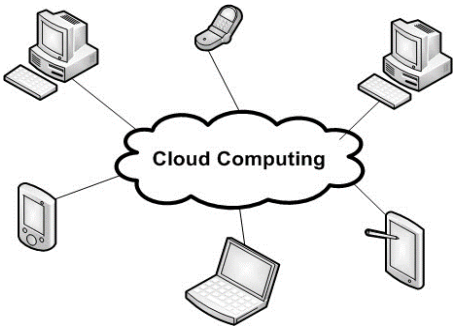
VASAVI COLLEGE OF ENGINEERING(AUTONOMOUS)
Ibrahimbagh, Hyderabad-31

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. (IT) III and IV Semesters With effect from 2018-2019
(For the batch admitted in 2017-18)



DEPARTMENT OF INFORMATION TECHNOLOGY
+91-40-23146050, 23146051
Fax: +91-40-23146090
Website: www.vce.ac.in

VASAVICOLLEGE OFENGINEERING (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EXAMINATION FOR B.E. III-SEMESTER w.e.f. 2018-19
(Students admitted in A.Y. 2017-18) - CBCS

S No.	Course Code	Course Name	Scheme of Instruction				Scheme of Examination			
			Periods per week				Duration in Hrs	Maximum Marks		Credits
			L	T	D	P		SEE	CIE	
1	BS330MA	Discrete Mathematics	3	-	-	-	3	60	40	3
2	BS320MA	Probability & Statistics	3	-	-	-	3	60	40	3
3	ES310IT	Advanced Data Structures	3	1	-	-	3	60	40	3
4	PC310IT	Basic Electronics	3	1	-	-	3	60	40	3
5	PC320IT	Digital Electronics & Logic Design	3	-	-	-	3	60	40	3
6	MC320CE	Environmental Science	2	-	-	-	3	60	40	2
7	MC310ME	Introduction to Entrepreneurship	1	-	-	-	2	40	30	1
8	HS310EH	Finishing School-I: Communication skills in English- I	2	2	-	-	3	60	40	2
9	OE3XXXX	Open Elective - I	2	-	-	-	3	60	40	2
PRACTICALS										
10	PC311IT	Basic Electronics Lab	-	-	-	2	3	50	30	1
11	ES311IT	Advanced Data Structures Lab	-	-	-	2	3	50	30	1
12	P319IT	Mini Project-I	-	-	-	2	-	-	30	1
		Total	22	4	-	6	-	620	440	25
		Grand Total	32				-	1060		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

SYLLABUS FOR B.E III SEMESTER
DISCRETE MATHEMATICS

Instruction : 3 Hours/week	SEE Marks :60	Course Code : BS330MA
Credits : 3	CIE Marks: 40	Duration of SEE: 3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	*At the end of the course students will be able to:*
1. *Understand* Propositions and their equivalences, predicates and quantifiers and learn various proof strategies. 2. *Study*the concepts of number theory such Modular Arithmetic, Congruences and basic cryptography etc., 3. *Understand* the basics of counting, combinatory, and various methods of solving Recurrence relations. 4. *Understand* Relations, Equivalence relations, Posets and Hasse diagrams. 5. *Analyze* the concepts of Graphs.	1. *Use* logical notation to define and reason about fundamental mathematical concepts and *synthesize* induction hypothesis and simple *Induction* proofs. 2. *Prove* elementary properties of modular arithmetic and basic cryptography and apply in Computer Science. 3. *Calculate* number of possible outcomes of elementary combinatorial processes such as permutations and combinations *Model* and analyze computational processes using analytic and combinatorial methods. 4. *Prove* whether a given relation is an equivalence relation/poset and will be able to draw a Hasse diagram. 5. *Apply* graph theory models of data structures and to solve problems of connectivity.

UNIT – I

Logic: Logic- Logical connectives- Propositional equivalences– Predicates and quantifiers – Nested quantifiers.

Mathematical Reasoning, Induction: Proof Strategy- Methods of Proofs- Mathematical Induction- Second Principle of Mathematical Induction.

UNIT – II

Number Theory: The Integers and Division- Division Algorithm- Fundamental Theorem of Arithmetic –Modular Arithmetic-Integers and Algorithms- Euclidean Algorithm. Applications of Number Theory-Linear Congruences- Fermat's Little Theorem- Public key cryptography- RSA Encryption and Decryption.

UNIT – III

Counting: Basics of counting- Pigeon hole principle- Permutations and combinations – Pascal's Identity- Vandermonde's Identity- Generalized Permutations and combinations.

Advanced Counting Techniques: Recurrence relations: Solving Recurrence Relations- Linear Homogeneous and Non-Homogeneous Recurrence relations.

UNIT – IV

Relations: Relations – Properties -Representing relations - Equivalence Relations - Partial Orderings- Poset- Hasse diagrams.

UNIT –V

Graph Theory: Introduction- Types of graphs- Graph terminology- Basic theorems- Representing Graphs and Graph Isomorphism - Connectivity- Euler and Hamiltonian paths - Planar graphs- Euler's Formula- Graph coloring- Basic Definitions.

Text Books:

1. Kenneth H.Rosen – Discrete Mathematics and its application – 5th edition, Mc Graw – Hill, 2003.
2. Joel. Mott. Abraham Kandel, T.P.Baker, Discrete Mathematics for Computer Scientist & Mathematicians, Prentice Hail N.J., 2nd edn, 1986.

