systems*, 1st ed., New Delhi: Khanna publications, 2016

[4] Thomas Connolly, Carolyn Begg, *Database Systems*, 3rd ed., Chennai: Pearson Education, 2003

Course Research Papers: Research papers (Journals/conference papers) relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in CourseWeb page.

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in CourseWeb page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1: analyze the schemata, illustrate the relational data model and consistency constraints effectively, and develop effective queries

CO2: design the database with an ER and EER models

CO3: apply the normalization on database to eliminate redundancy and query optimization techniques to determine the most efficient way to execute a query plans

CO4: apply multi-level security, correctness of data and control over access on database

Course Articulation Matrix (CAM): U18AI405 DATABASE MANAGEMENT SYSTEMS																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18AI405.1	2	2	2	2	1	1	-	1	1	1	-	2	2	1	2
CO2	U18AI405.2	3	3	3	3	1	1	-	1	1	1	-	3	3	1	3
CO3	U18AI405.3	3	3	3	3	1	1	-	1	1	1	-	3	2	1	2
CO4	U18AI405.4	2	2	2	2	1	1	-	1	1	1	-	2	3	1	2
U18AI405		2.5	2.5	2.5	2.5	1	1	-	1	1	1	-	2.5	2.5	1	2.25

U18AI406 PYTHON PROGRAMMING

Class: B.Tech. IV-Semester

Branch: Computer Science & Engineering (AI & ML)

Teaching Scheme :

L	T	P	C
3	-	-	3

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LOs):

This course will develop student's knowledge in/on…

LO1: basics of python programming, operators, control statements & functions in Python
LO2: namespaces, modules, collections, string handling methods & regular expressions
LO3: object oriented programming, inheritance, polymorphism, files& database connectivity using SQLite
LO4: Numpy, Pandas and Matplotlib libraries of Python

UNIT-I (9)

Introduction: Features of Python, The future of Python, Writing and executing Python programs

Python Preliminaries: Literal constants, Variables and identifiers, Data types, Input operation, Comments, Reserved words, Indentation, Operators, Expressions in Python, Type conversion

Decision Control Statements: Selection/Conditional branching statements, Loop structures/ iterative statements, Nested loop, the continue statement, the pass statement, the else statement used with loops

Functions: Function definition, Function call, Variable scope and lifetime, the return statement, Advances in defining in functions, Lambda functions, Recursive functions

UNIT-II (9)

Modules and Name Spaces: The from…import statement, Naming module, the dir() function, Packages in Python, Standard library modules, globals(), locals(), and reload(), Function redefinition

Python Strings: String operations, String formatting operator, Built-in string methods and functions, slice operation, ord() and Chr() Functions, in and not in operators, Comparing strings, Regular expressions and meta characters

Data Structures: Sequences, Lists, Tuple, Sets, Dictionaries

UNIT-III (9)

Python Object Oriented Programming: Classes and objects, Class method and self-argument, The __init__() method, Class variables and object variables, The __del__() method, Public and private data members, Private methods, Calling a class method from another class method, Built-in class attributes, Class methods, Static methods, Inheritance and polymorphism, Error and Exception handling

Files: Opening and closing files, Reading and writing files, File positions, Renaming and deleting files, Directory methods

Database Connectivity: Database browser for SQLite, Creating a database table, Insert and retrieve data from database

Case Study: Twitter spidering

UNIT-IV (9)

NumPy: The basics of NumPy arrays, Array indexing, Array slicing, Reshaping of array, Concatenation and splitting arrays, Introducing UFuncs

Data Manipulation with Pandas: Installing and using Pandas, Introducing Pandas objects, data indexing and selection, Handling missing data, Combining datasets, Merge and join, Aggregation and grouping

Visualization with Matplotlib: Importing Matplotlib, Saving figures to files, Simple line plots, Simple scatter plots, Histograms, Binnings, and density, Example-Handwritten digits, Text and annotations Example-Effects of holidays on US births, Geographic data with basemap, Plotting data on maps, Example-California cities

Text Book:

[1] Reema Thareja, *Python Programming using problem solving approach*, New Delhi: Oxford University Press, 2017. *(Chapter 1 to 7)*
[2] Jake VanderPlas, *Python Data Science Handbook- Essential Tools for Working with Data*, California: O'Reilly Media Inc., 2016. (*Chapter 2 to 4*)

Reference Books:

[1] Dr.Charles R. Severance, *Python for Everybody-Exploring Data Using Python*, open book, 2016.
[2] David Beazley, *Python Cookbook*, 3rd ed., California: O'Reilly Media, Inc., 2013.
[3] Caleb Hattingh, *20 Python Libraries You Aren't Using (But Should)*, 2nd ed., California: O'Reilly Media, Inc., 2016.
[4] Magnus Lie Hetland, *Beginning: from Novice to Professional*, New York City: A press, 2005.

Course Research Papers: Research papers (Indexed Journals/conference papers) relevant to the course content will be posted by the course faculty in Course Web page.

Course Patents: Patents relevant to the course content will be posted by the course faculty in Course Web page.

Course Projects: Course project is an independent project carried out by the student during the course period, under the supervision of course faculty. Course faculty will post few course projects titles in Course Web page. Students are encouraged to come up and experiment with the ideas that interest them.

