VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

Ibrahimbagh, Hyderabad-31

Approved by A.I.C.T.E., New Delhi and

Affiliated to Osmania University, Hyderabad-07

Sponsored

by

VASAVI ACADEMY OF EDUCATION

Hyderabad

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR

B.E. (CSE)III and IV Semesters

With effect from 2023-24

(For the batch admitted in 2022-23)

(R-22)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Phones: +91-40-23146020, 23146021

Fax: +91-40-23146090

With effect from the Academic Year 2023-24

Institute Vision

Striving for a symbiosis of technological excellence and human values

Institute Mission

To arm young brains with competitive technology and nurture holistic development of the individuals for a better tomorrow

Department Vision

To be a center for academic excellence in the field of Computer Science and Engineering education to enable graduates to be ethical and competent professionals

Department Mission

To enable students to develop logic and problem solving approach that will help build their careers in the innovative field of computing and provide creative solutions for the benefit of society.

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B.E (CSE) Program Educational Objectives (PEO's)	
Graduates should be able to utilize the knowledge gained from their academic program to:	
PEO I	Solve problems in a modern technological society as valuable and productive engineers.
PEO II	Function and communicate effectively, both individually and within multidisciplinary teams.
PEO III	Be sensitive to the consequences of their work, both ethically and professionally, for productive professional careers.
PEO IV	Continue the process of life-long learning.

B.E. (CSE) PROGRAM OUTCOMES (PO's) Engineering Graduates will be able to:	
PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
P1O	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
P11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
P12	**Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

B.E (CSE) PROGRAM SPECIFIC OUTCOMES (PSO's)	
PSO I	Graduates will have knowledge of programming and designing algorithms to develop solutions for engineering problems pertaining to AI&ML.
PSO II	Graduates will be able to develop models in Machine Learning, Deep Learning using knowledge of AI and modern tools.
PSO III	Graduates will apply AI&ML techniques for real world applications in the areas of Cyber Security, Image processing, Natural Language Processing and IoT

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION(R-22)
FOR B.E 2022-23 ADMITTED BATCH III SEMESTER (A.Y 2023-24)

B.E. CSE (AI&ML) III Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
THEORY								
UII22PC310CS	Microprocessors, Microcontrollers & Interfacing	3	-	-	3	60	40	3
UII22PC320CS	Data Structures	3	-	-	3	60	40	3
UII22PC330CS	Object Oriented Programming	3	-	-	3	60	40	3
UII22PC340CS	Computer Architecture	3	-	-	3	60	40	3
U22BS320MA	Transform Techniques, Probability and Statistics	3	-	-	3	60	40	3
U22OE3XXXX	Open Elective-I	2	-	-	3	60	40	2
U22HS320EH	Skill Development Course- I (Communication Skills in English I)	1	-	-	2	40	30	1
UII22PE330CS	Skill Development Course- II (Technical Skills-I)	1	-	-	2	40	30	1
U22HS030EH	Human Values and Professional Ethics-II	1	-	-	2	40	30	1
PRACTICALS								
UII22PC311CS	Microprocessors, Microcontrollers & Interfacing Lab	-	-	2	3	50	30	1
UII22PC321CS	Data Structures Lab	-	-	2	3	50	30	1
UII22PC331CS	Object Oriented Programming Lab	-	-	2	3	50	30	1
	TOTAL	**20**	**0**	**6**		**630**	**420**	**23**
	GRAND TOTAL	**26**				**1050**		
Student should acquire one NPTEL course certification of 8 weeks duration (2 credits) during I Sem to VI Sem								

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MICROPROCESSORS, MICROCONTROLLER & INTERFACING

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **UII22PC310CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Explain the architecture of 8086 microprocessor, 8051 microcontroller and ARM processor 2 Write assembly language programs to interface I/O devices with processor and controller	1 Explain the architecture, addressing modes and instruction set of 8086 microprocessor 2 Explain interrupt handling mechanisms of 8086 microprocessor 3 Interface analog and digital I/O devices with8086 microprocessor 4 Write assembly language programs using instruction set of 8051 and ARM controller 5 Write programs to interface 8051 microcontroller with I/O devices such as keyboard and stepper motor

UNIT-I:

Microprocessor: Introduction, Overview of Micro computer structure and Operation, Microprocessor Evolution and Types, 8086 Internal Architecture, Pin Configuration, Minimum and Maximum mode, addressing modes, Instruction set, Programming the 8086, Accessing Data in Memory.

UNIT-II: Implementing standard program structures in 8086, Strings, Procedures and Macros, Assembler directives, Interrupts and Interrupt Applications, Hardware and software interrupt applications, Interrupt examples.

UNIT-III:

Digital Interfacing: Programmable Parallel Ports and Handshake Input/Output, Programmable Peripheral Interface (8255A), Programmable Communication Interface (8251A), Keyboard and display Controller (8279) Interfacing, Programmable Interrupt Controller(8259),Interfacing to Alpha Numeric Displays, Interfacing LCD displays.

Analog Interfacing – A/D & D/A interfacing, DMA Controller(8257).

UNIT-IV: Introduction to Microcontrollers, 8051 Architecture, Instruction set, Addressing modes and Programming techniques. Comparison of various families of 8-bit micro controllers, System Design Techniques.

UNIT-V: Interfacing of LCD, ADC, Sensors, Stepper motor, keyboard and DAC using 8051 microcontrollers.

ARM Processor: Introduction, Processor and Memory Organization, Data Operations, Flow of Control, NodeMCU (Node MicroController Unit)

Case studies: Case study on Home protection system, Case study on closed loop DC motor speed control system.

Learning Resources:

1. Douglas V. Hall, Microprocessors and Interfacing, 2ndEdition (2006), McGraw Hill.
2. Kenneth J. Ayala, The 8051 Microcontroller Architecture, Programming and Application, Penram International (2007)
3. Marilyn Wolf, Computers as Components: Principles of Embedded Computing System Design, 3rd Edition (2012), Elsevier Morgan Kauffmann Publishers.
4. Yu-cheng Liu, Glenn A. Gibson, Microcomputer Systems The 8086/8088 Family - Architecture, Programming and Design 2ndEdition (2011)
5. Barry B. Brey, The Intel Microprocessor, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium pro-processors – Architecture, Programming and interfacing, 8thEdition (2013), Prentice Hall.
6. Ray A.K & Bhurchandhi K.M, Advanced Microprocessor and Peripherals,2ndEdition(2007),TMH.
7. K. Shibu, Introduction to Embedded Systems, (2009), Paperback.
8. Speed Control of 2-pole DC Motor Using Pwm PROTEUS VSM 7.9 & AVR STUDIO (SOFTWARE)By IJSTE - International Journal of Science Technology and Engineering.
9. http://nptel.ac.in/courses/108107029/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2023-24

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Department of Computer Science & Engineering

DATA STRUCTURES

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week):3:0:0	SEE Marks: 60	Course Code:**UII22PC320CS**
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Identify and use appropriate data structure for a given problem with effective utilization of space and time. 2 Describe the linear and nonlinear data structures. 3 Analyze the complexities of different sorting techniques.	1 Compute time and space complexities of Algorithms. Design a solution to a given problem using arrays. 2 Develop applications using stacks, queues and linked lists. 3 Choose the appropriate nonlinear data structure and perform operations on them. 4 Choose suitable sorting technique to maximize the performance of the solution. Select the hashing technique to perform dictionary operations. 5 Explain operations on Efficient Binary Search Trees and Multiway Search Trees.

UNIT-I:

Basic concepts: Algorithm Specification- Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations.

Arrays: Arrays - ADT, Polynomials, Sparse matrices, Strings-ADT, Pattern Matching.

UNIT-II:

Stacks and Queues: Stacks, Stacks using dynamic arrays, Queues, Circular Queues using dynamic arrays, A Mazing Problem, Evaluation of Expressions – Evaluating Postfix Expression, Infix to Postfix.

Linked Lists: Singly Linked Lists and Chains, Linked Stacks and Queues, Polynomials, Operations for Circularly linked lists, Equivalence Classes, Sparse matrices, Doubly Linked Lists.

UNIT-III:

Trees: Introduction, Binary Trees, Binary Tree Traversals, Heaps, Binary Search trees (BST): Definition, Searching a BST, Insertion into a BST, Deletion from a BST.

Graphs: The Graph ADT, Elementary graph operations, Minimum Cost Spanning Trees- Kruskal's Algorithm, Prim's Algorithm.

UNIT-IV:

Sorting: Insertion Sort, Quick sort, Merge sort, Heap sort, Sorting on Several Keys, List and Table Sorts.

Hashing :Introduction, Static Hashing: Hash tables, Hash functions, Overflow handling.

UNIT-V:

Efficient Binary Search Trees: AVL Trees, Red-Black Trees, Splay Trees.

Multiway Search Trees: m-way search trees-Definition and properties, Searching an m-way search tree, B-Trees-Definition and properties, Number of Elements in a B-Tree, Insertion into a B-Tree and Deletion from a B-Tree.

Trie Data Structure: Introduction, Basic Operations.

Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press.
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, 2nd Edition (2002), Pearson.
3. Kushwaha D. S and Misra A.K, Data Structures A Programming Approach with C, Second Edition(2014), PHI.,
4. Gilberg R. F and Forouzan B. A, Data Structures: A Pseudocode Approach with C, Second Edition(2007), CengageLeaming
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press
7. YedidyahLangsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos
9. http://nptel.ac.in/courses/106106127/
10. http://www.nptel.ac.in/courses/106102064

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

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Department of Computer Science & Engineering

OBJECT ORIENTED PROGRAMMING

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks:60	Course Code:**UII22PC330CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply object oriented principles to develop applications using Java constructs.	1 Apply object oriented programming concepts to solve a problem 2 Employ exception handling, concurrent programming practices to develop a parallel processing application 3 Perform I/O operations to develop an interactive Java application. 4 Design a Java utility using the collection framework 5 Apply functional programming constructs and understand a large scale project development architecture style.

UNIT-I:

Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Concepts, Benefits of Object Oriented Development.

Java Programming Fundamentals: Introduction, Overview of Java, JVM Architecture, Data types, Variables and Arrays, Operators, Control Statements, Classes and Methods, Garbage Collection, this keyword, final, Inheritance, Method Overriding.

UNIT-II:

Classes and Interfaces: Singleton class, Abstract class, Nested class, Interface, Package.

Exception Handling: Introduction, types of exceptions, syntax of exception handling code, multiple catch statements, using finally statement, user-defined exceptions.

Multithreaded Programming: Introduction to threads, creating threads, extending the Thread class, implementing the Runnable interface, life cycle of a thread, priority of a thread, synchronization, and Inter-thread Communication, Deadlock.

UNIT-III:

StringHandling: String, StringBuffer and StringBuilder

Java.lang: Type Wrapper, Process, Runtime, Object class, Generics

IO: Java I/O Classes and Interfaces, Files and Directories, Byte and Character Streams, Serialization.

UNIT-IV: **Collections:**

Introduction to Collection: Interfaces, Collection Classes, Iterators, List, Set, Maps, Comparator, Arrays.

Legacy Classes and Interfaces, StringTokenizer, BitSet, Date, Calendar, Random, Flow, Timer.

UNIT-V:

Lambda expressions: Expressions, Functions, lambda as argument

Stream API: Basics, Filter, Sort, Map, Collect

Regular Expressions: Pattern, Matcher, Regular expression Syntax

JAVA Beans: Architecture

Learning Resources:

1. Herbert Schildt, Java: The Complete Reference, 12th Edition, Tata McGraw Hill 2021.
2. Joshua Bloch, Effective Java, 3rd Edition, Pearson, 2017
3. Timothy Budd, An introduction to Object-Oriented Programming, 3rd Edition, Pearson Education, 2008
4. Eric Freeman, Bert Bates, Kathy Sierra , Head First Design Patterns: A Brain-Friendly Guide, 1st Edition, O'Reilly, 2016
5. P.RadhaKrishna, Object Oriented Programming through Java, UniversitiesPress,2007.
6. Sachin Malhotra, Saurabh Choudhary, Programming in Java, 2nd Edition, Oxford Press, 2014.
7. https://docs.oracle.com/javase/tutorial/java

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2023-24

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Department of Computer Science & Engineering

COMPUTER ARCHITECTURE

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**UII22PC340CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, students will be able to
• Learn the structure and behavior of various functional modules of a computer and identify how they interact to provide the processing needs of the user. • Understand memory hierarchy and analyze different ways of communicating with I/O of digital computer.	1. Analyze the major components of a computer and design basic hardware for functional modules of digital computer. 2. Analyze micro programmed control unit for designing a digital computer. 3. Apply pipeline concepts to increase computational speed of CPU and analyze the flow of data and instructions in the CPU operations. 4. Analyze techniques used by a computer to communicate with I/O devices. 5. Evaluate the memory organization techniques and assess the performance of a CPU.

UNIT-I

Overview of Computer Function and Interconnection: Computer Components, Interconnection Structures, Bus Interconnection, Bus Structure, Data Transfer.

Register Transfer Micro operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic, Logic, Shift Micro operations, Arithmetic Logic Shift Unit.

UNIT-II

Basic Computer organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instruction, Input-Output and Interrupt.

Micro programmed Control: Control memory, Address Sequencing, Micro program Example, Design of Control Unit.

UNIT-III

Central Processing Unit: General Register organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, RISC.

Pipeline: Parallel processing, Pipelining, Arithmetic pipeline, Instruction Pipeline.

Computer Arithmetic: Addition and Subtraction, Multiplication, Division, Floating Point Arithmetic Operations.

UNIT-IV

Input-Output organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor (IOP).

UNIT-V

Memory Organization: Memory Hierarchy, Main Memory, RAM and ROM, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Assessing and Understanding Performance: CPU Performance and its Factors, Evaluating Performance.

Suggested Books:

1. M.Morris Mano, Computer System Architecture, 3rd Edition (2007), Pearson Education Asia.

Reference Books:

1. William Stallings, Computer Organization & Architecture, 8th Edition (2011), Pearson Education Asia.
2. David A Patterson, John L Hennessy, Computer Organization and Design, 4th Edition (2014), Morgan Kaufmann.
3. Carl.V Hamacher, Vranesic Z.G, Zaky S.G, Computer Organization, 5th Edition (2011), McGraw Hill.
4. Pal Chaudhuri.P, Computer Organization and Design, , 3rd Edition(2009), Prentice Hall of India.

Online Resources:

1. http://nptel.ac.in/courses/106102157/
2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-823-computer-system-architecture-fall-2005/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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DEPARTMENT OF MATHEMATICS

TRANSFORM TECHNIQUES, PROBABILITY & STATISTICS

SYLLABUS FOR B.E. III-SEMESTER

L :T:P(Hrs/week): 3:0:0	SEE Marks :60	Course Code:**U22BS320MA**
Credits :3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Study the Fourier series, conditions for expansion of function and half range series 2. Learn the concept of Fourier, Sine, Cosine and inverse Fourier Transform Sine and Cosine transform of a function and various properties. 3. Understand random variables and probability distributions 4. Study the standard statistical tests employed for small samples 5. Study the method to fit different curves to a given data and measuring the Correlation between variables	1. Expand any function which is continuous, Discontinuous, even or odd in terms of its Fourier series. 2. Determine Fourier transform, Fourier sine and cosine transform and inverse Fourier Sine and Cosine transform of a function. 3. Apply various probability distributions to solve practical problems 4. Estimate unknown parameters of populations and apply the tests of hypothesis for small samples 5. Solve problems to fit various curves to the given data using curve fitting, and also to find co-efficient of correlation between the variables.

UNIT –I (10Hours)

Fourier series: Introduction to Fourier series – Conditions for a Fourier expansion – Functions having points of discontinuity – Change of Interval - Fourier series expansions of even and odd functions - Fourier Expansion of Half- range Sine and Cosine series.