Reference Books:

1. Discrete and Combinatorial Mathematics by Ralph P. Grimaldi , Pearson International
2. J.P.Trembly, R.Manohar, Discrete Mathematical Structure with Application to Computer Science, Mc Graw- Hill – 1997.
3. R.K. Bisht, H.S.Dhami - Discrete Mathematics, Oxford University Press, 2015.

SYLLABUS FOR B.E.III SEMESTER
PROBABILITY & STATISTICS

Instruction: 3 Hrs /week	SEE Marks :60	Course Code :BS320MA
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

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 concepts and application of conditional probability 2. Understand various concepts of Random variables and standard Statistical Distributions 3. Study various methods of testing large samples 4. Analyze standard statistical tests employed for small samples 5. Understand fitting of a straight line to a given data and measuring Correlation between variables.	1. Apply conditional probability to the real world problems 2. Apply various statistical distributions to solve practical problems, to estimate unknown parameters of populations and apply the tests of hypotheses. 3. Infer properties of population conducting tests on samples 4. Categorize population based on tests on small samples 5. Solve problems on fitting of a straight line to the given data and also to find co-efficient of correlation and to determine regression lines and their application problems.

UNIT –I (8 Hours)

Conditional Probability: Introduction to Permutations and Combinations, Definition of Probability – Addition Law of probability, Conditional Probability- Baye's Theorem

UNIT –II (14 Hours)

Statistical Distributions: Random Variables - Probability Distribution function for Discrete and Continuous Random variables - Expectation – Variance – Moments -Moment Generating Function- Poisson and Normal Distributions

UNIT-III (6 Hours)

Sampling and Inference: Testing of Hypothesis, Level of Significance, Tests of Significance for large samples

UNIT-III (6 Hours)

Tests of Significance for small samples - t-test - F- test - χ^2 - test.

UNIT-V (6 Hours)

Curve Fitting: Curve fitting by the Method of Least Squares - Fitting of Straight line – Regression - Lines of Regression - Correlation – Karl Pearson's Co-efficient of Correlation.

Text Books:

1. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand& sons, New Delhi.
2. R.K. Jain & S.R.K. lyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
3. 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.

Online Resources:

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

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E.III SEMESTER
ADVANCED DATA STRUCTURES

Instruction: 3+1 Hrs /week	SEE Marks :60	Course Code :ES310IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Acquire object-oriented problem solving skills and explore efficient storage mechanisms for easy access, design and implementation of various non-linear data structures.	1. Explain Object Oriented Programming concepts using C++. 2. Design programs using inheritance, polymorphism and exception handling 3. Demonstrate the usage of non-linear data structures – graphs & trees for traversals 4. Implement Binary Search Trees such as Red-Black and AVL trees 5. Apply different hashing techniques to a given problem

UNIT-I:

Introduction to C++: Programming paradigms, Object Oriented Programming Concepts, Advantages and Applications of OOPs. Variables and Assignments, Input and Output, Data Types and Expressions, Simple Flow Control and Control Structures, pointers and Dynamic arrays. Defining Classes: Structures, Classes, Abstract Data Types, Constructors, Destructors, Copy Constructors.

Static Polymorphism: Function and Operator Overloading, Friend Functions.

UNIT-II:

Inheritance: The Notion of Inheritance, Runtime Polymorphism.

Templates, Exception Handling: Exception Handling Basics.

Review of Linear Data Structures, Applications of Lists – Polynomial manipulation- Operations, Circular Linked List.

UNIT-III:

NON LINEAR DATA STRUCTURES:

Trees: Introduction, Binary Trees, Binary Tree Traversals, Heaps.

Binary Search trees (BST) : Definition, Searching a BST, Insertion into a BST, Deletion from a BST.

UNIT-IV:

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.

UNIT-V:

GRAPHS AND HASHING:

Graphs: The Graph ADT, Elementary graph operations (Depth First Search (DFS), Breadth First Search (BFS), Minimum Cost Spanning Trees-Kruskal's Algorithm, Prim's Algorithm.

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

Suggested Reading:

1. Walter Savitch, "Problem solving with C++", 6 th Edition, Pearson Education, 2009.
2. Ellis Horowitz, Dinesh Mehta, S. Sahani. Fundamentals of Data Structures in C++, Universities Press. 2007.
3. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, Pearson Education 2006.
4. Michael T. Goodrich, Roberto Tamassia, David Mount, Data structures and Algorithms in C++, Wiley India Pvt. Ltd, 2004
5. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stem 'Introduction to Algorithms' 2002.
6. Yedidyah Langsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition (2009), PHI .

Online Resources:

1. http://nptel.ac.in/courses/106105151/
2. http://nptel.ac.in/courses/106106127/

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. III SEMESTER
BASIC ELECTRONICS

Instruction: 3+1 Hrs /week	SEE Marks :60	Course Code :PC310IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Identify different electronic devices, their characteristics and use them in building simple electronic circuits.	1. Design simple circuits like rectifiers, voltage regulators, clipping and clamping circuits for the given specifications based on the operating principles of the diode. 2. Analyze different bipolar junction transistor circuits to determine Input impedance, output impedance, Voltage gain, current gain using exact and approximate h parameter models. 3. Verify the implementation of simple Boolean functions using CMOS circuits with the help of Truth table indicating the different transistors ON/OFF conditions. 4. Determine the kind of feedback used in a given negative feedback amplifier circuit and determine the frequency of oscillation of Hartley, Colpitt and RC phase shift oscillators. 5. Analyze simple operational amplifier circuits to determine the voltages at specific points in the circuit and design simple operational amplifier circuits for given application.