Course Learning Outcomes(COs):

On completion of this course, student's will be able to…

CO1: make use of syntax, control statements, operators and functions for writing basic python programs
CO2: design programs using collections, namespaces, packages, strings& regular expressions
CO3: develop python programs using object oriented programming principles, files & database handling mechanisms
CO4: build visualization graphs with Matplotlib and adapt packages like Numpy or Pandas for statistical analysis & data handling

Course Articulation Matrix(CAM):U18AI406 PYTHON PROGRAMMING																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18AI406.1	1	1	1	1	2	1	-	1	1	1	-	2	2	1	1
CO2	U18AI406.2	1	1	2	1	2	1	-	1	1	1	-	2	2	1	1
CO3	U18AI406.3	2	2	2	2	3	1	-	1	1	1	-	2	2	2	1
CO4	U18AI406.4	2	2	2	2	3	1	-	1	1	1	-	2	2	2	2
U18AI406		1.5	1.5	1.75	1.5	2.5	1	-	1	1	1	-	2	2	1.5	1.25

U18AI407 DATABASE MANAGEMENT SYSTEMS LABORATORY

Class: B.Tech. IV- Semester **Branch:** Computer Science and Engineering (AI & ML)

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Exam	60 Marks

Course Learning Objectives(LOs):

This course will develop student's knowledge in/on…

LO1: SQL queries related to DDL, DML, TCL and DCL constructs using Oracle
LO2: SQL queries related to functions, joins, indexes, sequences and user defined data types
LO3: PL/SQL programs using PL/SQL block, cursors, parameterized cursors, and exceptions
LO4: PL/SQL programs using procedures, functions, packages and triggers

LIST OF EXPERIMENTS

Structured Query Language (SQL)
Experiment-I

1. Design and implement DDL, DML, TCL and DCL commands
2. Design and implement Queries on types of constraints

Experiment -II

3. Design and implement Queries using built-in functions of NUMBER, CHARACTER and DATE Data types
4. Design and implement Queries on Data type conversion functions

Experiment -III

5. Design and implement Queries on single row functions and operators

Experiment -IV

6. Design and implement Queries on aggregate functions

Experiment -V

7. Design and implement Queries on joins and nested queries

Experiment -VI

8. Construct SQL statements to create simple, composite indexes, user-defined data types, views, sequences

PL/SQL Programs:
Experiment –VII

9. Implementation of sample PL/SQL programs using conditional and iterative statements

Experiment -VIII

10. Implementation of PL/SQL programs using cursors

Experiment -IX

11. Implementation of PL/SQL programs using parameterized cursors

Experiment-X

12. Create PL/SQL programs to handle exceptions

Experiment –XI

13. Create PL/SQL programs using stored procedures and functions

Experiment -XII

14. Create PL/SQL programs using packages and triggers

Laboratory Manual:

[2] *Database Management Systems Laboratory Manual,* Dept. of CSE (AI & ML), KITS Warangal

Reference Books:

[5] Ivan Bayross, *SQL, PL/SQL: The Programming Language of Oracle,* 4th ed., New Delhi: BPB publications, 2010

[6] P. S. Deshpande, *SQL & PL/SQL for Oracle 11g Black Book,* New Delhi: Wiley Publisher, 2011

Course Learning Outcomes (COs):

On completion of this course, students' will be able to…

CO1: develop SQL queries using the concepts related to DDL, DML, TCL and DCL constructs of Oracle
CO2: develop SQL queries using functions, joins, indexes, sequences and views
CO3: develop SQL queries using the PL/SQL programs, cursors and exceptions
CO4: create PL/SQL programs using procedures, functions, packages and triggers

Course Articulation Matrix (CAM): U18AI407 DATABASE MANAGEMENT SYSTEMS LABORATORY																
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18AI407.1	2	2	2	2	2	1	-	1	2	1	-	2	2	1	2
CO2	U18AI407.2	2	2	2	2	2	1	-	1	2	1	-	2	2	1	2
CO3	U18AI407.3	2	2	2	3	2	1	-	1	3	1	-	2	2	1	3
CO4	U18AI407.4	2	2	3	3	2	1	-	1	3	1	-	2	3	1	3
U18AI407		2	2	2.25	2.5	2	1	-	1	2.5	1	-	2	2.25	1	2.5

U18AI408 PYTHON PROGRAMMING LAB

Class: B.Tech. IV-Semester **Branch: C**omputer Science & Engineering (AI & ML)

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme :

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):

This Course will develop student's knowledge in/on…

LO1: fundamentals of python programming such as variables, operators, control statements & functions

LO2: concepts such as namespaces, packages, string handling methods, regular expressions, lists&dictionaries of Python

LO3:concepts such as object oriented programming, creating classes, inheritance, polymorphism, error handling, file handling & accessing database of Python

LO4: NumPy, Pandas &Matplotlib libraries in python

Experiment-I (UNIT-I)

1. Installation of Python and verifying PATH environment variable
2. Running instructions in Interactive interpreter and a python script
   (a) Executing instructions in Python Interactive Interpreter
   (b) Running python scripts in Command Prompt
   (c) Running python scripts in IDLE
3. Write a program to demonstrate importance of indentations. Purposefully raise Indentation Error and correct it
4. Write a program to take input text as command line argument and display it on screen

Experiment-II

1. Write a program that takes 2 numbers as command line arguments and print its sum
2. Write a program to check whether the given number is even or odd
3. Write a program to calculate GCD of 2 numbers
4. Write a program to find Exponentiation (Power) of a number
5. Write a program to find given year is leap year or not
6. Write a program to develop a simple calculator

Experiment-III (Use functions concept for implementing below programs)

1. Write a program to find the Factorial of a given number
2. Write a program to evaluate the Fibonacci series for a given number 'n'
3. Write a program to find the Armstrong for a given number
4. Write a program to find sum of N numbers
5. Write a program to take a number as input, and print countdown from that number to zero (use while loop)
6. Write a program to find circulating 'n' values

Experiment-IV (UNIT-II)

1. Write a program to implement a module using import statement (Use python source file as a Module and implement import statement another python source files)
2. Write a program to implement from, import statement
3. Write a program to implement dir() function
4. Write a program to demonstrate packages in python