UNIT-II (10Hours)

Fourier Transforms: Fourier Integral Theorem (without Proof) - Fourier Transforms – Inverse Fourier Transform - Properties of Fourier Transform – Fourier Cosine & Sine Transforms.

UNIT-III (10 Hours)
Probability Distribution:
Random Variables - Discrete and Continuous Random variables-Properties-Distribution functions and densities - Normal Distribution-Properties-Standard Normal variate.

UNIT-IV(12 Hours)
Test of Hypothesis
Introduction -Testing of Hypothesis- Null and Alternative Hypothesis -Errors- -Level of Significance-Confidence Intervals -Tests of Significance for small samples - t-test for single mean - F- test for comparison of variances - Chi-square test for goodness of fit..

UNIT-V (10Hours)
Curve Fitting:
Curve fitting by the Method of Least Squares - Fitting of Straight Line-Second order curve (parabola) - Exponential curves- Correlation – Karl Pearson's Co-efficient of Correlation.

Text Books:

1. R.K. Jain & S.R.K. lyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.

Reference Books:

1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali& Manish Goyal, Laxmi Publication.
3. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand& sons, New Delhi.

Online Resources :

1. http://mathworld.wolfram.com/topics
2. http://www.nptel.ac.in/course.php

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

OPEN ELECTIVES OFFERED IN B.E. III SEMESTER (2023-24)

Dept	Title (Open Elective-I)	Code	Credits
CIVIL	Green Buildings	U22OE310CE	2
ECE	Introduction to Signals and Systems (Communication Engineering Stream)	U22OE340EC	2
EEE	Non Conventional Energy Sources	U22OE310EE	2
Mech	Introduction to Unmanned Aerial Vehicles (Stream: Unmanned Aerial Vehicles)	U22OE310ME	2
	Introduction to Industrial Robotics (Stream: Robotics)	U22OE320ME	2
	Introduction to Automobile Engineering (General Pool)	U22OE330ME	2
Maths	Complex Variables	U22OE320MA	2
H&SS	Learning to Learn	U22OE310EH	2
Physics	Smart Materials and Applications (General Pool)	U22OE310PH	2
	Track-I: Materials Science for Engineers Fundamentals of Materials Science	U23OE330PH	2
	Track-II: Semiconductor Physics and Device Applications Essentials of Semiconductor Physics	U23OE320PH	2
Chem.	Polymeric Materials	U22OE310CH	2

With effect from the Academic Year 2023-24

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

GREEN BUILDINGS (Open Elective-I)

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:60	Course Code: **U22OE310CE**
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Learn the principles of planning and orientation of buildings. 2. Environmental implications of natural and building materials along with green cover 3. Acquire knowledge on various aspects of green buildings	1. Explain the principles of building planning, its bylaws and provide facilities for rainwater harvesting. 2. Analyse the aspects of energy, water and waste management in buildings. 3. Understand the concepts of green building technologies. 4. Understand rating systems of GRIHA IGBC and LEED.

UNIT-I: Planning of buildings: Principles of planning, Relevant building bylaws, site selection for buildings, orientation of buildings, Provision of rain water harvesting

UNIT-II: Building-Energy-Implications: Environmental implications of buildings energy, carbon emissions, water use, waste disposal; Building materials: sources, methods of production and environmental Implications. Green building materials and recycling, Green cover and built environment

UNIT-III: Green Building Technologies: Introduction- Necessity - Concept of Green building. Principles of green building – Site selection criteria for Green Buildings – effective cooling and heating systems – effective electrical systems-Passive solar architecture - effective water conservation systems

UNIT-IV: Certification Systems: Certification systems- Green Rating for Integrated Habitat Assessment (GRIHA), Indian Green Building Council (IGBC) and Leadership in Energy and Environmental Design (LEED), case studies

Learning Resources:

1. Kumara Swamy N.Kameswara Rao A., Building Planning And Drawing, Charotar, Publications, 2013.
2. Shahane, V. S, "Planning and Designing Building", Poona, Allies Book Stall, 2004.
3. Michael Bauer, Peter Mösle and Michael Schwarz "Green Building – Guidebook for Sustainable Architecture" Springer, 2010.
4. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison "Green Building Handbook" Volume I, Spon Press, 2001.
5. Mili Majumdar, "Energy-efficient buildings in India" Tata Energy Research Institute, 2002.
6. TERI "Sustainable Building Design Manual- Volume I & II" Tata Energy Research Institute, 2009.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INTRODUCTION TO SIGNALS & SYSTEMS

(Communication Engineering Stream: Open Elective - I)

SYLLABUS FOR B.E. III – SEMESTER (Other branches)

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: **U22OE340EC**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Define and classify continuous and discrete time signals and systems. 2. Determine frequency domain characteristics of continuous and discrete time signals.	**On completion of the course, students will be able to** 1. Analyze basic signals and systems in continuous and discrete time domain 2. Apply the properties of different transformation techniques to analyze continuous time domain signals and systems in frequency domain 3. Determine the response of an LTI system using Convolution 4. Apply the properties of different transformation techniques to convert a discrete time domain signal to frequency domain

UNIT - I

Continuous time signals: types of signals, representation of signals, basic elementary signals, operations on signals.

Continuous time systems: Classification of systems - static and dynamic, linear and non linear, time invariant and time variant.

Lab Activity: Generation of elementary signals in MATLAB.

UNIT - II

Continuous time Fourier Series: Introduction, existence, properties, magnitude and phase spectrums

Continuous time Fourier transforms: Introduction, existence,

properties, magnitude and phase spectrums.

Lab Activity: Verification of properties of Fourier Transform in MATLAB.

UNIT – III

Laplace transforms: Introduction, existence, Laplace transform of basic elementary signals, properties, inverse Laplace transforms, Analysis of LTI systems using Laplace Transform.

Lab activity: Obtaining system response using Laplace transforms in MATLAB

UNIT - IV

Discrete time signals: types of signals, representation of signals, basic elementary signals, operations on signals.

Discrete time systems: classification of systems - static and dynamic, linear and non linear, time invariant and time variant.

Lab activity: Generation of elementary signals in MATLAB.

Learning Resources:

1. P. Ramakrishna Rao, Signals and Systems, Mc Graw Hill, 2008.
2. Alan V. Oppenheim, Alan S. Wilsky and S. Hamid Nawab, Signals and Systems, 2nd ed., PHI, 2009.
3. Nagoor kani , Signals and Systems McGraw Hill, 2013
4. https://onlinecourses.nptel.ac.in/noc19_ee07/preview
   (Principle of Signals and Systems by Prof. Aditya K Jagannatham
5. https://www.edx.org/course/signals-and-systems-part-1-1
6. https://www.edx.org/course/signals-systems-part-2-iitbombayx-ee210-2x-3

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2. No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Non Conventional Energy Sources

Open Elective-I

SYLLABUS FOR B.E. III SEMESTER

L: T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:**U22OE310EE**
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To provide a survey of the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state- of -the-art energy systems.	1. Demonstrate the generation of electricity from various Non-Conventional sources of energy and solar power generation 2. Illustrate the generation of energy from wind and generation of energy from waste 3. Demonstrate the generation of energy by biomass and fuel cells 4. Illustrate the ocean and geo thermal energy generation

UNIT-I: Introduction and Solar Energy:

Introduction: Need for Non-conventional energy sources, Types of Non-Conventional energy sources. Renewable energy across the Global and in India. Renewable energy for rural applications, Renewable energy for urban, industrial and commercial applications

Solar Energy: Solar cell fundamentals: Semiconductors, Photovoltaic effect, Solar PV cell, module, panel, array, Solar cell operating characteristics: Voltage-current characteristic, energy losses, maximising the performance. Applications of solar energy, Solar energy program in India, Case study

UNIT-II: Wind Energy and Waste to Energy:

Wind Energy: Nature of wind, Basic components of Wind Energy Conversion System(WECS), Power extraction from the wind, Applications of wind energy. Wind energy program in India, Case Study

Waste to Energy: Key issues, Waste recovery management, Case study

UNIT-III: Biomass Energy and Fuel Cells:

BiomassEnergy: Definition, Bio fuels, Biomass resources, Biomass conversion technologies: Incineration- Thermo chemical conversion- Bio-chemical conversion. Advantages and disadvantages of biomass energy, Case study

Fuel Cells: Definition-Classification of fuel cells, Principle of operation, Hydrogen-oxygen fuel cell, Alkaline fuel cell, Proton exchange membrane fuel cell, Molten carbonate fuel cell, Solid oxide electrolyte cells, Comparison of fuel cells- Advantages and Disadvantages of fuel cells-Applications of Fuel cells. Case study

UNIT-IV: Ocean Energy and Geothermal Energy:

Ocean Energy: Ocean thermal electric conversion (OTEC) methods: Open cycle and Closed cycle- Principles of tidal power generation-Advantages and limitations of tidal power generation, Case study

Geothermal Energy: Geothermal resources- Vapour dominated geothermal plant- Liquid dominated geothermal plant- Applications of Geothermal Energy, Case study

Learning Resources:

1. B H KHAN, Non-Conventional Energy Resources, McGraw Hill, 2nd Edition, 2009.
2. G. S. Sawhney, Non-Conventional Energy Resources, PHI Learning Pvt Ltd, 2012
3. ShobhNath Singh, Non-Conventional Energy Resources, Pearson, 2016
4. G.D. Rai, Non-Conventional Energy Sources ,Khanna Publishers, New Delhi, 2011.
5. Ashok Desai V, Non-Conventional Energy, Wiley Eastern Ltd, 1990.
6. Mittal K.M, Non-Conventional Energy Systems, Wheeler Publishing Co. Ltd, 1997.
7. Ramesh R, Kurnar K.U, Renewable Energy Technologies, Narosa Publishing House, New Delhi, 1997.

The break-up of CIE : Internal Tests+Assignments+Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 2	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 2	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

INTRODUCTION TO UNMANNED AERIAL VEHICLES
(Stream: Unmanned Aerial Vehicles)
(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U22OE310ME**
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
The objective of this Course is to understand the features of UAV, elements, navigation and guidance of UAV and to design and silmulate UAV	1 Explain the types and characteristics of UAVs and their applications. 2 Illustrate the concepts of aerodynamics of flight vehicle. 3 Identify and explain the components, sensors and payload of UAVs, their navigation and guidance. 4 Design and perform structural, aerodynamic analysis of UAV components

Unit-I: Introduction to UAV

UAV: Definition, History; Difference between aircraft and UAV; DGCA Classification of UAVs; Types and Characteristics of Drones: Fixed, Multi-rotor, and Flapping Wing; Applications: Defense, Civil, Environmental monitoring.

Unit-II: Basics of Flight

Different types of flight vehicles; Components and functions of an airplane; Forces acting on Airplane; Physical properties and structure of the atmosphere; Aerodynamics – aerofoil nomenclature, aerofoil characteristics, Angle of attack, Mach number, Lift and Drag, Propulsion and airplane structures.

Unit-III: UAV Elements, Navigation and Guidance

Components: Arms, motors, propellers, electronic speed controller (ESC), flight controller; Propulsion; Data Link; Sensors and Payloads: GPS, IMU, Light Detection and Ranging (LiDAR), Imaging cameras, Classification of payload based on applications; Hyper-spectral sensors; Laser Detection and Range (LADAR); Synthetic Aperture Radar (SAR); Thermal cameras; ultra-sonic detectors; Case study on payloads. Introduction to navigation systems and types of guidance; Mission Planning and Control.

Unit-IV: Design & Simulation of UAV

Introduction to CAD; Design of UAV components; Structural Analysis using CAE; Aerodynamic Analysis using CFD; Manufacturing of the components of UAVs: 3D printing; Case studies;

Learning Resources:

1. Andey Lennon, "Basics of R/C Model Aircraft Design" Model Airplane News Publication
2. John Baichtal, Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs.
3. K Valavanis, George J Vachtsevanos, Handbook of Unmanned Aerial Vehicles, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.
4. DGCA RPAS Guidance Manual, Revision 3 – 2020

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

Introduction to Industrial Robotics (Open Elective-I)

(**Stream: Robotics)**

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U21OE320ME**
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

COURSE OBJECTIVE **The objective of the course is to**	**COURSE OUTCOMES** **On completion of the course, students will be able to**
study industrial robot components, configuration, sensors, drives, applications and programming through experiential learning.	1. explain configuration of industrial robots and summarize various applications. 2. interpret various elements of the industrial robots 3. Develop methodology to represent position and orientation of industrial robot links in spatial coordinate system. 4. classify various sensors used in industrial robots and interface between the human user and an industrial robot using various programming languages.

UNIT-I

ROBOT BASICS

Robot-Basic concepts, Need, Law, History, Anatomy, specifications.

Robot configurations-cartesian, cylindrical, polar, articulated and SCARA. Parallel robots

ROBOT APPLICATIONS

Application in industry – material handling, loading & unloading, processing, welding & painting, assembly and inspection

UNIT-II

ROBOT ELEMENTS

End effectors-Classification, Types of Mechanical actuation, Gripper design, Robot joints types, Robot drive system types: Electrical, pneumatic and hydraulic. Position and velocity feedback devices

UNIT-III

ROBOT COORDINATE SYSTEMS

Coordinate frames, Rotation matrix, Euler angles, Roll pitch and yaw angle representation, Composite rotations, Homogeneous Transformation matrix.

UNIT-IV

ROBOT SENSORS

Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors

Robot programming

On line programming, teach pendant control, Lead through, Walk through, off line programming, Task programming.

Learning Resources:

1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel and Nicholas G Odrey, "Industrial Robotics Technology, Programming and Applications", Tata Mc Graw-Hill Publishing Company Limited , 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata Mc Graw Hill Publishing Company Limited, 2010.
3. Klafter R.D, Chmielewski T.A, and Negin. M, "Robotic Engineering: An Integrated Approach", Prentice Hall of India Pvt. Ltd.,1994.
4. K.S. Fu, R.C. Gonzalez and C.S.G. Lee , "Robotics control, sensing, vision and intelligence", Tata Mc Graw-Hill Publishing Company Limited, 2008
5. R.K. Mittal and I. J. Nagrath"Robotics and Control", Tata Mc Graw-Hill Publishing Company Limited,2003.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Mechanical Engineering

Introduction to Automobile Engineering
(Open Elective-I)(General Pool)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U21OE330ME**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

Course objectives	Course Outcomes
The objectives of this course are to: 1. familiarize the student with the different types of automobiles and engine components along with its working. 2. impart adequate knowledge in fuel supply, cooling, lubrication and ignition of IC engines. 3. understand the steering geometry, steering mechanism and types of suspension systems. 4. gain the knowledge about working of clutch, gear box mechanism, and brakes and make the student conversant with types of wheels, tyres	**On completion of the course, the student will be able to:** 1. identify types of Automobiles and engine components and describe its working. 2. describe the engine fuel Supply system in petrol and Diesel engines, cooling system, and lubrication systems. 3. describe the steering mechanism, suspension systems 4. describe the working principle and operation of clutch, gear mechanism, brakes and identify the types of wheels, tyres

UNIT-I

Introduction: Types of automobiles, Lay out of transmission system, Engine components: cylinder block, cylinder head, crankcase, crank shaft and cam shaft. Types and working of IC Engines: SI and CI engines, two stroke and four stroke engines.

UNIT-II

Fuel system: Fuel supply system for SI engines and CI engines. Simple carburettor, Introduction to Multipoint fuel injection system (**MPFI**) of petrol engines, Introduction to **CRDI** system for diesel engines.

Cooling system: air cooling, water cooling: Thermo syphon, pump circulation system.

Lubrication system: Petroil System, splash system, pressure lubrication: Wet sump and Dry Sump.

Ignition system: Battery Ignition System, Magneto Ignition System and Electronic Ignition System.