UNIT – I

PN junction diode, Biasing, Zener diodes, Rectifier Circuits, Limiting and clamping circuits, Schottky Barrier diode and Varactor diode.

UNIT – II

Bipolar junction transistors –characteristics, analysis of transistor circuits at DC, , biasing, transistor as amplifier, effect of emitter bypass capacitance, h-parameter model of BJT, approximate analysis of BJT circuits using h-parameter model, transistor as switch, internal capacitance. Pi equivalent circuit, low frequency and high frequency operation, thermal run away

UNIT – III

MOSFET current-voltage characteristics, MOSFET as an amplifier and as a switch,

Digital CMOS logic circuits: Introduction, digital IC technologies and logic circuit families, Voltage Transfer Characteristic (VTC) of inverter, Noise Margins, Propagation delay, static and dynamic operation of CMOS inverter. CMOS logic gate circuits: Basic structure (PUN and PDN), Implementation of 2-input NOR gate, NAND gate, complex gates and exclusive OR gate.

UNIT – IV

Feedback – Structure, Properties of negative feedback, Topologies, Advantages of negative feedback amplifiers Sinusoidal Oscillators – Loop gain, Barkhausen criteria, RC Phase shift, LC and Crystal Oscillators.

Power Amplifiers: class A, B and C amplifiers.

UNIT – V

Operational Amplifiers: Ideal characteristics, op. amp. as adder, Subtractor, Integrator, differentiator and comparator using op. amp. generation of square and Triangular waveforms, Monostable multi vibrator.

Op. Amp. As Voltage –controlled current switch(VCCS), Current-controlled Voltage source(CCVS), Instrumentation Amplifier, antilogarithmic amplifiers and analog multipliers.

Suggested Reading :

1. Jacob Millman, Christos CHalkais, Satybratajit, Electronic Devices and Circuits,Mc Graw Hill India Private Ltd, 3rd Edition
2. Adel S. Sedra, Kenneth C. Smith, Microelectronic Circuits, 5th Edition, Oxford International Student Edition, 2006
3. D. Roy Choudhury, Shail B. Jain, Linear Integrated Circuits, New Age International Publishers, 4th Edition.

References

4. JocobMillman, Arvin grable – Micro Electronics – 2nd Edition, McGraw Hill 1987.
5. Donald L. Schilling, Charles Belove, Electronic Circuits Discrete and Integrated, Tata Mc Graw Hill Education, 3rd Edition

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. III SEMESTER
DIGITAL ELECTRONICS & LOGIC DESIGN

Instruction: 3 Hrs /week	SEE Marks :60	Course Code :PC320IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Understand the operation of different combinational and sequential circuits and use them in the design of digital circuits.	1. Simplify Boolean functions using algebraic and K-map techniques to a specific number of literals. 2. Design combinational circuits using fundamental logic gates and programmable logic devices for a given problem. 3. Draw the circuits of different types of flip flops and explain their operation using truth tables and excitation tables. 4. Analyze any given synchronous or asynchronous sequential circuit and design a synchronous or asynchronous sequential circuit for a given specification of the problem. 5. Implement combinational and sequential circuits using VHDL programming language.

UNIT – I

Introduction to Boolean algebra and number system, Logic Gates, Optimized implementation of logic functions – Karnaugh Map, Strategies for minimization of product-of-sum and sum-of-product functions. Multiple output circuits. NAND and NOR logic networks, Cost functions, TTL 74 series gates, Introduction to CAD tools and VHDL

UNIT – II

Combinational circuit building blocks – Multiplexers. Decoders. Encoders. Code converters, Arithmetic comparison circuits. general structure of a PLA, gate level diagram, schematic diagram, PAL. Structure of CPLDs and FPGAs, 2-input and 3-input lookup tables(LUT). Design of Arithmetic-circuits using CAD tools. TTL 74 series ICs, VHDL for Combinational circuits

UNIT – III

Basic Latch, Gated SR Latch, gated D Latch, T Flip-flop, JK Flip-flop, excitation tables. Master-Slave edge triggered flip-flops. Set up and hold time of a flip-flop. Registers, Counter. TTL 74 series ICs, Using registers and counters with CAD tools. Design examples using VHDL.

UNIT – IV

Synchronous Sequential Circuits – Analysis of Synchronous sequential Circuits Basic design steps. State-Assignment problem Moore and Mealy state models. State minimization, Design of FSM with CAD Tools. Implementation using VHDL.

UNIT-V

Introduction to Asynchronous sequential circuits, Analysis of Asynchronous sequential circuits. Hazards: static and dynamic hazards. Significance of Hazards. Clock skew, ASM Charts, Digital Hardware Design Flow.