Experiment-V

Write python program on strings for the following

1. To display substring in a string
2. To update an existing string
3. To implement string concatenation
4. To demonstrate string formatting operator

Experiment-VI

1. Write a program to demonstrate use of slicing in strings
2. Write a program to compare two strings
3. Write a program which prints the reverse of a given input string. (use a function with name Reverse string and call this function for performing the operation)
4. To demonstrate built-in string methods
5. Write a program to demonstrate list and related functions

Experiment-VII

2. Write a program to demonstrate tuple, set and related functions
3. Write a program to demonstrate dictionaries
4. Write a program to demonstrate Regex functions
5. Write a program to demonstrate regular expressions using Meta characters

Experiment-VIII (UNIT-III)

Write python program for the following

1. To demonstrate classes and objects
2. To demonstrate class method and static method
3. To demonstrate inheritance

Write python program on file operations for the following

1. To open and read data from a file
2. To write data into a file
3. To compute number of characters, words, lines in a file

Experiment-IX

Write python programs to implement database connectivity

1. Install and verify SQLite Connector for Python
2. To connect check SQLite Database connectivity
3. To retrieve and display data from a table
4. To insert data into a table
5. To delete rows in a table

Experiment-X (UNIT-IV)

1. Install and setup NumPy environment
2. Write a program to demonstrate NumPy array
3. Write a program to demonstrate Slice operation
4. Write a program to demonstrate Reshaping of an array

Experiment-XI

1. Install and setup pandas environment
2. Write a python pandas program to create a series from an ndarray
3. Write a python pandas program to demonstrate indexing and selecting data
4. Twitter data analysis using Pandas

Experiment-XII

1. Install and setup matplotlib
2. Write a program to draw a simple line plot
3. Write a program to draw a histogram plot
4. Customize plots and experiment with different maps plots

Laboratory Manual:

[1] *Python Programming Laboratory Manual*, Dept. of CSE (AI & ML), KITSW

Reference Books:

[1] Reema Thareja, Python Programming using problem solving approach, New Delhi: Oxford university press, 2017. *(Chapter 1 to 7)*

[2] Jake Vander Plas, Python Data Science Handbook- Essential Tools for Working with Data, California: O'Reilly Media, Inc., 2016.(*Chapter 2 to 4*)

Course Learning Outcomes(COs):

On completion of this course, student's will be able to…

CO1: develop python programs using operators, control statements &functions

CO2: apply namespaces, packages, string handling methods, regular expressions, lists &dictionaries of Python for writing programs

CO3: build new classes, create objects, perform operations on files and implement database operations in Python

CO4: design visualization graphs with Matplotlib and experiment with Numpy& Pandas libraries for data

Course Articulation Matrix(CAM):U18AI408 PYTHON PROGRAMMING LAB															
Course Outcomes		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	U18AI408.1	2	2	2	2	2	1	-	1	2	1	-	2	2	2	2
CO2	U18AI408.2	2	2	2	2	2	1	-	1	2	1	-	1	2	2	2
CO3	U18AI408.3	2	2	2	2	3	1	-	1	2	1	-	2	2	2	2
CO4	U18AI408.4	2	2	2	2	3	1	-	1	2	1	-	2	2	2	2
U18AI408		2	2	2	2	2.5	1	-	1	2	1	-	1.75	2	2	2

U18OE411A OBJECT ORIENTED PROGRAMMINGLABORATORY

Class: B. Tech IV-Semester **Branch:** Open Elective Based Lab

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives(LO):

This course will develop students' knowledge in/on…

LO1: implementing concepts of object oriented programming
LO2: debug and test java applications effectively
LO3: effective use of exception handling, interfaces and packages during applications development
LO4: I/O and applet programming in java

List Of Experiments

Experiment-I

1. Write a program to demonstrate operators of java.
2. Write a program to demonstrate type casting and operator precedence.
3. Write a program to demonstrate different types of if-statements.
4. Write a program to demonstrate switch-case.

Experiment-II

1. Write a program to demonstrating loop control statements.
2. Write a program to demonstrate for-each control loop.
3. Implement programs using single dimensional arrays.
4. Write a program to define a two dimensional array where each row contains different number of columns.

Experiment -III

1. Write a program to demonstrate creating object to a class for accessing variables and methods.
2. Write a program to demonstrate creating multiple object.
3. Write a program to demonstrate passing objects to methods.
4. Write a program to demonstrate constructors and garbage collector by invoking it explicitly.

Experiment -IV

1. Write a program to demonstrate static members.
2. Write a program to demonstrate command line argument.
3. Write a program to demonstrate variable length argument.
4. Write a program to demonstrate wrapper classes.

Experiment -V

1. Write a program to demonstrate inheritance using extends keyword.
2. Write a program to demonstrate multilevel inheritance.
3. Write a program to demonstrate hierarchical inheritance.
4. Write a program to demonstrate access controls.

Experiment -VI

1. Write program to demonstrate *this* and *supper* keywords.
2. Write program to demonstrate dynamic method dispatch.
3. Write a program to demonstrate final variable and methods.
4. Write a program to demonstrate use of abstract class.

Experiment -VII

1. Write a program to define an Interface and implement it into a class.
2. Write a program to implement multiple interfaces into single class.
3. Write a program to extend interfaces.
4. Write a program to implement nested interfaces.

Experiment -VIII

1. Write a program to create a package, and demonstrate to import a package to a class.
2. Write a program to demonstrate access protection of packages.
3. Write a program to demonstrate static import of package.

Experiment-IX

1. Write a program to demonstrate *try* and *catch* statement for exception handling
2. Handle *Array Index Of Bounds Exception*, *Number Format Exception* and *Divide By Zero Exception* using multiple catch blocks.
3. Write a program to demonstrate user defined exception with *throw keyword*
4. Write a program to demonstrate *finally* block.