UNIT-III

Suspension system: Rigid axle, Independent suspension system: Double wish bone type, Macpherson strut system.

Steering system: wheel alignment, Ackermann steering mechanism, steering geometry: camber, caster, toe-in, toe-out, steering linkage for vehicle with rigid axle front suspension, steering linkage for vehicle with independent front suspension.

UNIT –IV

Power Train: Single plate clutch, Multi plate clutch. Manual Gear Box: sliding mesh gear box, constant mesh gear box, synchromesh gear box. Working principle of differential.

Brakes: Types: Drum and Disc brakes, Hydraulic Braking system, **ABS** system.

Wheels and Tyres: Types of Wheels: wire wheels, disc wheels, alloy wheels. Types of tyres: Tube type, tubeless type.

Learning Resources:

1. Crouse & Anglin, "Automobile Engineering", 10th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi,. 2007.
2. Kirpal Singh, "Automobile Engineering", Vol.I& II, 13th Edition, Standard Publishers, New Delhi 2013.
3. R.B Gupta, "Automobile Engineering" 7th Edition, Satya Prakashan, New Delhi, 2015.
4. Joseph Heitner, "Automotive Mechanics", 2nd Edition, Affiliated East West Pvt. Ltd., 2013.
5. C.P. Nakra, "Basic Automobile Engineering", 7th Edition, Dhanpat Rai Publishing C (P) Ltd., 2016.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

COMPLEX VARIABLES

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: **U220E320MA**
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to :	*At the end of the course students should be able to:*
1. Understand the Analytic functions, conditions and harmonic functions. 2. Evaluate the line integral of a function of a complex variable using Cauchy's integral formula, and how to 3. Understand the concept of Taylor's and Laurent Series. 4. Understand the Cauchy's residue theorem.	1. Apply the condition(s) for a complex variable function to be analytic and/or harmonic and to construct an Analytic function. 2. Evaluate the complex integrals by Cauchy's theorem and Cauchy's Integral formula 3. Identify the singularities of a function and to expand a given function as a Taylor's / Laurent's series. 4. Evaluate the complex integrals by Cauchy's Residue theorem

UNIT – I(8 classes)

DIFFERENTIATION OF COMPLEX FUNCTION

Introduction to complex function-Limits and Continuity of function - Differentiability and Analyticity - Necessary & Sufficient Condition for a Function to be Analytic(Cartesian) - Milne-Thompson's method -Harmonic Functions.

UNIT – II(6 classes)

INTEGRATION OF COMPLEX FUNCTION

Complex Integration- Cauchy's Theorem(with proof) - Cauchy's Integral Formula(with proof) - Evaluation of integrals by Cauchy's Integral formula.

UNIT – III(6 classes)
SERIES OF COMPLEX FUNCTIONS
Power series - Taylor's Series - Laurent's Series (without proofs) –Zero and singularities of complex function.

UNIT – IV(8 classes)
RESIDUES
Introduction to Residues- Residues at singularities-Cauchy's Residue theorem (without proof) –Evaluation of integrals by Cauchy's Residue theorem.

Learning Resources:

1. Advanced Engineering Mathematics 3rd Edition, R.K.Jain&S.R.K.Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics 40thEdition Dr. B.S Grewal, Khanna Publishers.
3. A Text book of Engineering Mathematics, N.P.Bali& Manish Goyal, Laxmi Publications.

Online Resources :
1 http://mathworld.wolfram.com/topics
2 http://www.nptel.ac.in/course.php;

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

LEARNING TO LEARN

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/Week):2:0:0	SEE Marks: 60	Course Code: **U22OE310EH**
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES **The course will enable the learners to:**	**COURSE OUTCOMES** **At the end of the course the learners will be able to: -**
1. Develop effective study skills, and enable students to cut down on the number of hours spent studying. 2. Explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving. 3. Handle procrastination and learn for long term. 4. Plan, prioritise and carry out tasks based on goals and priority.	1. Get learners maximize their learning in a stipulated amount of time. 2. Become competent learners and learn creatively. 3. Meet deadlines, submit progress reports and recall what has been learnt for effective usage. 4. Set Performance Standards and take initiative based on set goals.

OVERVIEW:

No matter what your skill levels in topics you would like to master, you can change your thinking and change your life. If you are struggling to cope, you'll see a structured treasure trove of practical techniques that walk you through what you need to do to get on track. If you've ever wanted to become better at anything, this course will help serve as your guide.

UNIT 1: STUDY SKILLS

Good study skills can increase a student's confidence, competence, and self-esteem. They can also reduce anxiety about tests and deadlines. This module is designed to develop effective study skills, and enable students to cut down on the number of hours spent studying, leaving more time for other important things in their life

1.1 Study Skills Checklist
1.2 Learning Styles
1.3 Habits of Effective Students
1.4 Using the Focused and Diffuse Modes
1.5 Introduction to memory and Memory Technique

UNIT 2: Chunking

In this module, we're going to be talking about chunks. Chunks are compact packages of information that your mind can easily access. We'll talk about how you can form chunks, how you can use them to improve your understanding and creativity with the material, and how chunks can help you to do better on tests. We'll also explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving.

2.1 Knowledge Chunking
2.2 Skill and Will
2.3 Sleep and Learning

UNIT 3: Procrastination and Memory

In this module, we talk about two intimately connected ideas—procrastination and memory. Building solid chunks in long term memory--chunks that are easily accessible by your short term memory—takes time. This is why learning to handle procrastination is so important. Finally, we talk about some of the best ways to access your brain's most powerful long term memory systems so that learning is long term and the learner has the ability to recall and use it as per need.

3.1 Controlling Procrastination
3.2 Ranking the importance of tasks with a to- do list
3.3 Finding their most productive time
3.4 Keeping track of time spent on different tasks
3.5 Introduction to Deep learning

UNIT 4: Renaissance Learning and Unlocking Your Potential

In this module we're going to talk more about important ideas and techniques that will enhance student's ability to learn. Students will also discover how to more profitably interact with fellow learners, how to recognize your own strengths, and how to avoid the "imposter syndrome." Fighter pilots and surgeons use checklists to help them with their critical duties—you can use a similar checklist to help you prepare for tests. Ultimately, you will learn more about the joys of living a life filled with learning!

4.1 Psychology of Goal Setting
4.2 Criteria for Goal Setting
4.3 Steps in Goal Setting
4.4 Visioning
4.5 Strategy & Action Plan
4.6 Goal Progress Review

LEARNING RESOURCES

learn.talentsprint.com

The break-up of marks for CIE :
Internal Tests + Quiz Tests + Assignments

1. No. of Internal Tests: 2 Max. Marks for each Internal Tests:30
2. No. of Assignments: 2 Max. Marks for each Assignments: 5
3. No. of Quizzes: 2 Max. Marks for each Quiz Tests: 5

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Physics

SMART MATERIALS AND APPLICATIONS
(General Pool-Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

Instruction :2Hrs/Week	SEE Marks : 60	Course Code : **U22OE310PH**
Credits: 2	CIE Marks : 40	Duration of SEE: 3 hrs

Course Objectives	Course Outcomes
The student will be able to 1. grasp the concepts of peizo and ferro electric materials 2. Learn fundamentals of pyro and thermo electric materials 3. gain knowledge on shape memory alloys 4. acquire fundamental knowledge on chromic materials	**the student should at least be able:** 1. summarize various properties and applications of peizo and ferro electric materials 2. apply fundamental principles of pyro and thermo electricity in relevant fields of engineering 3. Explain types of shape memory alloys and their properties and applications 4. Outline the importance of chromic materials in engineering fields.

UNIT I: PIEZO AND FERRO MATERIALS (8 hours)

Piezo electric effect and inverse piezoelectric effect, Piezo electric materials, Structure of Quartz crystal, Piezoelectric oscillator, Magnetostriction, Magnetostriction oscillator, piezo-electric sensors, applications of Piezo-electric materials.

Characteristics and properties of ferro-electric materials, Curie-Weiss law, applications of Ferro electric materials

UNIT II: PYRO AND THERMO-ELECTRIC MATERIALS (6 hours)

Pyroelectricity: pyro electric effect, pyro electric materials, pyro-electric detector.

Thermoelectricity: thermoelectric effect, Seebeck effect, Peltier effect, thermocouple, Principle and working of thermoelectric generator and Thermoelectric cooler, applications of thermoelectric materials

UNIT III: SHAPE MEMORY MATERIALS (8 hours)

Introduction to shape memory alloys (SMA)- Shape Memory Effect (SME), Austenite, Martensite phases, Properties and characteristics SMAs**,** one-way and two way shape memory effects, Properties of Ni-Ti shape memory alloy, Cu-based shape memory alloys, and their applications, Applications of SMAs.

UNIT-IV: (6 hours)

Electro-chromaticity, Electro-chromic materials, Electro-chromic sensors and devices.

Photo-chromaticity, Photo-chromic materials, Photo-chromic sensors and devices.

Thermo-chromaticity, thermo-chromic materials, thermo-chromic sensors and devices.

Smart fluids: Magneto-rheological and Electro-rheological fluids.

Learning Resources:

1. K. Otsuka and C M Wayman, Shape memory materials, Cambridge university press, 1998.
2. T W Duerig, K N Melton, D Stockel, C M Wayman, Engineering aspects of shape memory alloys, Butterworth-Heinemann, 1990
3. A.K. Sawhney, A Course in Electronic Measurements and Instrumentation, Dhanpat Rai & Sons, 2015
4. D. Patranabis, Sensors and Transducers, PHI Learning Pvt. Ltd., 2013

The break-up of marks for CIE :
Internal Tests + Quiz Tests + Assignments

1. No. of Internal Tests: 2 Max. Marks for each Internal Tests: 30
2. No. of Assignments: 2 Max. Marks for each Assignments: 5
3. No. of Quizzes: 2 Max. Marks for each Quiz Tests: 5

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Physics

Track-I: MATERIALS SCIENCE FOR ENGINEERS
FUNDAMENTALS OF MATERIALS SCIENCE
(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

Instruction :2Hrs/Week	SEE Marks : 60	Course Code : **U22OE330PH**
Credits: 2	CIE Marks : 40	Duration of Semester End Exam:3 hrs

UNIT I: Atomic structure and Chemical Bonding (8 hours)

Structure of the atom, The quantum states, Forces between atoms, Ionization potential, Electron affinity and electronegativity. Bond energy, Bond type and Bond length. Types of Bonds-Ionic, Covalent, Metallic bonding, Hydrogen bond, Vanderwalls bond, Cohesive energy of ionic crystals, Madelung constant.

UNIT II: Atomic Packing (6 hours)

Simple crystal structures, Classification of close packings 2-D & 3-D, Voids in closed packings, size and coordination of voids, significance of voids, axial ratio and lattice constants, effect of radius ratio, representation of closed packing, Paulings rule, Applications of Paulings rule to actual structures, examples of closed packed structures. Line and surface density of atoms.

UNIT III: Diffusion in Solids (8 hours)

Solid state diffusion, Diffusion mechanisms, Self-diffusion, Impurity diffusion coefficient, Fick's laws, Diffusion coefficient, determination of diffusion coefficient, Random walk diffusion, Diffusion in a simple cubic structure, Diffusion under external field, Kirkendall shift, Ionic conductivity, Ionic conductivity of alkali halides.

UNIT-IV: Strengthening Mechanisms (6 hours)

Solidification of metals and alloys, cooling curves, concepts of nucleation and growth, Heat transfer associated in nucleation and growth, Homogeneous and Heterogeneous nucleation, Structure of metal ingots,

Construction of binary alloys, Formation of alloy phases, viz. Solid solutions – substitutional and interstitial, intermetallic compounds.

References:

1. A.J.Dekker, Solid State Physics, Macmillan India Ltd., 2008.
2. V Raghavan, Materials Science and Engineering, PHI, 6th Edn, 2015
3. W.D. Callister Jr & David G. Rethwich, Materials Science and Engineering an Introduction-, John Wiley, 10th Edn, 2018.
4. M. A. Wahab, Solid State Physics, Narosa. 2015.
5. J. P. Srivastava, Elements of Solid-State Physics, PHI, 2014.

The break-up of marks for CIE :

Internal Tests + Quiz Tests + Assignments

1. No. of Internal Tests: 2 Max. Marks for each Internal Tests: 30
2. No. of Assignments: 2 Max. Marks for each Assignments: 5
3. No. of Quizzes: 2 Max. Marks for each Quiz Tests: 5

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Physics

Track-II: SEMICONDUCTOR PHYSICS AND DEVICE APPLICATIONS
ESSENTIALS OF SEMICONDUCTOR PHYSICS
(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

Instruction :2Hrs/Week	SEE Marks : 60	Course Code : **U22OE320PH**
Credits: 2	CIE Marks : 40	Duration of Semester End Exam:3 hrs

UNIT I: Basics of Quantum Mechanics (8 Hrs)

Existence of matter waves, Wave function and its significance, Schrodinger time dependent and independent wave equations, Wave equation of a free particle, Origin of band gap, Energy bands in solids, Postulates of quantum mechanics, Quantum mechanical operators and expectation values, Potential well , Quantum tunnelling.

UNIT II: Semiconductors: Energy Band and Charge Carriers (6 Hrs)

Types of semiconductors (doping, bandgap, composition), Fermi-Dirac statistics- Density of states of semiconductor, Fermi level in semiconductors, Law of mass action, Charge compensation and charge neutrality, Hall probes and its applications.

UNIT-III: Growth of Semiconductors (6 Hrs)

Introduction, Bulk crystal growth, Epitaxial crystal growth, Evaporation and sputtering, defects in crystal, Band gap engineering, GaAs crystal growth.

UNIT IV: Carrier Transport in Semiconductors (6 Hrs)

Carrier generation, Carrier life time, Carrier scattering and mobility, Low-field and high-field transport, introduction to diffusion, Drift-diffusion current and total current density, Einstein relation , Direct and indirect recombination and trapping, Current continuity equation, Carrier injection, ambipolar transport, Diffusion length.

References:

1. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
2. Donald Neamen, Semiconductors Physics and Devices, Tata Mc Graw Hill, 2003
3. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley Publications, 2002.
4. Semiconductor Devices, Basic Principles Jasprit Singh, Wiley Publications, 2001
5. Electronic Devices and Circuits- Millman and Halkias-Tata Mc Graw Hill, 1983.
6. Solid State Electronic Devices - Ben G Streetman-Prentice Hall, New Delhi, 1995.

The break-up of marks for CIE :
Internal Tests + Quiz Tests + Assignments

1. No. of Internal Tests: 2 Max. Marks for each Internal Tests: 30
2. No. of Assignments: 2 Max. Marks for each Assignments: 5
3. No. of Quizzes: 2 Max. Marks for each Quiz Tests: 5

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Chemistry

POLYMERIC MATERIALS

Title of the course: Materials for Engineers

(Open Elective-I)

SYLLABUS FOR B.E.III-SEMESTER

Instruction :2Hrs / Week	SEE Marks : 60	Course Code : **U22OE310CH**
Credits: 2	CIE Marks : 40	Duration of SEE : 3Hours

OBJECTIVES	OUTCOMES
The course will enable the students:	**At the end of the course students should be able to:**
1. To familiarize with various types of polymers 2. To acquaint with different methods of polymerization. 3. To converse the different polymerization techniques 4. To familiarize with various high performance/ specialty polymers.	1. Classify the polymers. 2. Analyze the different polymerization methods and their mechanisms. 3. Discuss the polymerization techniques used for the selected polymers. 4. Discuss the synthesis, properties and applications of selected polymers.

UNIT-I: INTRODUCTION TO POLYMERS AND TYPES: (5h)

Introduction to various engineering materials, brief history of polymers, importance of polymers in engineering, terminology- ,classification of polymers- a) based on mechanism, b) based on chain topology, c) based on end use d) linear, branched and cross linked polymers e) based on physical state, Nomenclature based on source and based on IUPAC, applications of polymers.