Suggested Reading:

1. M. Moris Mano, Charles R. Kime, Logic and Computer Design Fundamentals, 2nd edition, Pearson Education Asia, 2001.
2. Stephen Brown ZvonkoVranesic – Fundamentals of Digital Logic with VHDL design, McGraw Hill – 2000.
3. Virendrakumar - Digital ElectronicsTheory& Experiments, New Age International Publishers, 2002
4. John F. Walkerly, Digital Design : Principles and Practices, Pearson India, 4th Edition.
5. Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss, Digital Systems: Principles and Applications, Pearson India, 10th Edition.

SYLLABUS FOR B.E III SEMESTER
ENVIRONMENTAL SCIENCE

Instruction:2 Hrs /week	SEE Marks :60	Course Code : MC320CE
Credits : 02	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
1. Describe various types of natural resources available on the earth surface. 2. Explain the concepts of an ecosystem and the biotic and abiotic components of various aquatic ecosystems. 3. Identify the values, threats of biodiversity, endangered and endemic species of India along with the conservation of biodiversity. 4. Explain the causes, effects and control measures of various types of environmental pollutions. 5. Describe the methods for water conservation, the causes, effects of global warming, climate change, acid rain, ozone layer depletion, various types of disasters and their mitigation measures.	At the end of the course, students will be able to: 1. Describe the various types of natural resources. 2. Differentiate between various biotic and abiotic components of ecosystem. 3. Examine the values, threats of biodiversity, the methods of conservation, endangered and endemic species of India. 4. Illustrate causes, effects, control measures of various types of environmental pollutions. 5. Explain the methods of water conservation, causes, effects of climate change, global warming, acid rain and ozone layer depletion, various types of disasters and their mitigation measures.

UNIT-I

Environmental Studies: Definition, importance of environmental studies. Natural resources: Water resources; floods, drought, conflicts over water, dams-benefits and problems. Food resources; Effects of modern agriculture, fertilizer-pesticide problems, water logging salinity. Energy resources: Renewable and non-renewable energy resources. Land Resources, soil erosion and desertification.

UNIT-II

Ecosystems: Structure and function of an ecosystem, producers, consumers and decomposers, food chains, food webs, ecological pyramids, aquatic ecosystem (ponds, oceans, estuaries).

UNIT-III

Biodiversity: Genetic species and ecosystem diversity. Values of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

UNIT-IV

Environmental Pollution: Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution and solid waste & e-waste management.

UNIT-V

Social Aspects and the Environment: Water conservation, Climate change, global warming, acid rain, ozone layer depletion. Environmental Impact Assesment, population explosion.

Suggested Books:

1. Deswal S. and Deswal A., A Basic Course on Environmental studies, Dhanpat Rai & Co Pvt. Ltd. 2013.
2. Benny Joseph, Environmental Studies, Tata McGraw-Hill, 2006.
3. Suresh K. Dhameja, Environmental Studies, S.K. Kataria& Sons, 2010.
4. De A.K., Environmental Chemistry, New Age International, 2003.
5. Odum E.P., Fundamentals of Ecology, W.B. Sunders Co., USA, 2004.
6. Sharma V.K., Disaster Management, National Centre for Disaster Management, IIPE, Delhi, 2013.
7. Rajagopalan R., Environmental Studies, Second Edition, Oxford University Press, 2013.

SYLLABUS FOR B.E III SEMESTER
INTRODUCTION OF ENTREPRENEURSHIP

Instruction:1 Hrs /week	SEE Marks :40	Course Code : MC310ME
Credits : 01	CIE Marks: 30	Duration of SEE : 3 Hrs

Course objectives	Course Outcomes
1. inspire students and help them imbibe an entrepreneurial mind-set. 2. introduce key traits and the DNA of an entrepreneur 3. provide the information about the facilities , schemes available to start enterprise in INDIA 4. improve the entrepreneur skills	At the end of the course, students will be able to: 1. Develop awareness about entrepreneurship and successful entrepreneurs. 2. Understand the supporting organizations available to establish the business in the country 3. Understand the different government policies which support the entrepreneur 4. Develop how to improve the communication and sales skills and generate and anlyze the business idias

UNIT -I

Entrepreneurship, myths about entrepreneurship, entrepreneur characteristics and its styles – Classification of Entrepreneurship – Forms of Business organizations –Role of Entrepreneurship in economic development. Managing risks and learning from failures.

E-cells, successful entrepreneurs, start-ups and incubators, institutions supporting small business enterprises.

UNIT -II

Central level supporting institutions: NABARD, SIDBI, NIC, KVIC, NIESBUD, SIDO, DST, EDI, FICCI, CII, ASSOCHAM etc. – state level institutions – DICs – SFC – SIDC. Design thinking and its process

Idea Generation and evaluation: Ideas in Entrepreneurships – Sources of New Ideas – Techniques for generating ideas – Opportunity Recognition and evaluation, Entrepreneurial skills, selling and selling skills – communication and modes of it, be an entrepreneur.