Experiment-X

1. Write a program to demonstrate string handling functions.
2. Write a program to demonstrate string searching functions.
3. Write a program to demonstrate string comparison functions.
4. Write a program to demonstrate string modification functions.

Experiment-XI

1. Write a program to demonstrate reading and writing input using byte stream classes
2. Write a program to demonstrate reading and writing input using character stream classes
3. Write a program to demonstrate data input and output streams
4. Write a program to demonstrate array input and output streams

Experiment-XII

1. Write a program to create a file using byte stream classes
2. Write a program to create a file using character stream classes
3. Write a program to open the specific file
4. Write a program to copy the content of one file to another.

Laboratory Manual:

1. Java Programming laboratory manual, *prepared by faculty of Dept. of CSE.*

Reference Book:

1. Herbert Schildt,"JAVA The Complete Reference", 9th Edition, McGraw-Hill Education India Pvt.Ltd , ISBN: 9781259002465, 2014.

Course Outcomes:

Course Code: U18OE411A		Course Name: Object Oriented Programming Laboratory
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18OE411A.1**	*implement OOP concepts using Java*
CO2	**U18OE411A.2**	*use the concepts like inheritance, polymorphism, packages and interfaces in application development*
CO3	**U18OE411A.3**	*handle runtime exceptions in object oriented programming*
CO4	**U18OE411A.4**	*build effective I/O interfaces for software applications*

Mapping of the Course Learning Outcomes with Program Outcomes:

Course Code: U18OE411A															
CO/PO	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE411A.1	2	2	2	1	-	-	-	-	-	1	-	-	2	1	2
U18OE411A.2	2	2	2	1	-	-	-	-	-	1	-	2	2	1	3
U18OE411A.3	2	2	2	1	-	-	-	-	-	1	-	2	2	1	3
U18OE411A.4	2	2	2	1	-	-	-	-	-	1	-	2	2	1	3
U18OE411	2	2	2	1	-	-	-	-	-	1	-	2	2	1	2.75

U18OE411B FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on

LO1: *determining the hydraulic coefficient for various flow measuring devices*

LO2: *implementing Bernoulli's equation and application of Bernoulli's theorem in estimating various losses in pipe*

LO3: *studying the various parameters which effects the impact of jet*

LO4: *studying the characteristics of hydraulic machines*

LIST OF EXPERIMENTS

1. Determination of Coefficient of Discharge for given Orifice meter and Venturi meter.
1. Determination of Coefficient of Discharge for given notches (triangular/rectangular)
2. Determination of Coefficient of Discharge for given orifice and mouth piece.
3. Verification of Bernoulli's theorem.
4. Estimation of coefficients of various head losses in pipes due to major and minor losses (sudden enlargement, sudden contraction and bend).
5. Determine of Reynolds's number using Reynolds's apparatus.
6. Determination of coefficient of impact for a jet on given vane.
7. Determination of performance characteristics of Francis Turbine
8. Determination of performance characteristics of Pelton Wheel.
9. Determination of performance characteristics of Centrifugal Pump.
10. Determination of performance characteristics of Submersible Pump.
11. Determination of performance characteristics of Reciprocating Pump.

Laboratory Manual:

1. "Fluid Mechanics Laboratory Manual", prepared by the faculty of Department of Civil Engineering.

Reference Books:

1. N. Kumara Swamy, "*Fluid Mechanics and Machinery Laboratory Manual*",Charotar Publishing House Pvt., Ltd., 1st edn.,2008.
2. Sarbjit Singh, "*Experiments in Fluid Mechanics*", PHI Learning Private Limited, New Delhi,2009.

Course Outcomes (COs):

Course Code:**U18OE411B**		Course Name: **Fluid Mechanics and Hydraulic Machines Laboratory**
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18OE411B.1**	*determine the hydraulic coefficient for various flow measuring devices*
CO2	**U18OE411B.2**	*apply Bernoulli's equation in estimating head loss in pipes*
CO3	**U18OE411B.3**	*apply the principles of impact of jet on different vanes*
CO4	**U18OE411B.4**	*demonstrate the characteristics of hydraulic machines.*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code:**U18OE311B**						Course Name: **Fluid Mechanics And Hydraulic Machines Laboratory**									
CO Code	**PO 1**	**PO2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE411B.1	2	1	-	1	-	-	-	-	1	-	-	1	2	-	-
U18OE411B.2	2	1	-	1	-	-	-	-	1	-	-	1	2	-	-
U18OE411B.3	2	1	-	1	-	-	-	-	1	-	-	1	2	-	-
U18OE411B.4	2	1	-	1	-	-	-	-	1	1	-	1	2	-	-
U18OE311B	**2**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**2**	**-**	**-**

U18OE411C MECHATRONICSLAB

Class: B.Tech. IV-Semester **Branch:** Mechanical Engineering

Teaching Scheme : **Examination Scheme:**

L	T	P	C
-	-	2	1

Continuous Internal Evaluation	:	40 marks
End Semester Examination	:	60 marks

Course Learning Outcomes (LOs):

This course will develop students' knowledge in /on

LO1: *basic elements underlying mechatronic systems: analog electronics, digital electronics, sensors, transducers, actuators, microcontrollers and embedded software.*

LO2*: interface of various systems to a PLC.*

LO3*: integration of various systems through programming.*

LO4*: design and simulation of hydraulic and pneumatic circuits.*

LIST OF EXPERIMENTS

1. Controlling A.C. Non servomotor clockwise and anti clockwise with time delay.
2. Controlling A.C. Non servo motor using digital inputs proximity sensors.
3. Controlling of Single acting Pneumatic Cylinder with time delay
4. Controlling of double acting Pneumatic Cylinder with time delay and sequencing
5. Control of D.C servomotor (rotating table clockwise and counterclockwise)
6. Integration of AC Non servo motors, single acting pneumatic cylinder and double acting pneumatic cylinder.
7. Integration of AC Non- servomotor and pneumatic cylinders with digital inputs.
8. Controlling of X table and Y table.
9. Controlling of various systems using manual inputs.
10. Controlling of traffic lights with time delay.
11. Controlling of lift operations with time delay.
12. Hydraulic and Pneumatic simulation.