UNIT-II: POLYMERIZATION: (7h)

Initiators- Types of Initiators, Thermal Decomposition of Initiators, Redox Initiation, Photochemical Initiation, Initiation by Ionizing Radiation, Pure Thermal Initiation, Other Methods of Initiation, Initiator Efficiency, Definition -Mechanism - Cage Effect.Step-Reaction (Condensation) Polymerization, Polymerization Mechanisms- Mechanism of Stepwise Polymerization, Radical

Chain (Addition) Polymerization, Chain Polymerization, Ionic and Coordination Chain (Addition) Polymerization, Cationic Polymerization, Anionic Polymerization, Copolymerization - Mechanisms of Copolymerization, Block and Graft Copolymers

UNIT-III: TECHNIQUES OF POLYMERIZATION: (7h)

Living Radical Polymerization - General Considerations, Atom Transfer Radical Polymerization (ATRP) -Polymerization Mechanism, Stable Free-Radical Polymerization (SFRP), Radical Addition–Fragmentation Transfer (RAFT) -and Other Living Radical Polymerizations.process conditions -bulk (mass) polymerization - solution polymerization- emulsion & suspension polymerization - heterogeneous polymerization - other processes; self-assembly and nanostructures.

UNIT-IV: COMMERCIAL & HIGH-PERFORMANCE POLYMERS: (7h)

Synthesis, properties and applications of commercial polymers: polyvinyl chloride, polystyrene

Requirements for High-Temperature Polymers.

Synthesis, properties and applications of

1) Aromatic polyethers: Polyether sulfone,
2) Liquid crystal polymers: poly(oxy-1,4-phenylenecarbonyl),
3) Inorganic polymers – Minerals - Glasses – Ceramics,
4) Organometallic polymers – Polysilanes

Text Books:

1. PRINCIPLES OF POLYMERIZATION Fourth Edition GEORGE ODIAN, University of New York, New York.
2. TEXTBOOK OF POLYMER Science THIRD EDITION, FRED W. BILLMEYER, Troy, New York
3. P.C.Jain and Monica Jain, "Engineering Chemistry", DhanpatRai Pub, Co., New Delhi (2002)
4. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).

Learning Resources:

1. NPTEL Polymer Chemistry Course, D. Dhara, IIT Kharagpur.
2. Polymer chemistry by Gowariker

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VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities and Social Sciences

Skill Development Course-I
(Communication Skills in English I)

SYLLABUS FOR BE -III SEMESTER

(COMMON FOR ALL BRANCHES)

L:T:P(Hrs/Week):2:0:0	SEE Marks: 40	Course Code: **U220HS320EH**
Credits: 1	CIE Marks: 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES **The course will enable the learners to:**	**COURSE OUTCOMES** **At the end of the course the learners will be able to:**
1. Get students proficient in both receptive and productive skills especially virtually 2. Enable students to understand the importance and method of exchanging information in a formal space- both written and spoken 3. Introduce students to an ideal structure for a presentation and discussion- individually and in groups 4. Develop and improve reading skills needed for college work and reproduce the content based on the situational need.	1. Introduce themselves effectively and converse in a formal environment especially in the online space 2. Write emails with appropriate structure and content 3. Use appropriate structure based on the content employing appropriate transitions in written and spoken communication 4. Paraphrase content and write an effective summary

Unit 1: Delightful Descriptions

1.1 Introductions on an Online Forum

1.2 Making Observations and Giving Opinion

1.3 Recalling and Describing

Unit 2: Formal Conversation Skills

2.1 Ask for Information
2.2 Give Information
2.3 Give Feedback
2.4 Seek Permission

Unit 3: Technical Expositions and Discussions

3.1 Classification
3.2 Sequence
3.3 Compare and Contrast
3.4 Cause and Effect
3.5 Problem and solution

Unit 4: Rational Recap

4.1 Paraphrasing - Written
1.2 Summarizing - Written
1.3 Paraphrasing – Spoken
1.4 Summarizing – Spoken

METHODOLOGY	**ASSESSMENTS**
- Case Studies - Demonstration - Presentations - Expert lectures - Writing and Audio-visual lessons	- Online assignments - Individual and Group

Learning Resources:

learn.talentsprint.com

The break-up of marks for CIE :
Internal Tests + Quiz Tests + Assignments

1. No. of Internal Tests: 2 Max. Marks for each Internal Tests:20
2. No. of Assignments: 2 Max. Marks for each Assignments: 5
3. No. of Quizzes: 2 Max. Marks for each Quiz Tests: 5

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

Skill Development Course-II (Technical Skills-I)
Problem Solving through Data Structures
SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week):1:0:0	SEE Marks : 40	Course Code:**UII22PE330CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Understand the significance of Competitive Coding 2. Prepare the students for the contests relative to the concepts learnt 3. Build confidence in coding using Linear Data structures 4. Learn essential algorithms for Competitive Coding	1. Solve scenario based problems on linked lists, Recursive Algorithms, Search & Sort Algorithms, Divide & Conquer Strategies and use memory manipulation functions. 2. Learn linear data structures usage in various applications with scenario based problem solving through coding.

Code Complexity Analysis & Linear List data

Problem solving through Coding, Compare and contrast coding and competitive coding, Various approaches for problem solving, techniques for competitive coding, Orientation on Competitive coding on coding platforms like Codechef/ Codeforces/ Leetcode/ Hackerrank etc.

Precise coding techniques implementing the evaluation of the language supported expressions, code complexity analysis, Linear / Logarithmic/ Super linear/ Polynomial/ Exponential/ Recursion Algorithm analysis, Problem Solving using Linear list data, Subscripts, 2D Array Subscript, RMO & CMO Representation, Matrix Problems. Company Specific Examples & Competitive Programming Practice Problems.

Contextual implementation using Competitive Coding using global coding

platforms: Code chef/ Leet code / Codeforces / Hackerrank etc.

Memory Manipulation Methods and Problem Solving on ring

Pointer Variable, Pointer Arithmetic, Memory Layout, Runtime memory allocation, Problem Solving on String Data, String handling methods, Examples, Practice Problems.

Problem Solving using Linked List data

Implementing a Structure member pointer reference, Coding solutions for Linked list manipulation, Solutions for order statistic problems on linked lists: Comparison/ Cycle Detection/ Merge Point Detection/ Merging the lists, Coding solution for the circular linked data and Double linked data, coding problems, Examples, Practice problems.

Problem Solving using Abstract data structures: Stacks

Problem solving using Stacks, Coding solutions for the implementation of stack using an array, Coding solutions for the implementation of stack using a linked list. Problem solving on expression conversion and evaluation, Examples, Practice problems.

Problem Solving through Queues & Search-Sort Algorithms

Problem solving using Queues, Coding solutions for the implementation of queue using an array/ linked list, Divide & Conquer Strategies: Linear Vs Binary Search Analysis, Bubble sort and Selection Sort Analysis, Examples, Practice problems.

Problem Solving through Divide & Conquer Strategies

Divide & Conquer Strategies: Quick sort Analysis, Merge Sort Analysis, Min/Power functions, Examples, Practice problems.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	1	Max. Marks for each Internal Test	:	30

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Humanities & Social Sciences

Human Values and Professional Ethics-II

SYLLABUS FOR B.E- III SEMESTER

(COMMON FOR ALL BRANCHES)

L:T:P(Hrs/Week):1:0:0	SEE Marks: 40	Course Code: **U22HS030EH**
Credits: 1	CIE Marks: 30	Duration of SEE: 02 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to:	**At the end of the course the learners will be able to: -**
1. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations 2. Understand professionalism in harmony with self and society. 3. Develop ethical human conduct and professional competence. 4. Enrich their interactions with the world around, both professional and personal.	1. Distinguish between Personal and Professional life goals–constantly evolving into better human beings and professionals. 2. Work out the strategy to actualize a harmonious environment wherever they work. 3. Distinguish between ethical and unethical practices, and start implementing ethical practices 4. Apply ethics and values in their personal and professional interactions.

UNIT 1: NORMATIVE ETHICS & SOCIETAL ETHICS

This unit deals with normative ethics, the branch of moral philosophy, or ethics, concerned with criteria of what is morally right and wrong. It includes the formulation of moral rules that have direct implications for what human actions, institutions, and ways of life should be like. This unit also covers societal ethics which is the systematic reflection on the moral dimensions of social structures, systems, issues, and communities.

1.1 Ethical Accountability

1.2 Society & Ethics

1.3 Rights & Responsibilities

UNIT 2: PROFESSIONAL ETHICS - NEED FOR ETHICAL CODES

This unit covers the code of Professional Ethics- it is designed to ensure that students learn the necessary skills that groom them to behave like employees should, one that is socially acceptable and respectful of one another. It establishes the rules for behavior and sends a message to every employee that universal compliance is expected.

2.1 Professional Ethics
2.2 Ethical Code
2.3 Flipped Classroom

UNIT 3: PRIVACY

This unit covers "Cyber ethics" - the code of responsible behaviour on the Internet. Just as we are taught to act responsibly in everyday life with lessons such as "Don't take what doesn't belong to you" and "Do not harm others," we must act responsibly in the cyber world as well. The basic rule is "Do not do something in cyberspace that you would consider wrong or illegal in everyday life."

3.1 Basics of Cyber Ethics
3.2 Privacy
3.3 Flipped Classroom

UNIT 4: MEDIA AND MEDICAL ETHICS

This unit covers Media and Medical ethics is the best division of applied ethics dealing with the specific ethical principles and standards of media (including broadcast media, film, theatre, the arts, print media and the internet) and medicine (practice of clinical medicine and related scientific research)
4.1 Media Ethics
4.2 Medical Ethics
4.3 Flipped Classroom

MODE of DELIVERY

• Questionnaires • Quizzes • Case-studies • Observations and practice • Home and classroom assignments	• Discussions • Skits • Short Movies/documentaries • Team tasks and individual tasks • Research based tasks • Viva

Relevant Websites, CD's and Documentaries

- Value Education website, Http://www.universalhumanvalues.info UPTU website, Http://www.uptu.ac.in
- Story of stuff, Http://www.storyofstuff.com
- Al Gore, As Inconvenient Truth, Paramount Classics ,USA
- Charlie Chaplin, Modern Times, United Artists, USA
- IIT Delhi, Modern Technology-The Untold story-Anand Gandhi, Right Here Right Now, Cyclewala production.

Learning Resources:

1. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
2. B.L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
3. A.N Tripathy, 2003 Human values, New Age International Publishers.
4. EG Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.

The break-up of marks for CIE :
Internal Tests +Quiz Tests+ Assignments

1. No. of Internal Tests: 1 Max. Marks for each Internal Tests: 20
2. No. of Assignments: 2 Max. Marks for each Assignments: 5
3. No. of Quizzes: 2 Max. Marks for each Quiz Tests: 5

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MICROPROCESSORS, MICROCONTROLLER & INTERFACING LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0 :0:2	SEE Marks : 50	Course Code:**UII22PC311CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Implement assembly language programs in 8086 microprocessor, 8051 and ARM controller. 2 Interface I/O devices to Microprocessor and Microcontroller.	1 Implement programs using instruction set of 8086 microprocessor. 2 Implement programs using macros and sub routines in 8086 microprocessor. 3 Develop an application to interface I/O devices with 8086 microprocessor. 4 Develop an application to interface I/O devices using 8051 microcontroller. 5 Implement assembly language programs using ARM processor.

8086 PROGRAMMING USING MICROPROCESSOR TRAINER KIT

1. Execution of basic programs on 8086Microprocessor.
2. Programs using different addressing modes.
3. Programs using single byte, multi byte, binary, BCD addition and subtraction.
4. Programs on searching and sorting.
5. Generation of waveforms using DAC interface.
6. Interfacing and programming of 8255. (E.g. traffic light controller).
7. Interfacing keypad/display unit.

8051 PROGRAMMING

8. Execution of basic programs on 8051 Microcontroller.
9. Programs on searching and sorting.
10. Interfacing Stepper Motor.
11. Interfacing LCD Display.
12. Interfacing Keypad.
13. Execution of basic programs using ARM Processor
14. ARM's Barrel Shifter program

Learning Resources:

1. Douglas V. Hall, Microprocessors and Interfacing, 2ndEdition (2006), McGraw Hill.
2. Kenneth J. Ayala, "The 8051 Microcontroller Architecture, Programming and Application", Penram International (2007)
3. Marilyn Wolf, Computers as Components: Principles of Embedded Computing System Design, 3rd Edition (2012), Elsevier Morgan Kauffmann Publishers.
4. Yu-cheng Liu, Glenn A. Gibson, Microcomputer Systems The 8086/8088 Family - Architecture, Programming and Design 2ndEdition (2011)
5. Barry B. Brey, The Intel Microprocessor, 8086/8088,80186/80188, 80286, 80386, 80486, Pentium and Pentium pro-processors – Architecture, Programming and interfacing, 8thEdition (2013), Prentice Hall.
6. Ray A.K &Bhurchandhi K.M, Advanced Microprocessor and Peripherals,2ndEdition (2007),TMH.
7. http://nptel.ac.in/courses/108107029/

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATA STRUCTURES LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week): 0:0:2	SEE Marks : 50	Course Code:**UII22PC321CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Design and analyze linear and nonlinear data structures	1 Implement insert, delete, search, sort and traverse operations on array and linked list
2 Acquire programming skills to implement sorting and searching techniques	2 Develop applications using stack and queue
3 Identify and apply the suitable data structure for the given real world problem	3 Apply nonlinear data structures to solve a problem
	4 Implement appropriate sorting technique for a given data set
	5 Implement hashing techniques to perform dictionary operations

Programming Exercise:

1. Implementation of Formula based representation.
2. Implementation of Singly Linked List, Doubly Linked List and Circular Linked List.
3. Implementation of Polynomial Arithmetic using Linked List.
4. Implementation of String Matching algorithms.
5. Implementation of Stacks, Queues.(Using both Arrays and Linked Lists)
6. Implementation of Infix to Postfix Conversion, Postfix Expression Evaluation.
7. Implementation of Recursive and Iterative Traversals on Binary Tree.
8. Implementation of Binary Search Tree.
9. Implementation of Operations on Binary Tree (Delete Entire Tree, Copy Entire Tree, Mirror Image, Level Order, Search for a Node etc.)
10. Implementation of Traversal on Graphs.

11. Implementation of Selection, Merge, Quick, Heap, and Insertion Sort.
12. Implementation of Binary Search and Hashing
13. Implementation of operations on AVL Trees.
14. Implementation of B-Trees.
15. Develop application using appropriate data structures.

Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition(2002), Pearson
3. Kushwaha D. S and Misra A.K, Data structures A Programming Approach with C, Second Edition(2014), PHl.,
4. Gilberg R. F and Forouzan B. A, Data structures: A Pseudocode Approach with C, Second Edition(2007), CengageLeaming
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press
7. YedidyahLangsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI
8. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos
9. http://nptel.ac.in/courses/106106127/
10. http://www.nptel.ac.in/courses/106102064

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OBJECT ORIENTED PROGRAMMING LAB

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks: 50	Course Code:**UII22PC331CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Implement object oriented concepts using Java constructs 2 Develop Java application using collection frame work and streams .	1 Implement a use-case using object oriented programming concepts 2 Develop applications using multi threaded programming 3 Implement I/O operations using console and file streams 4 Apply collection framework to store and manipulate data 5 Apply functional programming constructs

Programming Exercise:

1. A program to demonstrate the concept of class with constructors, methods and overloading.
2. A program to demonstrate the concept of inheritance, Abstract class & Interface.
3. A program to create Packages.
4. A program to demonstrate Exception Handling.
5. A program to demonstrate Thread Synchronization.
6. A program to work on strings using String classes.
7. A program to demonstrate the usage of Filter and Buffered I/O streams
8. A program to demonstrate Serialization and Deserialization
9. A program using List & Set interfaces, Iterator & List Iterator
10. A program using Mapinterface, Date, Calendar &Timer.
11. A program to implement object comparison using comparator
12. A program to implement Lambda Functions
13. A program to implement Stream API
14. A program to demonstrate usage of Regular Expressions

Learning Resources:

1. Herbert Schildt, Java: The Complete Reference, 12th Edition, Tata McGraw Hill 2021.
2. Joshua Bloch, Effective Java, 3rd Edition, Pearson, 2017
3. TimothyBudd, An introduction to Object-Oriented Programming, 3rd Edition, Pearson Education, 2008
4. Eric Freeman, Bert Bates, Kathy Sierra , Head First Design Patterns: A Brain-Friendly Guide, 1st Edition, O'Reilly, 2016
5. P. RadhaKrishna, Object Oriented Programming through Java, UniversitiesPress,2007.
6. Sachin Malhotra, Saurabh Choudhary, ProgramminginJava,2ndEdition,Oxford Press,2014.
7. https://docs.oracle.com/javase/tutorial/java

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION(R-22)
FOR B.E. BRIDGE COURSE III SEMESTER (A.Y 2023-24)

B.E. CSE (AI & ML) III Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P**		**SEE**	**CIE**	
THEORY								
UB22BS300MA	Matrix Theory & Vector Calculus	2	-	-	3	50	-	-
UB22ES310CS	Computer Programming	2	-	-	3	50	-	-
	TOTAL	**4**	**-**	**-**	-	**100**	**-**	**-**
	GRAND TOTAL	**4**				**100**		

VASAVICOLLEGEOFENGINEERING(Autonomous)

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IBRAHIMBAGH,HYDERABAD– 500031

DEPARTMENT OF MATHEMATICS

MATRIX THEORY & VECTOR CALCULUS

BRIDGE COURSE FOR B.E. III-SEMESTER (For CSE, EEE, ECE & IT)

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code :**UB22BS300MA**
Credits :--	CIE Marks : --	Duration of SEE : 3 Hours

UNIT-I: (4 Hours)
DIFFERENTIATION& INTEGRATION

Differentiation of standard functions(Formulae) - Partial Derivatives– Derivativeof Composite functions and Implicit functions - Chain Rule - Total Derivative

Integration - Elementary Integration – Integration of standard functions- Methods of Integration-Integration by substitution- Integration by parts.

UNIT –II (6 Hours)
VECTOR DIFFERENTIATION

Scalar and Vector point functions -Vector Differentiation-Level Surfaces- Gradient of a scalar point function- Normal to a level surface- Directional Derivative – Divergence and Curl of a Vector field - Conservative vector field.

UNIT – III (6 Hours)

MULTIPLE INTEGRALS: Double and Triple integrals (Cartesian) - Change of order of integration (Cartesian Coordinates).

VECTOR INTEGRATION: Line integral and Green's Theorem (without proof)

UNIT- IV(8 Hours)
MATRIX THEORY

Rank of matrix- Echelon form - -System of Linear Equations- Consistency of Homogeneous and Non-homogeneous system of equations- Eigen values and EigenVectors.

Suggested Books:

1. B.S. Grewal, Higher Engineering Mathematics
2. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House

VASAVICOLLEGEOFENGINEERING(Autonomous)

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IBRAHIMBAGH,HYDERABAD– 500031

Department of Computer Science & Engineering

COMPUTER PROGRAMMING

SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code :**UB22ES310CS**
Credits :--	CIE Marks : --	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Acquire problem solving skills 2. Develop flow charts 3. Understand structured programming concepts 4. Write programs in C Language	1. Design flowcharts and algorithms for solving a problem and choose appropriate data type for writing programs in C language 2. Design modular programs involving input output operations, decision making and looping constructs 3. Apply the concept of arrays for storing, sorting and searching data 4. Apply the concept of pointers for dynamic memory management and string handling 5. Design programs to store data in structures and files

UNIT-I

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Flowcharts.

Introduction to C Language- Background, C Programs, Identifiers, Types, Variables, Constants, Input/Output, Expressions, Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion, Statements, Bitwise Operators.

UNIT-II

Selection: Logical Data and Operators, if… else, switch Statements, Standard Functions.

Repetition: Loops, while, for, do-while Statements, Loop Examples, break, continue, goto.

Functions: Designing Structured Programs, Functions Basics, User Defined Functions.

UNIT-III

Recursion-Recursive Functions, Preprocessor Commands.

Arrays: Two-Dimensional Arrays, Linear Search and Binary Search, Selection Sort and Bubble Sort.

UNIT-IV

Pointers: Introduction, Pointers to Pointers, Arithmetic operations using pointers

Strings – Concepts, C Strings, String Input/output, Functions, Arrays of Strings, String Manipulation Functions.

UNIT-V

Structure: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Unions.

Input and Output: Files, Streams, Standard Library Input/Output Functions, Character Input/Output Functions.

Learning Resources:

1. B. A. Forouzan& Richard F. Gilberg, "A Structured Programming Approach using C", 3rd Edition, Cengage Learning, 2013.
2. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Prentice-Hall, 2006.
3. Rajaraman V, "The Fundamentals of Computer", 4th Edition, Prentice-Hall of India, 2006.
4. Steve Oualline, "Practical C Programming", 3rd Edition, O'Reilly Press.
5. Jeri R. Hanly, Elliot B. Koffman, "Problem Solving and Program Design in C", 5th Edition, Pearson Education, 2007.
6. E. Balagurusamy, "Programming in ANSI C", 4th Edition, TMG, 2008.
7. Gottfried, "Programming with C", 3rd Edition, TMH, 2010.
8. R G Dromey, "How to Solve it by Computer", 1st Edition, Pearson Education, 2006.

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION(R-22)
FOR B.E 2022-23 ADMITTED BATCH IV SEMESTER (A.Y. 2023-24)

B.E CSE (AI&ML) IV Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
THEORY								
UII22PC410CS	Discrete Structures	3	-	-	3	60	40	3
UII22PC420CS	Database Management Systems	3	-	-	3	60	40	3
UII22PC430CS	Operating Systems	3	-	-	3	60	40	3
UII22PC440CS	Design & Analysis of Algorithms	3	-	-	3	60	40	3
UII22PC450CS	Machine Learning	3	-	-	3	60	40	3
U22OE4XXXX	Open Elective-II	3	-	-	3	60	40	3
U22BS430MA	Skill Development Course-III (Aptitude-II)	1	-	-	2	40	30	1
UII22PE430CS	Skill Development Course -IV (Technical Skills-II)	1	-	-	2	40	30	1
PRACTICALS								
UII22PC421CS	Database Management Systems Lab	-	-	2	3	50	30	1
UII22PC431CS	Operating Systems Lab	-	-	2	3	50	30	1
UII22PC441CS	Design & Analysis of Algorithms Lab	-	-	2	3	50	30	1
	TOTAL	**20**	**-**	**6**		**590**	**390**	**23**
	GRAND TOTAL	**26**				**980**		
Student should acquire one NPTEL course certification of 8 weeks duration (2 credits) during I Sem to VI Sem								

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DISCRETE STRUCTURES

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks:60	Course Code:**UII22PC410CS**
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Understand the concepts of set theory, arithmetic logic and proof techniques 2. Build mathematical models to solve the real world problems by using appropriate methods	1. Construct compound statements using logical connectives and verify the validityof conclusion using inference rules 2. Compare types of relations and functionsand also apply principle of inclusion and exclusion to solve counting problems 3. Solve types of recurrence relations to findthe complexity of an algorithm 4. Develop crypto system using Ring and modular arithmetic

UNIT – I : Fundamentals of Logic

Basic Connectives and Truth Tables, Logical Equivalence, Logical Implication, Use of Quantifiers, Definitions and the Proof of Theorems. **Functions:** Cartesian Product, One-to-one, Onto Functions, Special Functions, Pigeonhole Principle, Composition and Inverse Functions.

UNIT – II : Number Theory: Properties of the Integers

Prime Numbers, The division algorithms, The Greatest Common Divisor, The Integers modulo nFermat's and Euler Theorems, The Fundamental theorem of arithmetic. Fermat's and Euler Theorems The Chinese Reminder Theorem(without proof)

UNIT – III : Relations

Partial Orders, Equivalence Relations and Partitions.

Principle of Inclusion and Exclusion: Principles of Inclusion and Exclusion, Generalizations of Principle, Derangements, Rook Polynomials, Arrangements with Forbidden Positions.

UNIT – IV : Generating Functions

Introductory Examples, Definition and Examples, Partitions of Integers, Exponential Generating Function, Summation Operator.

Recurrence Relations: First – Order Linear Recurrence Relation, Second – Order Linear Homogenous Recurrence Relation with Constant Coefficients, Non Homogenous Recurrence Relation.

UNIT – V : Algebraic Structures& Ring Theory

Algebraic System – General Properties, semi groups, Monoids, Homomorphism, Cosets and Lagrange's Theorem. The Ring structure: Definition and Examples, Ring Properties and Substructures, Ring Homomorphism and Isomorphism.

Learning Resources:

1. Ralph P. Grimaldi, Discrete and Combinatorial Mathematics, 4th Edition (2003), Pearson Education.
2. Kenneth H Rosen, Discrete mathematics and its applications, 5th Edition (2006), Tata McGraw-Hill Edition, New Delhi.
3. J.P. Tremblay, R. Manohar, Discrete Mathematical Structure with Applications to Computer Science, 4th Edition (1987),McGraw Hill , New Delhi.
4. Joe L. Mott, A. Kandel, T.P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd Edition (1986), Prentice Hall.
5. Thomas Koshy, Discrete Mathematics with Applications, 1stEdition (2004), Elsevier Inc.
6. http://nptel.ac.in/courses/106106094/
7. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-fall-2010

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DATABASE MANAGEMENT SYSTEMS

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:**UII22PC420CS**
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Identify issues involved in the design and implementation of a database system. 2 Understand transaction processing, concurrency control and recovery techniques.	1 Identify the functional components of database management system. Design conceptual data model using Entity Relationship Diagram. 2 Transform a conceptual data model into a relational model. 3 Apply normalization techniques in database design. 4 Apply indexing and hashing techniques for effective data retrieval. 5 Analyze strategies for managing security, backup and recovery of data.

UNIT-I:

Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Design, Data Storage and Querying, Data Mining and Information retrieval, Database Architecture , Database Users and Administrators.

Database Design and E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E-R Design Issues, Extended E-R features, Reduction to Relational Schemas.

UNIT-II:

Relational Model: Structure of Relation Database, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations, Modification of the Database, Relational Calculus.

Structured Query Language: Introduction, Basic Structure of SQL Queries, Set Operations, Additional Basic Operations, Aggregate Functions, Null Values, Nested Sub queries, Views, Join Expression.

UNIT-III:

Advanced SQL: SQL Data Types, Integrity constraints Authorization, Functions and Procedural Constructs, Recursive Queries, Triggers, JDBC, ODBC and Embedded SQL.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and first Normal form, Decomposition Using Functional Dependencies, functional Dependency Theory and Decomposition using Multivalue Dependencies

UNIT-IV:

Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, B-Tree Files, Multiple – Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing.

Transaction Management: Transaction concept, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation and Atomicity, Serializability, Recoverability.

UNIT-V:

Concurrency Control: Lock Based Protocols, Timestamp – Based Protocols Validation Based Protocols, Deadlock Handling.

Recovery System: Failure Classification, Storage Structure Recovery and Atomicity, Log Based Recovery, Advanced Recovery Techniques and Remote Backup Systems.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
2. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System , 8th Edition(2006) Pearson Education.
3. Raghu Ramakrishna, and Johannes Gehrke, Database Management Systems, 3rd Edition(2003), McGraw Hill.
4. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
5. Peter Rob, Carlos coronel, Database Systems, (2007), Thomoson.
6. http://nptel.ac.in/courses/106106093/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

OPERATING SYSTEMS

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks: 60	Course Code:**UII22PC430CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Understand Operating system Structures, Services and threading models	1 Explain Operating system structures and internal structure of a process and Compare CPU scheduling algorithms
2 Learn operating system services by considering case studies such as Linux, Windows and Android	2 Apply contiguous & non-contiguous techniques for main memory management.
	3 Design solutions for classical synchronization problems and describe deadlock handling methods
	4 Explain file system Implementation and device management.
	5 Explain I/O operation implementation techniques and apply Access matrix for system protection. Describe the features of Linux, Windows and Android Operating systems

UNIT-I:

Introduction to operating systems: Operating system services, User and Operating- system interface, System calls, Operating system structure.

Process: Process concept, Process Scheduling, Operations on process, Threads, Multithreading Models, Multicore programming.
CPU Scheduling: Scheduling Criteria, Scheduling Algorithms, Multiprocessor scheduling.

UNIT-II:
Memory Management: Swapping, Contiguous memory allocation, Paging, Segmentation, Structure of the page table.
Virtual memory: Demand paging, Page replacement Algorithms, Thrashing, Allocating Kernel memory.

UNIT –III:
Process synchronization: The critical Section problem, Peterson's solution, Synchronization Hardware, 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 –IV:
File System Interface: File Concept, Access Methods, Directory and Disk Structure
File System Implementation: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free Space management.
Device Management: Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap Space Management, RAID structure.

UNIT-V:
I/O System: I/O hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O request to hardware operation.

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

Case Studies: Linux System: Design Principles, Process Management, Scheduling
Windows 10 - Design Principles, System components, Terminal Services & Fast user switching, File system

Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 10th Edition (2018), Wiley India.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition (2001), Pearson Education, Asia.
3. Dhananjay, Dhamdhere.M, *Operating System-concept based approach*, 3rd edition (2009), Tata McGraw Hill, Asia
4. Robet Love: *Linux Kernel Development*, (2004)Pearson Education
5. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
6. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DESIGN AND ANALYSIS OF ALGORITHMS

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):3:0:0	SEE Marks:60	Course Code:**UII22PC440CS**
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Analyze the asymptotic performance of algorithms	1 Compare asymptotic behavior of functions derived from algorithms
2 Apply algorithm design strategies to solve science and engineering problems.	2 Apply divide & conquer and greedy algorithmic design paradigms to solve problems
	3 Design algorithms using Dynamic Programming strategy
	4 Design algorithms for problems using backtracking and branch & bound algorithm design techniques
	5 Identify the complexity class of a given problem

UNIT – I:

Introduction: Introduction to Algorithm, algorithm specification.

Performance analysis: space complexity, time complexity. Asymptotic notations, amortized analysis, Masters theorem.

UNIT – II:

Divide and Conquer: General method, Binary search, finding maximum and minimum, Merge sort, Quick sort, Expected Running Time of Randomized Quick Sort, Strassen's Matrix Multiplication Algorithm, Karatsuba's large Integer Multiplication.

The Greedy Method: The general method, Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Path, Ford–Fulkerson algorithm for Maximum flow problem.

UNIT – III: Dynamic Programming: The general method, Matrix-chain multiplication problem, Multistage graph, All Pairs Shortest Paths, Optimal Binary Search Trees (OBST), 0/1 Knapsack, Reliability Design, Traveling Salesman Problem, Bi-connected Components and DFS, Longest Common Subsequence (LCS) problem.

UNIT – IV:

Backtracking: General method, the 8-Queens Problem, Graph Coloring, Hamiltonian Cycles, Knapsack Problem.

Branch and Bound: The method, 0/1 Knapsack problem, Traveling Salesperson problem.

UNIT – V: NP-Hard and NP-Complete problems: Tractable and intractable problems, Non-Deterministic search and sorting, classes P, NP, NP-Complete, NP-Hard, Satisifiability (SAT), Cook's theorem, reductions, Procedure for NP-Complete, Clique Decision Problem,Traveling Salesperson problem, Approximation algorithm for Vertex Cover Problem, Set Cover Problem.