Learning Resources:

1. Bruce R. Barringer and R. Duane Ireland, "Entrepreneurship: successfully launching new ventures", 3rd edition, Pearson Prentice Hall, 2009.
2. P. Denning and R. Dunham, "The Innovator's Way", MIT Press: Cambridge, Massachusetts, 2010.
3. Arya Kumar, "Entrepreneurship", Pearson Education, Delhi, 2012.
4. Michael H. Morris, D.F.Kuratko, J G Covin, "Corporate Entrepreneurship and Innovation", Cengage learning, New Delhi,2010
5. Peter F. Drucker, "Innovation and Entrepreneurship", Routledge Classics, 2015 .
6. https://www.wfglobal.org/initiatives/national-entrepreneurship-network/

SYLLABUS FOR B.E III SEMESTER
FS – I: COMMUNICATION SKILLS IN ENGLISH-I

Instruction:2+2 Hrs /week	SEE Marks :60	Course Code : HS310EH
Credits : 02	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
1. The four major skills of language learning listening, speaking reading and writing provide the right key to success. 2. The main objective of this finishing school curriculum is to involve content for all the above mentioned four skills in teaching English and to get students proficient in both receptive and productive skills	At the end of the course, students will be able to: 1. Respond to questions and Engage in an informal conversation. 2. Narrate a message/story/incident, both verbally and in writing. 3. Describe an event / a session / a move / an article and recognize and list the key points in a topic/message/article. Debate on a topic by picking up the key points from the arguments placed.. 4. Respond to others while being in a casual dialogue and participate in group and form discussions by providing factual information, possible solutions, and examples. 5. Comprehend facts given and respond in an appropriate manner and provide logical conclusions to the topics under discussion. 6. Construct sentences in a coherent form and provide explanations to prepare, present, and analyze reports.

UNIT I – FUNDAMENTALS OF COMMUNICATION

Competencies:

3. Basic conversational ability.
4. Write e-mails introducing themselves & their purpose

Topics covered

Greeting and Introductions
Small Talk
Recalling

Topic Level Details

Greeting & Introductions

Competencies:

- Greeting appropriately
- Introducing themselves, a friend
- Responding to simple statements and questions both verbally and in writing
- Seeking introduction from others about themselves or about any topic.
- Writing an email with appropriate salutation, subject lines, self introduction, and purpose of mail.

Small Talk

Competencies:

- Identifying the topic of conversation.
- Speaking a few sentences on a random list of topics
- Reading simple information like weather reports, advertisements
- Seeking clarifications.

Recalling

Competencies:

- State takeaways from a session or conversations

UNIT II:NARRATIONS AND DIALOGUES

Competencies:

- Framing proper phrases and sentences to describe in context
- Speaking fluently with clarity and discrimination
- Responding to others in the dialogue.

Topics covered

Paraphrasing

Describing

Topic Level Details

Paraphrasing

Competencies:

- Listen for main ideas and reformulating information in his/her own words
- Draw appropriate conclusions post reading a passage.
- Writing an email confirming his/her understanding about a topic

Describing

Competencies:

- Speaking, Reading, and Writing descriptive sentences and paragraphs.

UNIT-III:RATIONAL RECAP

Competencies:

- Organizing and structuring the communication
- Detailing a topic
- Summarizing a topic.

Topics Covered:

Organizing

Sequencing

Explaining

Summarizing

Topic Level Details

Organizing

Competencies:

- Organizing the communication based on the context and audience

Sequencing

Competencies:

5. Structuring the content based on the type of information.

Explaining

Competencies:

- Explaining a technical/general topic in detail.
- Write an email giving detailed explanation/process

Summarizing

Competencies:

6. Recapitulating

UNIT-IV: PROFESSIONAL DISCUSSIONS AND DEBATES

Competencies:

- Analytical and Probing Skills
- Interpersonal Skills

Topics Covered:

Discussing

Debating

Topic Level Details

Discussing

Learning Outcome:

The students should be able to explore and support issues by adding explanations and examples.

Competencies:

- Thinking
- Assimilating

Debating

Competencies:

- Comprehending key points of the debate and note decisive points including supporting details.
- Construct a logical chain of arguments and decisive points.
- Writing a review about a product by providing reasons, causes, and effects

UNIT - V: DRAWING CONCLUSIONS AND REPORTING

Competencies:

- Reasoning skills - Coherent and logical thinking
- Reporting and Analyzing skills.

Topics Covered:

Concluding

Reporting

Topic Level Details

Concluding

Competencies:

- Analyzing the points discussed.
- Connecting all points without gaps.
- Identifying clinchers.
- Communicating the decisions

Reporting

Competencies:

- Reporting an incident
- Writing/Presenting a project report

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. III SEMESTER
BASIC ELECTRONICS LAB

Instruction: 2 Hrs /week	SEE Marks :50	Course Code :PC311IT
Credits : 1	CIE Marks: 30	Duration of SEE : 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Identify the different electronic devices and use them in building different application circuits.	1. Identify and use different electronic devices and measuring equipments. 2. Use PN diode, Zener diode for applications like rectifiers, clipping and clamping circuits and voltage regulators. 3. Use BJT transistor in the design of amplifier circuit. 4. Implement different types of oscillator circuits. 5. Use operational amplifier for different applications and verify the operation of different digital circuits.