Laboratory Manual:

1. Mechatronics Lab Manual, prepared by faculty of Mechanical Engineering, KITSW

REFERENCE BOOKS:

1. *ATS Manual of L.S. Mechatronics2000.*
2. Bolton W., Mechatronics, *Pearson Publications,* 5/e, ISBN-13: 978-0273742869,2011.

Course Outcomes (COs):

Course Code: **U18OE411C** Course Name: **MECHATRONICS LAB**		
CO	**CO code**	*Upon completion of this course, the student will be able to…*
CO1	**U18OE411C.1**	*Develop PLC program to control AC non servomotors, single acting and double acting pneumatic cylinders with different operation conditions*
CO2	**U18OE411C.2**	*Develop PLC program to control various systems.*
CO3	**U18OE411C.3**	*Integrate various mechanical and electrical systems and operate them.*
CO4	**U18OE411C.4**	*Design and simulate the hydraulic and pneumatic circuits.*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code: **U18OE411C** Course Name: **MECHATRONICS LAB**															
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18OE411C.1	1	2	1	2						1		1			
U18OE411C.2	1	2	1	2	2	-	-	-	-	1	-	1	1	1	1
U18OE411C.3	1	2	1	2	2	-	-	-	-	1	-	1	1	1	1
U18OE411C.4	1	2	1	2	2	-	-	-	-	1	-	1	1	1	1
U18OE411C	**1**	**2**	**1**	**2**	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**1**	**1**	**1**	**1**

U18OE411D WEB PROGRAMMINGLABORATORY

Class: IV Semester **Branch:** Computer Science and Engineering

Teaching Scheme:

L	T	P	C
-	-	3	2

Examination Scheme :

Continuous Internal Evaluation :	40 marks
End Semester Exam :	60 marks

Course Learning Objectives:
This course will develop students' knowledge in /on

CO1: implementing HTML Tags, CSS and Java Scripts for creating static web pages.
CO2: usage of JSP in designing dynamic web pages.
CO3: usage of PHP in designing a web base application.
CO4: accessing different web data servers using JSP and PHP

Experiment-1

1. Design the following static web pages with the following attributes:
   a. Basic Tags.
   b. Heading Tags.
   c. List (Ordered and Un-Ordered).
   d. Textbox, Buttons.

Experiment-2

2. HTML

AIM: Design the following static web pages required for an online book store web site.

a. HOMEPAGE:
b. LOGINPAGE
c. CATALOGEPAGE

DESCRIPTION:

a. HOMEPAGE

The static home page must contain three **frames**.

- ***Top frame*:** Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).
- ***Left frame*:** At least four links for navigation, which will display the catalogue of respective links. For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.
- ***Right frame*:** The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the website.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the Web Site			

b. LOGIN PAGE: This page looks like below:

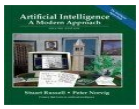
Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Login : Password: Submi Reset			

Experiment-3

c. CATOLOGUEPAGE:

The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following:

- Snap shot of Cover Page.
- Author Name andPublisher.
- Price and Add to cartbutton.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE		Book : XML Bible Author : Winston Publication :Wiely	$ 40.5	Add to cart
ECE		Book : AI Author :S.Russel Publication : Princeton hall	$ 63	Add to cart
EEE		Book : Java 2 Author : Watson Publication : BPB publications	$ 35.5	Add to cart
CIVIL		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 50	Add to cart

Experiment-4

3. **VALIDATION**
   AIM: To do validation for registration page using JavaScript.
   DESCRIPTION: Write *JavaScript* to validate the following fields of the above registration page.
   a. Name (Name should contains alphabets and the length should not be less than 6 characters).
   b. Password (Password should not be less than 6 characters length).
   c. E-mailid(shouldnotcontainanyinvalidandmustfollowthestandardpattern ***(name@domain.com)***
   d. Phone number (Phone number should contain 10 digits only). Note: You can also validate the login page with these parameters.

4. **CSS**
   AIM: Write a program illustrating various methods in cascading style sheets.
   a. Use different font, styles and set a background image
   b. Control the repetition of the image
   c. Define styles for links
   d. Work with layers and add a customized cursor
   DESCRIPTION: Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:
   a. Use different font, styles: In the style definition you define how each selector should work (font, color etc.).Then, in the body of your pages, you refer to these selectors to activate the styles.
   b. Set a background image for both the page and single elements on the page. You can define the background image for the page like this:
   c. Control the repetition of the image with the background-repeat property. As background-repeat:repeat
   d. Define styles for links
   e. Work with layers:
   f. Add a customized cursor:
   Selector {cursor:value}
   .xlink {cursor:crosshair}
   .hlink{cursor:help}
5. Embedding JavaScript in HTML pages.
6. Design a registration form and validate its field by using JavaScript.

Experiment-5

7. To design the scientific calculator and make event for each button using JavaScript.
8. WAP to create popup boxes in Java Script.
9. Program to create a class calculator that contains an overloaded method called "add" to calculate the sum of two integers, two float numbers and, one integer and one float.