Learning Resources:

1. Ellis Horowitz, SartajSahani, SanguthevarRajasekaran," Fundamentals of computer Algorithms", Second edition (2008),Universities Press.
2. Thomas H. Cormen, Leiserson C.E, Rivest.R.L , Stein.C, Introduction to Algorithm, 2nd edition (2001), MIT press, USA.
3. Michael T. Goodrich, Roberto Tamassia, Algorithm Design, foundations, analysis, and internet examples, WIELEY student edition (2006).
4. Aho, Hopcroft, Ulman, The Design and Analysis of Computer Algorithms, (2000), Pearson Education.
5. Algorithm Design, 1st Edition, Jon Kleinberg and ÉvaTardos, Pearson.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

MACHINE LEARNING

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks:60	Course Code:**UII22PC450CS**
Credits : 3	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
To formulate machine learning problems corresponding to an application.	1 Explain the basics of concept learning and inductive learning. 2 Design decision tree neural network solve classification problems. 3 Comprehend probabilistic methods for learning. 4 Explain the instance based learning and reinforcement learning. 5 Build optimal classifiers using Genetic Algorithm and deep learning.

UNIT-I:

Introduction: Well-Posed Learning Problems, Designing a Learning System, Perspectives and Issues in Machine Learning.

The Concept Learning: A concept Learning Task, Concept learning as Search : General –to- Specific Ordering of Hypothesis, Find-S: Finding Maximally Specific Hypothesis, Version spaces and the CANDIDATE-ELIMINATION ALGORITHM : Representation, The List-Then-Eliminate Algorithm, Candidate Elimination Learning Algorithm, Inductive bias.

UNIT-II:

Decision Tree Learning: Introduction, Decision Tree Representation, Approximate Problems for Decision Tree Learning , The Basic Decision Tree Algorithm, Hypothesis space search in Decision Tree Learning, Issues in Decision Tree Learning.

Artificial Neural Networks: Introduction, Neural Network Representation, Perceptrons, Gradient descent and the Delta rule, Multilayer Networks and

the Backpropagation Algorithm, Derivatives of back propogation rule. Back propagation algorithm- Convergence, Generalization.

Evaluating Hypotheses: Estimating hypotheses Accuracy, Basics of sampling theory.

UNIT-III:

Bayesian Learning: Introduction, Bayes Theorem, Concept Learning, Bayes Optimal Classifier, Naïve Bayes Classifier, Bayesian Belief networks, EM algorithm.

Computational Learning Theory: Introduction, Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Spaces : E-Exhausting the version space, Sample Complexity for Infinite Hypothesis Spaces : Shattering a set of Instances, The Vapnik-Chervomenkis Dimension

UNIT-IV:

Instance-based Learning: Introduction, k-Nearest Neighbor Learning, Locally Weighted Regressions, Radial Basis Functions, Case –based learning.

Reinforcement Learning: Introduction, Learning Task, Q Learning.

UNIT-V:

Genetic Algorithms: Motivation, Genetic Algorithm-Representing Hypotheses, Genetic Operators, Fitness Function and Selection, An Illustrative Example, Hypothesis Space Search, Genetic programming, Models of Evolution and Learning.

Deep Learning: Convolutional neural networks, recurrent neural networks.

Learning Resources:

1. Tom Mitchell, —Machine Learning||, McGraw-Hill Science, First edition.
2. Christopher Bishop, —Pattern Recognition and Machine learning||, Springer (2006).
3. Stephen Marsland,||Machine Learning –an algorithmic perspective||, CRC Press.
4. Bengio, Yoshua, Ian J. Goodfellow, and Aaron Courville, "Deep learning ", An MIT Press book in preparation (2015).
5. Daniela witten, Trevor Hastie Robert Tibshirani and Gareth James, —An introduction to statistical Learning with applications in R, Springer 2013
6. https://onlinecourses.nptel.ac.in/noc18_cs26/preview
7. https://www.coursera.org/learn/machine-learning

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

OPEN ELECTIVES OFFERED IN B.E. IV SEMESTER (2023-24)

Dept	Title Open Elective-II	Code	credits
CIVIL	Disaster Management	U22OE410CE	3
ECE	Mathematical Programming for Engineers (General Pool)	U22OE410EC	3
	Introduction to Principles of Communication Engineering (Communication Engineering Stream)	U22OE440EC	3
EEE	Solar Power and Applications	U22OE410EE	3
Mech.	Design Principles of UAVs (Stream: Unmanned Aerial Vehicles)	U22OE410ME	3
	Kinematics and Dynamics of Robotics (Stream: Robotics)	U22OE420ME	3
	Optimization Methods (General Pool)	U22OE430ME	3
H&SS	Critical Thinking	U22OE430EH	3
	Technical Writing and Professional Presentations	U22OE020EH	3
Physics	Track-I: Materials Science for Engineers Synthesis and properties of materials	U22OE420PH	3
	Track-II: Semiconductor Physics and Device Applications Basic Semiconductor Devices	U22OE410PH	3
Maths	Numerical Methods	U22OE410MA	3

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

DISASTER MANAGEMENT

(Open Elective-II)

SYLLABUS FOR B.E. IV-SEMESTER

L : T : P (Hrs./week): 3 : 0 : 0	SEE Marks:60	Course Code: **U22OE410CE**
Credits : 3	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES**
In this subject the students will	Upon the completion of this course students will be able to
1. Know about the state of art of disaster management in world and explore the history of the disasters and comprehend how past events have helped shape the future. 2. Study the various natural and manmade disasters and apply the mitigation measures. 3. Expose students to various technologies used for disaster mitigation and management.	1. Attain knowledge on various types, stages, phases in disaster international policies and programmes with reference to the disaster reduction. 2. Understand various types of natural disaster, their occurrence, Effects, Mitigation and management System in India. 3. Understand different types of manmade disasters, their occurrence, Effects, Mitigation and Management System in India. 4. Explain the utility of geographical information systems (GIS), Remote sensing technology in all phases of disaster mitigation and management. 5. Understand the Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management.

UNIT-I: Introduction: Hazard, vulnerability and risk, Types of disasters, Disaster management cycle, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India.

UNIT-II: Natural Disasters-Hydro-meteorological based disasters: Tropical cyclones, floods, drought zones-Causes, Types, effects and Mitigation measures.

UNIT-III: Natural Disasters Geographical based disasters: Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures.

UNIT-IV: Human Induced hazards: Chemical industrial hazards, major power break downs, traffic accidents, etc.

UNIT-V: Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management: Introduction to remote sensing and GIS, its applications in disaster management.

Learning Resources:

1. Rajib, S and Krishna Murthy, R.R.(2012) "Disaster Management Global Challenges and
   Local Solutions "Univerities Press, Hyderabd, 2012.
2. Navele, P & Raja, C.K. (2009), Earth and Atmospheric Disasters Management, Natural and Manmade, B.S. Publications, Hyderabad, 2009.
3. Battacharya, T. Disaster Science and Management, Tat McGraw Hill Company, New Delhi, 2012.

The break-up of CIE: Internal Tests +Assignments + Quizzes

1	No. of Internal Tests	: 2	Max. Marks for each Internal Test		: 30
2	No. of Assignments	: 3	Max. Marks for each Assignment		: 5
3	No. of Quizzes	: 3	Max. Marks for each Quiz Test		: 5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers

(General Pool: Open Elective - II)

SYLLABUS FOR B.E. IV – SEMESTER (Civil, CSE, EEE, IT, Mechanical)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U22OE410EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide fundamental knowledge of programming language for solving problems.	On completion of the course, students will be able to 1. Generate arrays and matrices for numerical problems solving. 2. Represent data and solution in graphical display. 3. Write scripts and functions to easily execute series of tasks in problem solving. 4. Use arrays, matrices and functions in Engineering applications 5. Design GUI for basic mathematical applications.

UNIT - I : Introduction:

Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on-line help, file types.

MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file.

Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions

Script Files, Function Files, Debugging methods in MATLAB.

Graphics: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options-Multiple plots-subplots-specialized 2D plots: stem-, bar, hist, pi, stairs, loglog, semilog, polar, comet 3D plots: Mesh, Contour, Surf, Stem3, ezplot.

UNIT - III : Numerical Methods Using MATLAB

Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration.

Linear Equations- Linear algebra in MATLAB, Solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations, Advanced topics.

UNIT - IV : Nonlinear Equations

System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions ployval and polyfit, cubic fit using least square method. Finding roots of a polynomial -roots function, Newton-Raphson Method.

UNIT - V :

Solution of Ordinary differential Equations (ODEs)-The 4^{th} order Runge-kutta Method, ODE Solvers in MATLAB, Solving First-order equations using ODE23 and ODE45.

Structures and Graphical user interface using app Designer: Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxford publications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt. Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition-Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Math works.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siauw Alexandre Bayen, Elsevier-18th April 2014.
5. https://nptel.ac.in/courses/103106118/2
6. https://www.udemy.com/numerical-methods/

The break-up of CIE : Internal Tests + Assignments + Quizzes

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2. No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Principles of Communication Engineering

(Communication Engineering Stream: Open Elective - II)

SYLLABUS FOR B.E. IV – SEMESTER (other branches)

L:T:P (Hrs./week): 3:0:0	SEE Marks: 60	Course Code: **U22OE440EC**
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Distinguish analog and digital Modulation techniques used in various Communication systems.	On completion of the course, students will be able to 1. Analyze the power and transmission bandwidth of Amplitude and Frequency Modulated signals. 2. Familiarize the process of reproduction of base band signal. 3. Analyze various pulse analog and pulse digital Modulation Techniques. 4. Understand the transmission of binary data in communication systems. 5. Estimate information content in a system

UNIT - I

Amplitude Modulation: Introduction to Modulation, Need for Modulation, Modulation index, Side bands, AM Power, Double Side Band Suppressed Carrier Modulation, Single Side Band Modulation, Vestigial Side Band Modulation, AM demodulation, Frequency Division Multiplexing,

Lab Activity: Generation of AM using MATLAB and Simulink.

UNIT - II

Angle Modulation: Angle Modulation fundamentals, Frequency Modulation – Modulation index and sidebands, Narrowband FM, Wideband FM, Principles of Phase Modulation, FM demodulation

Lab Activity: Generation of FM signals using MATLAB and Simulink.

UNIT - III

Signal Sampling and Analog Pulse Communication: Ideal Sampling, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation.

Digital Communication Techniques: Quantization, Data Conversion, Time Division Multiplexing, Pulse Code Modulation, Delta Modulation.

Lab Activity: Demonstration of Sampling using MATLAB.

UNIT - IV

Transmission of Binary Data in Communication Systems: Digital Codes, Principles of Digital Transmission, ASK FSK, BPSK

Lab activity: Demonstration of ASK and BPSK using SIMULINK.

UNIT - V

Information Theory: Uncertainty, Information and entropy. Discrete memory less channels

Source Coding Techniques: Shannon-Fano coding, Huffman Coding

Lab activity: Entropy calculations using MATLAB

Learning Resources:

1. Louis E. Frenzel, Principles of Electronic Communication Systems, 3rd Edition. Tata Mcgraw Hill.
2. Wayne Tomasi, Electronic Communications Systems, 5th Edition, Pearson Education.

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2. No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SOLAR POWER AND APPLICATIONS

Open Elective-II

SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE410EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To impart the basics of solar energy harnessing and solar panel and array.	1. Compare different energy resources. 2. Identify and choose proper type of meter for solar radiation measurement. 3. Use proper solar thermal system according to the load requirements. 4. Categorize and compare photovoltaic cells. 5. Apply the knowledge of solar energy.

Unit – I

Fundamentals of Energy Sources: Oil crisis of 1973, Classifications of Energy Resources, Importance of Non-conventional energy sources, Advantages-disadvantages and salient features of Non-conventional energy sources.

Unit – II

Solar Energy Basics: Sun as a source of energy, the Earth, Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Depletion of solar Radiation, Pyranometer, Pyrheliometer, Sunshine Recorder.

Unit – III

Solar Thermal Systems: Solar Collectors, Solar Water Heater, Solar Passive space – heating and cooling systems, Solar Cookers, Solar furnaces, Solar thermal water pump, Vapour compression refrigeration and Solar pond Electric power plant.

Unit – IV

Solar Photovoltaic Systems: Solar Cell fundamentals, Cell characteristics, Cell classification, Module, Panel and Array, Maximizing the Solar PV output and load matching, MPPT.

Unit – V

Solar PV systems & Applications: Solar PV system classification - Stand-Alone Solar PV system and Grid-Interactive Solar PV system. Applications - Water Pumping, lighting, medical refrigeration, village power and Telecommunication.

Suggested Reading:

1. B H Khan, Non-Conventional Energy Resources, 2nd Edition, Tata McGraw Hill.
2. G. D. Rai, Non-Conventional Energy Sources, 13th Reprint 2014, Khanna Publications.

The break-up of CIE : Internal Tests+Assignments+Quizzes

1.	No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

SYLLABUS FOR B.E. IV-SEMESTER
Design Principles of UAVs (Open Elective-II)
(Stream: Unmanned Aerial Vehicles)

Instruction : 3Hours /week	SEE Marks : 60	Course Code : **U22OE410ME**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
The objective of this Course is to understand the features of fundamentals of design and parameters, aerodynamic design, performance, weight estimation and stability of UAVs	1 Describe the design fundamentals of UAVs. 2 Apply the fundamental parameters in the design of UAVs. 3 Analyze the aerodynamic design of UAVs. 4 Explore the design concepts for the performance of UAVs. 5 Estimate the weight and stability of UAVs.

UNIT I: Design Fundamentals:

Introduction, UAV Classifications, Design Criteria, Objectives, and Priorities, Feasibility Analysis, Design Groups, Design Disciplines, Design Process: UAV Life Cycle, Systems Engineering Approach, Conceptual Design, Preliminary Design, Detail Design, Design Review, Evaluation and Feedback.

UNIT II: Fundamental parameters

Various methods to measure flight velocity: using Pitot tube and Pitot static tube, with numerical problems, Variation of Pressure, density and temperature with altitude, Standard atmosphere with numerical problems. Anatomy of Airplane: Various control surfaces for an airplane: Airfoil Nomenclature: Design steps to construct an Airfoil.

UNIT III: Aerodynamic design: Lift and drag.

Generation of Lift and drag: How lift is generated, Variation of lift with angle of attack, Sources of Drag. Aerodynamic center, Center of pressure, Various

wing planforms, Mean aerodynamic cord. Lifting line theory, NACA airfoils, Drag generation and dear polar. Difference between Airfoil and Finite wing, Numerical problems on wing planforms. Interpreting airfoil data, Lift curve slope of finite wing, Drag Polar, Numerical problems on selection of an airfoil.

UNIT IV: Design for performance: Thrust and power.

Introduction to Airplane performance, Equation of motion in parallel and perpendicular direction of motion, Steady Level flight, Thrust required for steady level flight, thrust required curve, thrust available curve for reciprocating and Jet engine, Power Required and Power available curve. Numerical problems on calculation of performance parameters, Selection of power plant. Rate of climb and Climb angle, Climb performance, Engine sizing, Power Plant selection.

UNIT V: Weight estimation and stability

Weight estimation, Common propulsion systems, Electric Propulsion, Battery Sizing, Iterative weight estimation, Wing sizing, Wing Planform selection and sizing, Case study demonstration of Flight test, Effect of variation of CG location, Static Stability, Effects of C.G. location on static stability, Longitudinal Static stability, Contribution of tail in static stability, Neutral point.