ANALOG:

1. CRO and its applications: Measurement of amplitude, frequency. Obtaining transfer characteristics and lissajous figures. Determination of unknown frequency using CRO.
2. Characteristics of pn junction diode ,
3. Characteristics of zener diode BJT.
4. Zener diode as a Voltage Regulator
5. Half-wave Rectifier, clipping and clamping circuits,
6. Full-wave rectifier
7. clipping and clamping circuits
8. Frequency response of Common Emitter amplifier
9. Hartley, colpitts and RC phase shift oscillators
10. Operational Amplifier as an adder, subtractor, and comparator

DIGITAL:

1. Truth table verification of logic gates using TTL 74 series ICs. Transfer characteristics of a TTL gate using CRO
2. Half Adder, Full Adder, Decoder, MUX, implementation of Boolean logic using decoders and MUXes.
3. Truth table verification of D flip flop, T flip-flop and JK flip-flop
4. Counters
5. Shift Registers

Note: Depending on the amount of work done in each activity and submission of the record, marks / grade will be awarded.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. III SEMESTER
ADVANCED DATA STRUCTURES LAB

Instruction: 2 Hrs /week	SEE Marks :50	Course Code :ES311IT
Credits : 1	CIE Marks: 30	Duration of SEE : 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Develop skills in OOP using C++, design and implementation of abstractions of non linear data structures and their practical applications.	1. Demonstrate Object oriented concepts using C++ 2. Implement and perform operations on circular linked list. 3. Implement and perform different operations on trees. 4. Implement and perform different operations on graphs.

1. Implementation of Class, function overloading.
2. Implementation of Constructor overloading using C++
3. Implementation of of Inheritance using C++
4. Implementation of dynamic polymorphism using C++
5. Implementation of Templates using C++.
6. Implementation of Circular Linked List.
7. Implementation of Polynomial Arithmetic using Linked List.
8. Implementation of Operations on Binary Tree (Insert,Delete,LevelOrder,Search)
9. Implementation of Tree Traversals on Binary Trees.
10. Write a program to create a binary search tree(BST) by considering the keys in given order and perform the following operations on it.
    (a) Minimum key
    (b) Maximum key
    (c) Search for a given key
11. Write a program to create a binary search tree(BST) by considering the keys in given order and perform the following operations on it.
    (a) Find predecessor of a node
    (b) Find successor of a node
    (c) delete a node with given key
12. Implementation of operations on AVL Trees.
13. Implementation of Breadth First search Traversal on Graphs.
14. Implementation of Depth First search Traversal on Graphs.
15. Implementation of Heap Sort.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. III SEMESTER

MINI PROJECT-I

Instruction: 2 Hrs /week	SEE Marks : --	Course Code :P319IT
Credits : 1	CIE Marks: 30	Duration of SEE : --

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Develop and implement a project using any of the programming languages/simulation tools/electronic components.	1. Apply theoretical knowledge to design solutions for real life problems. 2. Demonstrate the ability to locate and use technical information from multiple sources. 3. Develop team spirit and demonstrate an understanding of professional ethics. 4. Demonstrate the ability to communicate effectively in speech and in writing. 5. Develop the capability for lifelong learning through advanced technology.

1. During the implementation of the projects, Personnel Software Process (PSP) has to be followed.
2. Two reviews will be conducted.
3. Report of the project work has to be submitted for evaluation.

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS
B.E- III SEMESTER (2018-19)

B.E- III SEM OPEN ELECTIVE-I COURSES			
Dept	Title	Code	credits
CIVIL	Geographical Information Systems	OE310CE	2
	Building Materials	OE320CE	2
CSE	Introduction to Data Structures	OE310CS	2
ECE	Introduction to Signals & Systems	OE310EC	2
	Introduction to Communication Systems	OE320EC	2
EEE	Electrical Installation and Safety	OE310EE	2
Mech	Basic Mechanical Engineering	OE300ME	2
	Mechanical Technology	OE310ME	2
IT	Introduction to Scripting Languages	OE310IT	2
Maths	Linear Algebra and its Applications	OE310MA	2

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR B.E. III-SEMESTER
GEOGRAPHICAL INFORMATION SYSTEMS
Open Elective – I (to other branches)

Instruction :2Hours/week	SEE Marks: 60	Course Code: OE310CE
Credits :2	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
1. Provide theoretical framework on fundamentals and basic concepts of GIS applications with its capabilities 2. have an in-depth understanding of the functionality of GIS and be critically aware of the potential and limitations of GIS in integrated analysis of spatial and non-spatial data	1. Explain Geographic Information Systems, become familiar with the basic principles of map projections and coordinate systems and understand the requirements of different user disciplines for applying GIS technology. 2. Describe the basics of working of geographical databases, various data structures and understand the concepts of data capture, storage, 3. Analyse outputs in a GIS environment. 4. Identify various analytical tools and functions in GIS and address various geospatial problems.

UNIT-I

Introduction: Map, definitions, representations-Point, line, polygon, common coordinate systems, Map projections – Transformations – Coordinate system – Map Analysis. History of development of Geographic Information Systems (GIS) - Standard GIS packages.

UNIT-II

Data Entry, Storage and Maintenance: Data types – spatial, non-spatial (attribute data) – data structure, data format – point line vector – Raster – Polygon – Object structural model –filters and files data in computer – Keyboard entry, Manual Digitizing, Scanner, Remotely sensed data, Existing Digital data Cartographic database, Digital elevation data, data compression.

UNIT-III

Data Analysis and Modelling: Spatial analysis, data retrieval, query (SQL) – Simple analysis, Recode overlay, Vector data analysis, Raster data analysis – Modeling in GIS – Digital elevation model – Cost and path analysis – Knowledge based systems.

UNIT-IV

Geographic Information Systems (GIS) Analysis Functions: Organizing data for analysis, classification of GIS, analysis function, maintenance and analysis of spatial data – transformations, conflation, edge matching and editing. Maintenance and analysis of non-spatial attribute data – editing and query functions.