Experiment-6

10. Print current date &time
11. JSP Program to auto refresh a page
12. JSP Program to count no. of visitors on website
13. JSP program for error handling
14. Demonstrate expression tag
15. Detect locale, language settings & local specific time
16. Demonstrate JSP implicit object
17. JSP Program to display given number in words

Experiment-7

18. Display the contents of Employee table in a neat format.
19. Insert ***N***, no. of records into Employee table using ***Prepared Statement.***
20. EnhancethesalariesofEmployeeby10%whoareearningsalarygreaterthan5000using ***Callable Statement.***
21. Delete all students whose marks are below 50% and also display the count.

Experiment-8

22. Write a HTML file to create a simple form with 5 input fields ***(Name, Password, Email, Pin code, Phone No. and a Submit button)*** and demonstrate required field validations to validate that all input fields are required and display error messages if the above validations do not hold.
23. Create a JSP Page with and run in JSP Engines.
24. Demonstrate Session Tracking in JSP.
25. JSP Program to validate username and password

Experiment-9

26. Create Database Connectivity with JSP page with different JDBC Drivers.
27. JSP Program to Select record from database
28. JSP Program to Insert a record into the database
29. Create a CRUD operation for JSP Page using MySQL
30. JSP Program to upload file into server

Experiment-10

31. Create a form for your college library entering student details for each student in the college. Validate the form using PHP valuators and display error messages.
32. Write a PHP which does the following job:
Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the User Name and Password from the database (instead of cookies).

Experiment-11

33. Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP.
34. Create and delete MYSQL database using PHP.

Experiment-12

35. Create a PHP program to demonstrate opening and closing a file.
36. Create a PHP program to demonstrate reading a file and writing in a file.

Course Code: **U18OE411D** Course Name: **Web Programming Laboratory**		
CO	**CO code**	*Upon completion of this course, the student will be able to…*
CO1	**U18OE411D.1**	create the static web pages using HTML Tags and CSS and Java Scripts
CO2	**U18OE411D.2**	design dynamic web page for web applications using JSP
CO3	**U18OE411D.3**	develop server side scripts for web base applications using PHP
CO4	**U18OE411D.4**	design web applications for effective storage and retrieval of data in MySQL using PHP.

Mapping of the course outcome with program outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12	PSO1	PSO2	PSO3
U18OE411D.1	2	2	2	1	2	1	-	1	2	1	2	1	2	2	2
U18OE411D.2	2	2	2	1	2	1	-	1	2	1	2	1	2	2	2
U18OE411D.3	2	2	2	1	2	1	-	1	2	1	2	1	2	2	2
U18OE411D.4	2	2	2	1	2	1	1	1	2	1	2	1	2	2	2
U18OE411D	**2**	**2**	**2**	**1**	**2**	**1**	**1**	**1**	**2**	**1**	**2**	**1**	**2**	**2**	**2**

U18OE411E MICROPROCESSORS LABORATORY

Class: B.Tech. IV-Semester **Branch:** Common to all branches

Teaching Scheme:

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LO):

This Course will develop student's knowledge on/in

LO1*: programming using 8086 Microprocessor kit*

LO2*: basic arithmetic programs and sorting using 8086 Microprocessor kit*

LO3*: string manipulation and code conversions using MASM*

LO4*: interfacing of subsystems to 8086 microprocessor kit*

List of Experiments

(Based on theory course U18OE303E)

1. Study of 8086 Trainer Board
2. Simple Arithmetic Operations (Addition, Subtraction, Multiplication and Division)
3. Finding Sum, Average.
4. Largest/Smallest Number in a given array
5. Arranging in Ascending/ Descending order
6. Finding Factorial using recursive procedure
7. Transfer of bytes from DS to ES
8. ALPs for String Manipulation
9. ALPs for Code conversions
10. Wave form Generation using DAC modules
    i. Square wave ii. Sawtooth wave iii. Triangular wave
11. ADC interfacing
12. Stepper motor –interfacing

Laboratory Manual:

1. Microprocessors Laboratory Manual, *prepared by the faculty of department of ECE,KITSW.*

Course Learning Outcomes (COs):

Course Code: **U18OE411E**		Course Name: **MICROPROCESSORSLAB**
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18OE411E.1**	*write and execute assembly language programs for given tasks on 8086 microprocessor kit*
CO2	**U18OE411E.2**	*implement code conversions and bit manipulations programs in 8086 using MASM*
CO3	**U18OE411E.3**	*write waveform generation code using DAC modules*
CO4	**U18OE411E.4**	*interface stepper motor, keyboard, memory etc. with 8086 microprocessor*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course code:**U18OE311E**					Course Name: **MICROPROCESSORSLAB**										
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PSO 2**	**PSO 3**
U18OE411E.1	3	3	2	1	--	--	--	--	--	--	--	--	2	2	1
U18OE411E.2	3	2	2	1	--	--	--	--	--	--	--	--	2	2	1
U18OE411E.3	3	2	1	1	--	--	--	--	--	--	--	--	2	2	1
U18OE411E.4	3	3	2	1	--	--	--	--	--	--	--	--	2	2	1
U18OE 411E	**3**	**2.5**	**1.75**	**1**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**2**	**2**	**1**

U18OE411F STRENGTH OF MATERIALSLABORATORY

Class: B.Tech.IV-Semester **Branch:** Common to all branches

Teaching Scheme :

L	T	P	C
-	-	2	1

Examination Scheme:

Continuous Internal Evaluation	40 marks
End Semester Examination	60 marks

Course Learning Objectives (LOs):

This course will develop students' knowledge in /on

LO1: *testing of civil engineering materials*

LO2: *mechanical properties of civil engineering materials*
LO3:*behavior of civil engineering materials when tested*
LO4:*codal specifications of various engineering materials*