Learning Resources:

1. Andey Lennon, "Basics of R/C Model Aircraft Design" Model Airplane News Publication
2. John Baichtal, Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs.
3. K Valavanis, George J Vachtsevanos, Handbook of Unmanned Aerial Vehicles, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.
4. DGCA RPAS Guidance Manual, Revision 3 – 2020

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

SYLLABUS FOR B.E. IV-SEMESTER
Kinematics and Dynamics of Robotics (Open Elective-II)
(Stream: Robotics)

Instruction :3Hours /week	SEE Marks : 60	Course Code : **U22OE420ME**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE The objective of the course is to	**COURSE OUTCOMES** On completion of the course, students will be able to
To develop the fundamental knowledge and skills required to analyze, design and control robotic systems	1. Analyze the kinematics of robotic systems and apply them to solve real world problems 2 Apply differential kinematics and statics concepts to design and control robotic systems 3 Analyze the dynamics of serial manipulators using lagrangian and Newton-Euler mechanics 4 Develop motion and force control strategies for robotic systems using feedback control techniques 5 Generate and analyze robot trajectories for various applications

UNIT-I

Robot Kinematics

Forward Kinematics: Forward/direct kinematic analysis of serial manipulators.

Inverse Kinematics: General properties of inverse kinematic solution. Inverse kinematics of serial RR planar manipulators.

UNIT-II

Differential Kinematics

Linear and angular velocity of links, Velocity propagation, Manipulator Jacobian for serial manipulators, Jacobian Singularities.

UNIT-III

Static Analysis: Force and moment balance, Jacobian in statics.

Dynamics of serial manipulators

Lagrangian formulation for equations of motion for RP, RR serial manipulators,

Unit-IV

Dynamics of serial manipulators

Recursive dynamics using Newton-Euler formulation of RP and RR serial manipulator.

UNIT-V

Trajectory Generation

Joint-Space Techniques: Cubic Polynomial Trajectories, Linear Segments with Parabolic Blends-without and with via points

Cartesian-Space Techniques: Straight line path, Circular Path, Position Planning, Orientation Planning.

Learning Resources:

1. Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, "Robotics: Modelling, Planning and Control", Springer Science & Business Media, 2010.
2. M.W.Spong and M.Vidyasagar,"Robot Dynamics and Control", 1st Edition, John Wiley and sons,1990.
3. R.K.Mittal and I.J.Nagrath, "Robotics and Control", Tata McGraw-Hill, 2003.
4. Subir Kumar Saha, "Introduction to Robotics", Tata McGraw-Hill Education, 2014.
5. Howie M. Choset, Seth Hutchinson, Kevin M. Lynch, "Principles of Robot Motion: Theory, Algorithms, and Implementation", MIT Press, 2005.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

Optimization Methods (Open Elective-II)
(General Pool)

SYLLABUS FOR B.E. IV-SEMESTER

Instruction :3Hrs /week	SEE Marks: 60	Course Code:**U22OE430ME**
Credits :3	CIE Marks: 40	Duration of SEE: 3 Hours

Course Objectives	Course Outcomes
The objectives of this course are to: understand Linear & non-linear programming, transportation modeling , CPM & PERT for project scheduling and control, and application of various optimization techniques for respective field engineering (Inter disciplinary)	**On completion of the course, the student will be able to:** 1. Optimization of resources in multi disciplinary areas through linear programming under different conditions. 2. Understand revised simplex methods per customer requirements to suit for various Organizations. 3. Minimization of total cost to apply for transportation techniques for the transhipment of Goods and products and Implement techniques like project management 4. Optimization of resources in multi disciplinary areas through non-linear programming under different conditions.

UNIT-I

Optimization-An overview

Meaning of Optimization-Origin of Optimization-Introduction to Linear programming problems (LPP) -Formulation of LPP- Graphical method, simplex method.

UNIT-II

Advanced topics in Linear programming

Special cases in simplex method, Duality in LPP, Differences between primal and dual, shadow prices, Dual simplex method, Revised simplex method.

UNIT-III

Transportation Model

Introduction to Transportation model-Formulation and solution of transportation models- Methods for calculating Initial basic feasible solution-Optimization of transportation model using MODI method.

Project Scheduling

Introduction to network analysis, Rules to draw network diagram, Fulkerson rule for numbering events, Critical path method, introduction to PERT.

UNIT-IV

Non linear programming problems

Optimization methods for single variable, multivariable functions, Maxima-Minima

One Dimensional Minimization: Uni-modal Function, Unrestricted search, Exhaustive search, Dichtomous search, Interval Halving method, Fibonacci and golden bisection Method , Newton and Quasi Newton method.

UNIT-V

Non Linear - Unconstrained optimization: classification, Univariate search, pattern Directions, Hook Jeeves, Powel method, steepest decent method.

Learning Resources:

1. Singiresu S. Rao, "Engineering optimization- Theory and Practice", 4th Edition, John Wiley and Sons, 2009.
2. NVS Raju, "Optimization Methods for Engineers ", PHI Learning Pvt. Ltd., 2014.
3. Prem Kumar Gupta and Dr. DS Hira, "Operations Research ", S.Chand & Company Pvt. Ltd., 2014.
4. R. Paneerselvam, "Operations Research", PHI Learning Pvt. Ltd., 2009.
5. Kalyanmoy Deb, Optimization for Engineering Design- algorithms and examples, PHI Pvt. Ltd, 1st edition 2003, Delhi.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

CRITICAL THINKING (Open Elective-II)

SYLLABUS FOR B.E. - IV Semester

Instruction : 3 Hours	SEE : 60	Course code **: U22OE430EH**
Credits : 3	CIE : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to:	**At the end of the course the learners will be able to: -**
1. Identify the core skills associated with critical thinking. 2. Comprehend the various techniques of critical thinking 3. Evaluate data and draw insights from it to make the right decisions 4. Understand where to look for bias and assumptions in problem 5. Understand structure, standards and ethics of critical writing	1. Analyse and compare techniques for comparing alternate solutions 2. Demonstrate the difference between deductive and inductive reasoning and construct logically sound arguments 3. Check for accuracy of data and use it as a tool for problem solving 4. Evaluate, identify and distinguish between relevant and irrelevant information to formulate a thesis or hypothesis. 5. Employ evidence and information effectively

UNIT 1: COMPONENTS OF CRITICAL THINKING

1.1 Applying Reason
1.2 Open Mindedness
1.3 Analysis
1.4 Logic

UNIT 2: NON-LINEAR THINKING

2.1 Step out of your Comfort Zone
2.2 Don't Jump to Conclusions
2.3 Expect and Initiate Change
2.4 Being Ready to Adapt

UNIT 3: LOGICAL THINKING

3.1 Ask the Right Questions
3.2 Organize Data
3.3 Evaluate Information
3.4 Draw Conclusions

UNIT 4: INFER MEANING FROM INFORMATIVE TEXTS

4.1 Making Assumptions
4.2 Watch out for Bias
4.3 Ask Clarifying Questions
4.4 SWOT Analysis

UNIT 5: PROBLEM SOLVING

5.1 Identifying Inconsistencies
5.2 Trust your Instincts
5.3 Asking Ask?

METHODOLOGY	**ASSESSMENTS**
- Case Studies	- Online assignments
- Demonstration	- Individual and Group
- Presentations	
- Expert lectures	
- Writing and Audio-visual lessons	

LEARNING RESOURCES

learn.talentsprint.com

1. Calling Bullshit: The Art of Skepticism in a Data-Driven World. by Carl Bergstrom & Jevin West. ...
2. Thinking, Fast and Slow. by Daniel Kahneman. ...
3. Factfulness: Ten Reasons We're Wrong About The World — And Why Things Are Better Than You Think. ...
4. Box Thinking: The Surprising Truth About Success. ...

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2. No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS

(Open Elective-II)

SYLLABUS FOR B.E. - IV Semester

Instruction : 3 Hours	SEE : 60	Course code **:** U22OE020EH
Credits : 3	CIE : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to:	**At the end of the course the learners will be able to: -**
1. Understand the principles and mechanics of technical writing for students of engineering. 2. Identify different kinds of business correspondences and the dos and don'ts for each of them. 3. Make effective presentations as part of today's workplace demands. 4. Recognize the need for Video and Written CVs with focus on specific elements. 5. Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs	1. Write effective reports. 2. Articulate business correspondences based on need. 3. Make persuasive presentations. 4. Design their videos CVs. 5. Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose

UNIT 1: FORMAL & INFORMAL TECHNICAL REPORTS

1.1 Informal Report Formats
1.2 Project and Research Reports
1.3 Formal Report Components, Feasibility Reports, Evaluation reports
1.4 Analytical and Informational reports
1.5 Executive summaries.

UNIT 2: BUSINESS CORRESPONDENCE

2.1 Electronic communication
2.2 Effective emails
2.3 Instant and text messaging guidelines

UNIT 3: PROFESSIONAL PRESENTATIONS

3.1 Paper presentations & Poster presentations
3.2 PowerPoint presentations
3.3 Storyboard writing

UNIT 4: RESUME & CVs

4.1 Technical Resume
4.2 Cover letter, resume format
4.3 Video CVs

UNIT 5: WRITING PROPOSALS & SOPs

5.1 Types of proposals
5.2 Request for proposals
5.3 Stating your objective.

METHODOLOGY

- Case Studies
- Demonstration
- Presentations
- Expert lectures
- Writing and Audio-visual lessons

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

1. Read Me First!: A Style Guide for the Computer Industry by Sun Technical Publications
2. Eats, Shoots and Leaves Paperback – 18 February 2010 by Lynne Truss
3. Don't Make Me Think, Revisited: A Common Sense Approach to Web & Mobile Usability | Third Edition | By Pearson Paperback –
4. The Design of Everyday Things: Revised and Expanded Edition Paperback –
   Illustrated, 5 November 2013 by Don Norman (Author)

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2. No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Physics

Track-I: MATERIALS SCIENCE FOR ENGINEERS
SYNTHESIS AND PROPERTIES OF MATERIALS
(Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

Instruction :3Hrs/Week	SEE Marks : 60	Course Code : **U22OE420PH**
Credits: 3	CIE Marks : 40	Duration of Semester End Exam:3 hrs

UNIT I: SYNTHESIS OF MATERIALS- PHYSICAL METHODS (10 hours)

Solid state reaction, diffusion, melt quenching, vapor deposition, Chemical vapor deposition, physical vapor deposition, sputtering, mechanical milling, electron beam deposition.

UNIT II: SYNTHESIS OF MATERIALS- CHEMICAL METHODS (8 hours)

Introduction, slow evaporation at room temperature, high-temperature solution growth, Sol-gel process, Aerosol method, Hydro-thermal process, Solvo-thermal synthesis, Photo-chemical synthesis.

UNIT III: Electrical Properties of Materials (8 hours)

The Boltzmann transport equation, Electrical conductivity, electrical conductivity at low temperatures, Matthiessen's rule, Thermal conductivity, Wiedemann-Franz law, Hall-effect, Temperature variation of electrical conductivity

UNIT-IV: Physical properties of Materials (10 hours)

Fundamentals of magnetism, different types of magnetism, Permeability, Magnetic Hysteresis, Coercive force.

Young's modulus, Bulk modulus, Modulus of rigidity, tensile testing and tensile strength, breaking strength, plastic deformation, failure analysis, hardness-testing, Brinell's, Viker's impact testing – toughness, resilience, scratch test.

UNIT-V: Optical and Thermal Properties of Materials (10 hours)

Optical properties: photoconductivity, optical absorption & transmission, energy band gap determination, photoluminescence, phosphorescence, electroluminescence.

Thermal properties: concept of phonons, thermal conductivity, specific heat, exothermic & endothermic processes.

References:

1. A.J.Dekker, Solid State Physics, Macmillan India Ltd., 2008.
2. V Raghavan, Materials Science and Engineering, PHI, 6th Edn, 2015
3. W.D. Callister Jr & David G. Rethwich, Materials Science and Engineering an Introduction-, John Wiley, 10th Edn, 2018.
4. M. A. Wahab, Solid State Physics, Narosa. 2015.
5. J. P. Srivastava, Elements of Solid-State Physics, PHI, 2014.

The break-up of marks for CIE :
Internal Tests + Quiz Tests + Assignments

1. No. of Internal Tests: 2 Max. Marks for each Internal Tests: 30
2. No. of Assignments: 2 Max. Marks for each Assignments: 5
3. No. of Quizzes: 2 Max. Marks for each Quiz Tests: 5

Duration of Internal Tests : 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Physics

Track-II: Semiconductor Physics and Device Applications
Basic Semiconductor Devices
(Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

Instruction :3Hrs/Week	SEE Marks : 60	Course Code : **U22OE410PH**
Credits: 3	CIE Marks : 40	Duration of Semester End Exam:3 hrs

UNIT I: Junction Diode (8 hours)

Basic structure of PN junction, Band bending, zero bias condition, Expression for built in potential, Electric field and space charge width, Abrupt and Graded junctions, Diode equation, Effect of temperature on PN junction diode, Capacitive effects in PN junction, Diode –applications.

UNIT II: Metal-Semiconductor Junction (10 hours)

Schottky and Ohmic contacts, Schottky barrier diode, Current voltage relationship, comparison of Schottky barrier diode and pn junction diode, Static Barrier Characteristics, Dynamic Characteristics, Ohmic Contact, Metal Oxide Semiconductor Capacitor-Capacitance-Voltage, Ideal MOS system-Threshold voltage.

UNIT III: Special Semiconductor Devices (8 hours)

Small signal equivalent circuits of PN-diode, short and long diode, Breakdown mechanisms in Zener diode, Varactor diode, Tunnel diode, Gunn diode, Shockley diode, IMPATT diode.

UNIT IV: BJT and Thyristor (8 hours)

BJT's – Construction and characteristics, Thyristor – Construction, working and characteristics, comparison of BJT and Thyristor, Heterojunction Bipolar junction transistor, Basics of gate turn-off thyristor (GTO), SiC based Bipolar Devices-Applications, Building a GaN Transistor-GaN Transistor Electrical Characteristics.

UNIT V: Fabrication Techniques (6 hours)

BJT fabrication: Diffused, point contact, fused or alloy and rate grown techniques, molecular beam epitaxy (MBE), epitaxial vapour phase, Liquid phase growth.

References:

1. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
2. Donald Neamen, Semiconductors Physics and Devices, Tata Mc Graw Hill, 2003
3. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley Publications, 2002.
4. Semiconductor Devices, Basic Principles Jasprit Singh, Wiley Publications, 2001
5. Electronic Devices and Circuits- Millman and Halkias-Tata Mc Graw Hill, 1983.
6. Solid State Electronic Devices - Ben G Streetman-Prentice Hall, New Delhi, 1995.

The break-up of marks for CIE :
Internal Tests + Quiz Tests + Assignments

1. No. of Internal Tests: 2 Max. Marks for each Internal Tests: 30
2. No. of Assignments: 2 Max. Marks for each Assignments: 5
3. No. of Quizzes: 2 Max. Marks for each Quiz Tests: 5

Duration of Internal Tests : 90 minutes

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VASAVI COLLEGE OF ENGINEERING (Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

NUMERICAL METHODS
(Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code:**U22OE410MA**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	*At the end of the course students will be able to:*
1. Study the various numerical methods to solve Algebraic and Transcendental equations. 2. Understand the methods to solve linear system of equations. 3. Understand the numerical methods in interpolation and extrapolation. 4. Understand the numerical methods in interpolation using central differences. 5. Understand the numerical methods in solving ordinary differential equations.	1. Apply the numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods 2. Solve the linear system of equations using direct and iteration methods. 3. Use the various numerical methods in interpolation and extrapolation. 4. Use the various numerical methods in interpolation using central differences. 5. Find the numerical solutions of ordinary differential equations.

Unit – I: (8Hours)

Solution of Algebraic and Transcendental equations:

Intermediate value property of equations-Solution of Algebraic and Transcendental equations: Bisection method, Newton-Raphson method Regula-Falsi method.