Suggested Books:

1. Kang-Tsung Chang, Introduction to GIS, Tata McGraw Hill Edition, 2015.
2. Burrough, P.A., Principles of GIS for land resource assessment, Oxford publication, 1986.
3. Anji Reddy M., Remote Sensing and Geographic Information System, 2012

References Books

1. John R Jensen, Ryan R Jensen, Introduction to Geographic Information System, 2013.
2. Krawkiwsky E.J. and Wells D. E., Coordinate Systems in Geodesy, 1984.
3. Stan Aronoff, Geographic Information Systems: A management perspective,Wdl Publications, 1991.

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR B.E. III-SEMESTER
BUILDING MATERIALS
Open Elective – I (to other branches)

Instruction :2Hour/week	SEE Marks : 60	Course Code : OE 320CE
Credits :2	CIE Marks : 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
In this subject the students will	*Upon the completion of this course students will be able to*
1. Acquire basic knowledge on building materials such as stones, bricks, cement, aggregates, mortar and concrete. 2. Study various aspects of paints, varnishes and timber.	1. Explain the characteristics of stones and bricks. 2. Describe the properties of cement, aggregate, concrete, mortar. 3. Identify the suitability of timber 4. Application of paints and varnishes for building works.

UNIT-I

Stones: Classifications of stones, uses of stones as building materials, characteristics of good building stones.

Bricks: Composition of brick clay. Process of manufacturing bricks. Characteristics of good building bricks, classification of bricks. Introduction to light weight bricks.

Timber: Timber as a building material and its uses. Various types of timber. Seasoning and its importance. Preservation of wood. Plywood & Laminates and their uses.

UNIT-II

Cement: Chemical composition of cement, manufacturing process. Specifications for Ordinary Portland Cement, Types of cements.

Fine Aggregate: Characteristics of good sand and its classifications, bulking of sand. Quarry sand.

Coarse Aggregate: Characteristics of good coarse aggregates for manufacture of concrete.

UNIT-III

Cement Mortar :Types and uses.

Concrete: Designation, workability of concrete – factors affecting, Slump test, Ready Mix Concrete (RMC).

UNIT-IV

Reinforcing steel: Types of reinforcement, specifications - M.S., HYSD, TMT.

Paints :Constituents, characteristics of good paints, varnishes.

Suggested Books:

1. Gambhir M.L., Neha Jamwal, Building Materials: Products, Properties and Systems, McGraw Hill Education (India) Private Limited, 2014.
2. Varghese P.C., Building Materials, PHI Learning Pvt. Ltd., Delhi, 2015.
3. Advances in Building Materials and Construction, Central Building Research Institute, Roorkee, 2004.

References Books:

1. Duggal S.K., Building Materials, New Age Publishers, 2012
2. Rangwala, Engineering Materials, Charotar Publishers, 2015

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E III SEMESTER
INTRODUCTION TO DATA STRUCTURES
Open Elective-I (for other Departments)

Instruction: 2 Hrs /week	SEE Marks :60	Course Code :OE310CS
Credits :2	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end 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.	1. Implement linear data structures. 2. Develop an application using stacks and queues. 3. Choose the appropriate nonlinear data structure and perform operations on them. 4. Analyze the time and space complexities of Algorithms.

UNIT - I

Arrays: Arrays - ADT, Polynomials, Sparse matrices,
Linked Lists: Singly Linked Lists, Circularly linked lists, Doubly Linked Lists.

UNIT – II

Stacks:Array Representation, Linked Representation, Applications.
Queues: Array Representation, Linked Representation, Applications.

UNIT – III

Introduction to non-linear Data Structures :Tree Definitions and Properties, Representations of Binary Trees, Operations, Binary Tree Traversal, Graph Definitions, properties and representations.

UNIT – IV

Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations

Suggested Books:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press

Reference Books:

1. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition (2002), Pearson
2. Kushwaha D. S and Misra A.K, Data structures A Programming Approach with C, Second Edition (2014), PHI.,
3. Gilberg R. F and Forouzan B. A, Data structures: A Pseudocode Approach with C, Second Edition (2007), Cengage Leeming
4. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
5. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition (2009), MIT Press
6. YedidyahLangsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition (2009), PHI.

Online Resources:

1. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos
2. http://nptel.ac.in/courses/106106127/
3. http://www.nptel.ac.in/courses/106102064

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

SYLLABUS FOR B.E. III SEMESTER

INTRODUCTION TO SIGNALS & SYSTEMS (Open Elective-I)

(for other Departments)

Instruction: 2 Hrs /week	SEE Marks :60	Course Code : OE310EC
Credits : 2	CIE Marks: 40	Duration of SEE : 3Hrs

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.	At the end 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 convert a continuous time domain signal to frequency domain. 3. Apply the properties of different transformation techniques to convert a discrete time domain signal to frequency domain. 4. Describe the distortion less transmission through an LTI system.

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.

UNIT - II

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

Laplace transforms: Introduction, existence, Laplace transform of basic elementary signals, properties, inverse Laplace transforms.

UNIT - III

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.