LIST OF EXPERIMENTS

1. Determination of Stress–Strain characteristics of (a) Mild steel and (b) TOR steel.
2. Determination of the compressive strength of wood and punching shear strength.
3. Determination of the brinell's hardness numbers for steel, brass and aluminum.
4. Determination of the modulus of rigidity by conducting torsion test on solid shaft or hollow shaft.
5. Determination of the modulus of rigidity by conducting compression test on spring.
6. Determination of the Young's modulus of the given material by conducting flexural test on simply supported beam.
7. Determination of the Young's modulus of the given material by conducting flexural test on continuous beam.
8. Determination of the Young's modulus of the given material by measuring conducting flexural test on propped cantilever beam.
9. Bend and rebend test on steel specimen.
10. Shear test for Mild steel specimen.
11. Impact test on Metal Specimens using Izod test.
12. Impact test on Metal Specimens using Charpy test.
13. Demonstration of measuring strains using strain gauges, LVDTs

Laboratory Manual:

1. *Strength of Materials Laboratory Manual*, prepared by faculty ofCivil Engineering, KITSW

Reference Books:

1. Harmer E. DavisandGeorge Earl Troxell, "*Testing and Inspection of Engineering Materials*",Mc Graw-Hill book company, inc,2nd edn.,1955.
2. A.V.K. Suryanarayana, "*Testing of Metallic Materials*", Prentice-Hall of India, 2nd edn.,2007.
3. IS 1786:2008 "*High strength deformed steel bars and wires for concrete reinforcement-specification.* Bureau of Indian standards, New Delhi,2008.
4. IS 432(Part-I):1982 "*Specification for mild steel and medium tensile steel bars and Hard drawn steel wires for concrete reinforcement*". Bureau of Indian standards, New Delhi,1992.
5. IS 432(Part-II):1982 "*Specification for mild steel and medium tensile steel bars and Hard drawn steel wires for concrete reinforcement*". Bureau of Indian standards, New Delhi,2004.

Course Outcomes (COs):

Course Code: **U18OE411F**		Course Name: **Strength of Materials Laboratory**
CO	**U18OE411F.1**	Upon completion of this course, the student will be able to…
CO1	**U18OE411F.2**	correlate theory with the testing of engineering materials for quality assessment.
CO2	**U18OE411F.3**	evaluate the mechanical properties of civil engineering materials.
CO3	**U18OE411F.4**	appraise the behavior of civil engineering materials when tested under loads.
CO4	**U18OE411F.1**	realize the specifications recommended by codes to civil engineering materials.

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code: **U18OE411F** Course Name: **Strength of Materials Laboratory**

CO Code	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
U18OE411F.1	1	-	-	1	-	1	-	-	2	1	1	1	1	1	1
U18OE411F.2	1	-	-	1	-	1	-	-	2	-	-	1	1	1	1
U18OE411F.3	1	-	-	1	-	1	-	-	2	-	-	1	1	1	1
U18OE411F.4	1	-	-	1	-	1	-	2	1	1	1	1	1	1	1
U18OE411F	**1**	**-**	**-**	**1**	**-**	**1**	**-**	**2**	**1.75**	**1**	**1**	**1**	**1**	**1**	**1**

U18MH415 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Class :**B.Tech. III Semester** Branch : **Common to all branches**

Teaching Scheme:

L	T	P	C
2	-	-	-

Examination Scheme:

Continuous Internal Evaluation	40 Marks
End Semester Examination	60 Marks

Course Learning Objectives (Los):

This course will develop the student's knowledge in/on
LO1: *basic structure of Indian knowledge system*
LO2: *Indian perspective of modern science*
LO3: *basic principles of yoga and holistic health care*
LO4: *benefits of yoga practice*

Unit – I(6)

Basic Structure of Indian Knowledge System: Introduction, Vedas – Origin, Classification, Structure, Rig Veda, Sama Veda, Yajur Veda, Atharva Veda; Upavedas – Dhanurveda, Sthapatveda, Gandharvaveda, Ayurveda; Vedang – Shiksha, Chanda, Vyakarna, Nirukta, Kalpa, Jyothisha; Upanga – Dharmashastra, Mimamsa, Tarkashastra,Purana.

Unit – II (6)

Modern Science and Indian Knowledge System: Introduction – Vedas as Basis for Modern Science – Architectural Developments – Medicine and its relevance – Mathematical Sciences in Vedas – Space and Military related developments – Chemical Sciences

Unit – III (6)

Yoga and Holistic Health Care: Healthy mind in healthy body – Yoga: Definition, types; Yoga to keep fit: Diet, Yoga Asanas – Fundamentals; Breathing techniques in Patanjali Yogatradition – Pranayama; chakras; meditation; Benefits of Yoga – Physical Health, Emotional Health, Prevention of Disease, Reducing or Alleviating Symptoms of Problems

Unit – IV (6)

Case studies – Yoga Practice: Yoga as an effective tool for management of human crisis – Depression, Self – Concept & Mental health, Yoga for stress management; Yoga: A way to cure for Insomnia.

Requisite: Yoga practice sessions are to be conducted for all the students taking this course by the time they complete Unit 1 and Unit 2.