Unit – II: (8Hours)

Solution of linear system of equations:

Direct methods- Gauss elimination method- Factorization method- Iterative methods: Jacobi's Iteration method- Gauss - Seidel Iteration method-Ill-conditioned system of equations.

Unit – III: (8Hours)

Numerical differences-I

Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences- Newton's divided difference formula.

Unit – IV: (8Hours)

Numerical differences-II

Central differences interpolation-Gauss's forwards and backward difference formulae-Stiriling's formula- Bessel's formula.

Unit – V: (8Hours)

Numerical Solutions of Ordinary Differential Equations

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta of 4th order (without proofs).

Text Books:

1. Numerical methods in engineering and science by B.S.Grewal, Khanna publishers
2. Advanced Engineering Mathematics by R.K.Jain&S.R.K.Iyengar, Narosa publishing house.

Reference Books:

1. Numerical Analysis by S.S.Sastry, PHI Ltd.

Online Resources :

1 http://mathworld.wolfram.com/topics
2 http://www.nptel.ac.in/course.php

The break-up of CIE : Internal Tests + Assignments + Quizzes

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3. No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 Minutes

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VASAVI COLLEGE OF ENGINEERING(Autonomous)

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IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Skill Development Course- III (Aptitude-II)

SYLLABUS FOR B. E -IV SEMESTER

L:T:P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code: **U22BS430MA**
Credits: 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES **The course will enable the learners to:**	**COURSE OUTCOMES** **At the end of the course the learners will be able to: -**
1. Students will be trained to enhance their employability skills. 2. Students will be introduced to higher order thinking and problem solving skills in the following areas - Arithmetic Ability, Numerical Ability and General Reasoning. 3. Students will be trained to work systematically with speed and accuracy while problem solving. 4. Students will be trained to apply concepts like percentages and averages to solve complex problems. 5. Students will be trained to use effective methods like elimination of options and shortcuts to solve problem accurately.	1. Solve questions in the mentioned areas using shortcuts and smart methods. 2. Understand the fundamentals concept of Aptitude skills. 3. Perform calculations with speed and accuracy. 4. Solve complex problems using basic concepts. 5. Use shortcuts with ease for effective problem solving.

UNIT 1: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -1

1.1 Time speed and distance
1.2 Boats and Streams
1.3 Problems on trains

UNIT 2: REASONING ABILITY- LOGICAL REASONING

2.1 Seating Arrangements- Linear; Circular; Complex
2.2 Venn diagrams
2.3 Syllogism
2.4 Cubes & Cuboids
2.5 Dices

UNIT 3: REASONING ABILITY- NON VERBAL REASONING

3.1 Figure Series
3.2 Directions
3.3 Clocks
3.4 Calendars

UNIT 4: QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -2

4.1 Mensuration Part -1
4.2 Mensuration Part -2
4.3 Logarithms

UNIT 5: QUANTITATIVE APTITUDE- ENGINEERING MATHEMATICS

5.1 Permutations and combinations
5.2 Probability

Prescribed textbook for theory:

1. Quantitative Aptitude S.CHAND by RS AGARWAL
2. A Modern Approach to Verbal & Non-Verbal Reasoning S.CHAND by Dr. R S Aggarwal

Suggested Reading

1. Learn.talentsprint.com/References Courses
2. Quantitative Aptitude Disha Publications
3. LOGICAL Reasoning Disha Publications

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal tests	:	2	Max.Marks	:	20
2	No. of assignments	:	2	Max. Marks	:	5
3	No. of Quizzes	:	2	Max. Marks	:	5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

Skill Development Course-IV (Technical Skills-II)
Problem Solving through Data Structures
SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):1:0:0	SEE Marks : 40	Course Code: **UII22PE430CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Understand the Nonlinear data structures and their applications. 2. Prepare the students for the contests relative to the concepts learnt. 3. Build confidence in coding using Non Linear Data structures 4. Leverage the Industry Standards of the DBMS concepts	1. Lean non-linear data structures with various applications that are essential for solving problems which involve complex relationships, efficient searching, and hierarchical organization. 2. Solve scenario based problems using Tree Data structures 3. Learn and apply greedy algorithms for efficient solutions to complex problems. 4. Learn and apply database concepts for designing efficient, reliable, and well-structured databases that meet the needs of modern applications.

Problem Solving through Non-Linear Data structures – Trees I
Problem solving approaches using Non-linear data structures, Coding problems on the height of a binary tree, Size of a binary tree, Tree order traversals, Problem Solving on Binary Trees, Examples, Practice problems.

Problem Solving through Non-Linear Data structures – Trees II
Time comparison and analysis on Binary Search Trees & Coding problems,

Search/probe sequence validation, Significance of height balancing the tree, Examples, Practice problems.

Problem Solving implementing Algorithms - Greedy Methods II

Algorithmic Thinking, Selection as Greedy Strategy, Heaps Min and Max, Priority Queues, Greedy Coin change solution, Examples, Practice problems.

Problem Solving implementing Algorithms - Greedy Methods II

Fractional Knapsack, Sequencing jobs with deadlines, Activity selection, Examples, Practice problems.

Problem Solving using DBMS I

Industry Standards of leveraging DBMS concepts: SQL Queries, Entity Relationship Models, Question, and answers.

Problem Solving using DBMS II

Industry Standards of leveraging DBMS concepts: Query Optimization, Transactions & Concurrency, Normalization, case studies, Question and answers

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	1	Max. Marks for each Internal Test	:	30

Duration of Internal Tests : 1 Hour 30 Minutes

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Department of Computer Science & Engineering

DATABASE MANAGEMENT SYSTEMS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:**UII22PC421CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply SQL commands on a database. 2 Develop an application using forms, reports and PL/SQL.	1 Design and implement a database schema. 2 Apply DDL, DML, DCL and TCL commands on a database. 3 Apply NO-SQL concepts for given database. 4 Implement PL/SQL programs for creating stored procedures, cursors & triggers. 5 Design and implement an application using forms and reports.

Programming Exercise:

I. SQL

1. Creation of database tables without constraints.
2. Creating tables using combination of constraints.
3. Usage of Stored Functions.
4. Exercising all types of Joins.
5. Exercising complex Queries.
6. Experiments on No-SQL.

II. PL/SQL

1. Demonstration of Blocks, Cursors, functions and Packages.
2. Demonstrate Exception Handling.
3. Usage of Triggers to perform operation on Single and Multiple Tables.
4. PL/SQL Procedures for data validation.

III. FORMS

1. Creation of forms for colleges Information System, Library Information System and Recruitment Cell.

IV. REPORTS

1. Creation of Reports based on different queries.
2. Creation of full-fledged Database Application.

Learning Resources:

1. Ivan Bayross, SQL, PL/SQL, The Programming Language of Oracle,4th Edition, PBP Publications.
2. Nilesh Shah, Database Systems Using Oracle, 2nd Edition (2007), PHI.
3. Rick F Van der Lans, Introduction to SQL, 4thEdition(2007), Pearson Education.
4. Benjamin Rosenzweig Elena Silvestrova, Oracle PL/SQL by Example, 3rdEdition(2004), Person Education.
5. Albert Lulushi, Oracle Forms Developer's Handbook, 1st Edition (2006), Pearson Education.
6. https://www.lynda.com/Access-tutorials/Welcome/195854/373426-4.html

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2023-24

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Department of Computer Science & Engineering

OPERATING SYSTEMS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P (Hrs./week):0:0:2	SEE Marks:50	Course Code:**UII22PC431CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply system calls for process management and file management 2 Implement techniques related to CPU Scheduling, Main memory management, Process synchronization and deadlock avoidance &detection	1 Implement operations on Files and Process by using system calls 2 Implement CPU Scheduling algorithms 3 Implement Page Replacement techniques 4 Design and implement solutions for Inter-Process Communication 5 Implement Kernel module programs

Programming Exercise:

1. Building & Booting of Operating system, Disk partitioning and Dual boot of OS
2. Write shell programs to implement a given task.
3. Implement system calls for File system management.
4. Implement system calls for Process management.
5. Write C programs to implement CPU scheduling algorithms (FCSF, SJF, Priority, RR, Multi level)
6. Write C programs to implement Page Replacement algorithms.
7. Implement Inter-process communication using
   i. Pipes (by using pipe system call)

ii. Message Queues (by using msgget, msgsnd, msgrcv system calls)

iii. Shared Memory (by using shmget, shmat, shmdt system calls)

8. Implement Process Synchronization for Bounded buffer, Readers-Writers and Dining philosophers' problems using Semaphores. (by using semget, semop system calls)
9. Study pthreads and implement a program which shows the performance improvement in using threads as compared with process.(Examples like Matrix Multiplication, Hyper quicksort, Merge sort, Traveling Sales Person problem)
10. Write a Linux Kernel Module for Task Information extraction.
11. Write a Linux Kernel Module for Listing Tasks.

Learning Resources:

1. Kernighan and Pike, UNIX Programming Environment,PHI/Pearson Education
2. U. Vahalia, UNIX Internals: The New Frontiers, Pearson Education Inc.2003.
3. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 10th Edition (2018), Wiley India.
4. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition (2001), Pearson Education, Asia.
5. Dhananjay, Dhamdhere.M, *Operating System-concept based approach*, 3rd edition (2009), Tata McGraw Hill, Asia
6. Robet Love: *Linux Kernel Development*, (2004)Pearson Education
7. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
8. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php
9. https://nptel.ac.in/courses/106106144/

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

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Department of Computer Science & Engineering

DESIGN & ANALYSIS OF ALGORITHMS LAB

SYLLABUS FOR B.E. IV-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks : 50	Course Code:**UII22PC441CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Implement solutions for the given problems using divide and conquer 2 Implement solutions for the given problems using greedy and dynamic programming 3 Implement solutions for the given problems using backtracking and branch and bound.	1 Implement searching, sorting and hashing using basic data structures. 2 Apply divide and conquer strategy to implement algorithm for a given problem. 3 Implement an algorithm for a given problem using Greedy design strategy 4 Apply dynamic programming to implement algorithms for a set of problems. 5 Implement algorithms for set of problems using backtracking and branch and bound.

Programming Exercise:

1. Implementation of Merge Sort, Quick Sort, Heap Sort, Binary Search and Hashing.
2. Implementation of Traversal on Graphs.
3. Implementation of Traversal on Trees and DAG.
4. Implement Single source shortest path algorithm.
5. Implement Minimum cost spanning tree algorithm.
6. Implement fractional Knapsack algorithm.
7. Implement Optimal merge patterns -Huffman encoding algorithm.

8. Implement Matrix–chain multiplication algorithm with dynamic programming.
9. Implement LCS algorithm and print Longest common subsequence.
10. Implement All-pairs shortest path algorithm.
11. Implement 0/1 Knapsack algorithm.
12. Implement multi-stage graph.
13. Implementation of N-queens problem with back tracking.
14. Implement Graph coloring problem with back tracking.
15. Implement TSP by branch and bound.
16. Implement 0/1 knapsack by branch and bound.

Learning Resources:

1. Ellis Horowitz, SartajSahani, SanguthevarRajasekaran," Fundamentals of computer Algorithms", Second edition (2008),Universities Press.
2. Thomas H. Cormen, Leiserson C.E, Rivest.R.L , Stein.C, Introduction to Algorithm, 2nd edition (2001), MIT press, USA.
3. Michael T. Goodrich, Roberto Tamassia, Algorithm Design, foundations, analysis, and internet examples, WIELEY student edition (2006).
4. Aho, Hopcroft, Ulman, The Design and Analysis of Computer Algorithms, (2000), Pearson Education.
5. Algorithm Design, 1st Edition, Jon Kleinberg and ÉvaTardos, Pearson.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2023-24

SCHEME OF INSTRUCTION AND EXAMINATION(R-22)
FOR B.E BRIDGE COURSE IV SEMESTER (A.Y 2023-24)
Common for CSE, CSE (AI&ML), IT

B.E IV Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P**		**SEE**	**CIE**	
THEORY								
UB22HS410EH	English Language and Communication	2	-	-	3	50	-	-
PRACTICAL								
UB22HS411EH	English Language and Communication Skills Lab	-	-	2	3	50	-	-
	TOTAL	**2**	**-**	**2**	-	**100**	**-**	**-**
	GRAND TOTAL	**4**				**100**		-

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION

SYLLABUS FOR B.E. IV SEMESTER (Bridge Course)

L :T:P(Hrs/week): 2	SEE Marks :50	Course Code: **UB22HS410EH**
Credits :0	CIE Marks :-	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The Course will enable the Learners to:	**At the end of the course the students will be able to :**
1. Converse effectively in various context.	1. Use language verbally and nonverbally in appropriate contexts
2. Listen for general and specific comprehension and write paragraphs.	2. Listen for global comprehension and to infer meaning from spoken discourses. Write paragraphs coherently.
3. Understand the elements of a good paragraph	3. Write paragraphs coherently.
4. Speak appropriately in daily conversations	4. Use phrases, essential vocabulary and polite expressions in every day conversations.

Unit-1 1.0: Communication& Functional English

1.1 Role and Importance of Communication, Process of Communication, Non-verbal communication, barriers to Communication.
Conversational phrases: greetings, introductions, apology, compliments, agreeing and disagreeing, polite forms in everyday conversations.

Unit 2 2.0: Listening

2.1 Importance of listening, Active listening

Unit 3. 3.0: Writing

1.1 Paragraph writing, coherence and cohesion.

Unit 4 4.0: Grammar and Vocabulary

4.1 Common Errors, one word substitutes, Phrasal-verbs, collocations.

Unit-5 5.0: Reading

5.1 Prose text- Our own civilization – CEM Joad

Prescribed textbook for theory:

Technical communication - Principles and Practice (2nd Edition 2014) - Meenakshi Raman and Sangeeta Sharma- Oxford University Press.

Suggested Reading

E.Suresh kumar, P. Sreehari and J. Savithri - Essential English
Reading comprehension - Nuttal.J.C - Orient Blackswan
Sunitha Mishra,C. Murali Krishna, Communication Skills for Engineers, Pearson, 2004.
M. Ashraf Rizvi. Effective Technical Communication. Tata Mcgraw Hill, 2005.
Allen and Waters., How English Works.
Willis Jane., English through English.

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

SYLLABUS FOR B.E. IV SEMESTER (Bridge Course)

(Common to all branches)

L :T:P(Hrs/week): 2	SEE Marks :50	Course Code: **UB22HS411EH**
Credits :0	CIE Marks :0	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The Course will enable the Learners to:	**At the end of the course the students will be able to :**
1. Converse in various situations. 2. Make paper and power point presentations. 3. Speak effectively using discourse markers.	1. Participate effectively in group discussions, Public speaking, debates (formal and informal 2. Research and sift information to make Presentations. 3. Listen for gist and make inferences from various speeches. 4. Use connectives and make transitions effectively while speaking.

ELCS – Component - INTERACTIVE COMMUNICATION SKILLS LAB

Group discussion: Objectives of GD, Types of GDs; Initiating, Continuing, and concluding a GD.

Debate: Understanding the differences between a debate and a group discussion, essentials of debate, concluding a debate.

Role Plays: Types of Role plays (formal and informal), use of discourse markers.

Presentation Skills: Making effective presentations, researching on various topics, use of Audio visual aids, coping with nerves.

Prescribed textbook for laboratory:

Speak Well: Jayshree Mohanraj, Kandula Nirupa Rani and Indira Babbellapati - Orient Black Swan.

Longman Dictionary of Contemporary English - 6th Edition, 2020. (The students will be given the PDF format).

Learning Resources:

1. Balasubramanian: A textbook of English phonetics for Indian students, Macmillan, 2008.
2. Priyadarshini Patnaik : Group discussion and interviews, Cambridge University Press India private limited 2011.
3. Daniel Jones: Cambridge English Pronouncing Dictionary - A Definitive guide to contemporary English Pronunciation.