Text Books :

1. Sathish Chandra Chaterjee, Dhirendramohan Datta, "An Introduction to Indian Philosophy", Rupa Publications Pvt. Ltd. New Delhi. (Chapter 2,3)
2. Priyadaranjan Ray, S.N. Sen, "The Cultural Heritage of India", Vol. 6, Science and Technology, The Ramakrishna Mission Institute of Culture,Calcutta
3. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkatta

4. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, VidyanidhiPrakasha Delhi, 2016 (Chapter 4, 5, 6, 7,8)

Reference Book:

1. Swami Jitatmananda, "Holistic Science and Vedanta", Bharatiya Vidya Bhavan Bombay. (Chapter 2, 3)

Course Outcomes (COs):

Course Code: **U18MH415** Course Name: **Essence Of Indian Traditional Knowledge**		
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	U18MH415.1	*summarize the basic structure of Vedas, Upavedas, Vedanga, Upanga*
CO2	U18MH415.2	*explain Vedas as principal source of knowledge for scientific inventions*
CO3	U18MH415.3	*describe different yogasanas, breathing techniques, chakras, meditation and their benefits*
CO4	U18MH415.4	*discuss the benefits of yoga as an effective tool for management of human crisis*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Coursecode: **U18MH415**Course Name: **Essence Of IndianTraditional Knowledge**															
CO Code	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**	**PSO 3**
U18MH415.1	-	-	-	-	-	1	-	2	1	1	-	-	-	-	-
U18MH415.2	-	-	-	-	-	1	1	2	1	1	-	-	-	-	-
U18MH415.3	-	-	-	-	-	1	-	2	2	1	-	2	-	-	-
U18MH415.4	-	-	-	-	-	1	1	2	2	1	-	2	-	-	-
U18MH415	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**2**	**1.5**	**1**	**-**	**2**	**-**	**-**	**-**

U18CH416 ENVIRONMENTALSTUDIES

Class: B. Tech. IV-Semester
Teaching Scheme :

L	T	P	C
2	-	-	2

Branch: Common to all branches
Examination Scheme:

Continuous Internal Evaluation:	40 marks
End Semester Exam :	60 marks

Course Learning objectives (LOs):

This course will develop students' knowledge in/on
LO1: *necessity to use natural resources more equitably*
LO2 :*concepts of ecosystem and the importance of biodiversity conservation*
LO3 : *causes, effects and control measures of various environmental issues*
LO4 : *issues involved in enforcement of environmental legislation*

UNIT-I (6)

Introduction - The multidisciplinary nature of environmental studies - definition, scope and importance. **Natural Resources: Forest Resources -** Use and over–exploitation of forests, deforestation, timber extraction, mining, dams - their effects on forests and tribal people; **Water Resources -** Use and over-utilization of surface and ground water, floods, drought, conflicts over water; **Mineral Resources -** Environmental effects of extracting and using mineral resources; **Agricultural Land -** Land as a resource, land degradation, soil erosion and desertification; **Food Resources** - World food problems, effects of modern agriculture, fertilizer-pesticide problems, water logging and salinity; **Energy Resources -** Renewable and non-renewable energy sources, use of alternate energy sources.

UNIT-II (6)

Ecosystem and Biodiversity: Ecosystem - Concepts of an ecosystem, food chain, food webs, ecological pyramids, energy flow in the ecosystem and ecological succession;
Biodiversity and its Conservation – Introduction, definition, genetic, species and ecosystem diversity, value of biodiversity, biodiversity in India, hot spots of biodiversity, man-wildlife conflicts, endangered and endemic species of India, in-situ and ex-situ conservation.

UNIT-III (6)

Environmental Pollution: Global climatic change, green house gases, effects of global warming, ozone layer depletion; International conventions/protocols - Earth summit, Kyoto protocol and Montreal protocol; causes and effects of air, water, soil, marine and noise pollution with case studies; solid and hazardous waste management, effects of urban industrial and nuclear waste; natural disaster management - flood, earthquake, cyclone and landslides.

UNIT-IV (6)

Social Issues and the Environment: **Role of Individual and Society** - Role of individual in prevention of pollution, water conservation, Rain water harvesting and watershed management; **Environmental Protection / Control Acts** - Air (Prevention and control of Pollution) Act- 1981, water (Prevention and Control of Pollution) Act-1974, water Pollution Cess Act-1977, Forest conservation Act (1980 and 1992), wildlife Protection Act 1972 and environment protection Act 1986, issues involved in enforcement of environmental legislations; **Human Population and Environment** - Population growth, family welfare programmes, women and child welfare programmes, role of information technology in environment and humanhealth.

TEXT BOOK:

1.ErachBharucha, "Text Book of Environmental Studies for Under Graduate Courses(2nd edn.)", *Universities Press (India) Private Limited,* 2013.

REFERENCE BOOKS:

1. Y. Anjaneyulu, "Introduction to Environmental Science", *B.S. Publications,*2004.
2. Gilbert M. Masters, "Introduction to Environmental Engineering & Science", *Prentice Hall of India,* Third Edition,1991.
3. Anubha Kaushik, C.P. Kaushik, "Environmental Studies", 4/e, *New Age International Publishers,*2014.
4. R.Rajagopalan, "Environmental Studies from crisis to cure", *Oxford University Press*, Second Edition,2011.

Course Outcomes (COs):

Course Code: **U18CH416**		Course Name: **Environmental Studies**
CO	**CO code**	Upon completion of this course, the student will be able to…
CO1	**U18CH416.1**	*investigate any environmental issue using an interdisciplinary framework*
CO2	**U18CH416.2**	*formulate an action plan for sustainable alternatives and conserving biodiversity that integrates science, humanist, social and economic perspective*
CO3	**U18CH416.3**	*identify and explain the complexity of issues and processes which contribute to an environmental problem*
CO4	**U18CH416.4**	*participate effectively in analysis and problem-solving through knowledge in environmental legislations*

Course Articulation Matrix (Mapping of COs with POs and PSOs):

Course Code: **U18CH416**					Course Name: **Environmental Studies**							
CO/PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
U18CH416.1	2	1	2	1	-	2	1	-	1	-	-	-
U18CH416.2	-	-	2	-	-	1	2	-	1	-	-	-
U18CH416.3	1	2	1	-	-	1	2	1	1	-	-	-
U18CH416.4	-	-	1	-	-	1	2	-	1	-	-	-
U18CH416	**1.5**	**1.5**	**1.5**	**1**	**-**	**1.25**	**1.75**	**1**	**1**	**-**	**-**	**-**