UNIT - IV

Introduction to continuous and discrete time LTI systems, properties, impulse response, causality, stability, transfer function, distortion less transmission through systems. Z-transform: Introduction, existence, Z-transform of basic elementary signals, properties, inverse Z-transforms.

Suggested Readings:

1. P. Ramakrishna Rao, *Signals and Systems,* McGraw Hill, 2008.
2. Alan V. Oppenheim, Alan S. Wilsky and S. Hamid Nawab, *Signals and Systems*, 2nd ed., PHI, 2009.
3. Nagoorkani , *Signals and Systems* McGraw Hill, 2013

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

SYLLABUS FOR B.E. III SEMESTER

Introduction to Communication Systems (Open Elective-I)

(for other Departments)

Instruction: 2 Hrs /week	SEE Marks :60	Course Code : OE320EC
Credits : 2	CIE Marks: 40	Duration of SEE : 3Hrs

Course Objective:	**Course Outcomes**
1. Distinguish between Amplitude and Frequency modulation methods and their application in Communication Receivers 2. Explain why multiplexing methods are necessary in communications and compare FDM with TDM 3. Compare and contrast FSK and BPSK modulation schemes employed in digital data transmission 4. Draw the block diagrams of different types of communication systems and explain their operation	At the end of the course, students will be able to: 1. Identify the Radio frequency spectrum and the bands of different types of radio systems 2. Analyze the power, efficiency and transmission bandwidth of Amplitude and Frequency Modulated signals. 3. Convert the Radio frequency to Intermediate frequency and explain the operation of Super heterodyne Receiver. 4. Compare and contrast Frequency Division Multiplexing and Time Division Multiplexing used in the Communication systems 5. Detect and correct errors present in bit stream data using parity check 6. Explain the basic principles of different types of communication systems.

UNIT - I

Introduction to Electronic Communication: Communication systems, Types of Electronic Communication, Modulation and Multiplexing, The Electromagnetic Spectrum, Bandwidth, Communication Applications, Gain and Attenuation definitions

Amplitude Modulation Fundamentals: AM concepts, Modulation Index and Percentage of Modulation, Sidebands and the Frequency Domain, AM Power.

UNIT - II

Fundamentals of Frequency Modulation: Basic principles of Frequency Modulation, Principles of Phase Modulation, Modulation Index and Sidebands, Noise – Suppression Effects of FM, Frequency Modulation verses Amplitude Modulation.

Communication Receivers: Basic Principles of Signal Reproduction, Superheterodyne Receivers, Frequency Conversion, Intermediate Frequency and Images, Noise.

UNIT - III

Digital Communication Techniques: Digital Transmission of Data, Parallel and Serial Transmission, Data Conversion, Pulse Modulation.

Multiplexing and De-multiplexing: Multiplexing Principles, Frequency Division Multiplexing, Time Division Multiplexing, PCM Multiplexing.

UNIT - IV

Transmission of Binary Data in Communication Systems: Digital Codes, Principles of Digital Transmission, Transmission Efficiency, Modem Concepts and Methods – FSK, BPSK, Error Detection and Correction. Different Types of Communication Systems: Microwave Concepts, Optical Principles, Optical Communication System.

References:

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SYLLABUS OF B.E III- SEMESTER
ELECTRICAL INSTALLATION AND SAFETY (Open Elective – I)

Instruction: 2Hrs /week	SEE Marks :60	Course Code :OE310EE
Credits :2	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Enable the student to	After completion of the course student will be able to
Have a fair knowledge about the fundamentals of wiring systems, electrical safety procedures, Estimation of lighting & Power loads.	1. Identify and choose the proper type wiring for domestic & industrial applications. 2. Apply and implement the Electrical safety procedures for repairs & hazards. 3. Design and Estimate the domestic lighting installation. 4. Design and Draw the wiring layout for a big office building, electrical laboratory, big industry and big hotel with lift arrangement

Unit – I

Wiring Systems: Introduction, size of wires, standard wires, types of wires, CTC, PVC, Lead sheathed VIR, weather proof wires, flexible wires different types of cable wires – Types and Installation of House Wiring Systems & Wirings Accessories : Methods of installing wiring, clips, screws -round blocks switch boards, sockets socket pins - CTS wiring - Installation of surface conduit wiring - Rigid conduits, flexible conduits – Conduit accessories - elbows bushings - reducers, conduit box saddles, PVC conduit wiring - Concealed wiring.

Unit – II

Safety Procedures: Distribution fuse boards - Main switches – Different types of fuses and fuse carriers - Safety procedures – Electric shock and first aid, causes for fire hazards in Electrical installations

Unit – III

Estimation of Lighting: Estimation of domestic lighting installation service main - types of wire - specification - quantity of materials required for service main – estimation and selection of interior wiring system suitable to a given building - number of circuits - quantity of accessories required -

estimates of materials for execution of the domestic wiring installation as per National Electrical act 2003.

Unit – IV

Estimation of power loads: Power wiring installation - Drawing wiring layout for a big office building, electrical laboratory, big industry, big hotel with lift arrangement and a residential building with 2 bed room house.- estimation upto 20 kVA calculation of load current based on ratings of various equipment's to be installed - size of wire.

Suggested Books:

1. J.B.Gupta –A course in Electrical installation Estimating & costing-9th edition 2014, S.K.Kataria& Sons.
2. S.L.Uppal-Electrical Wiring ,Estimating& costing Electrical wiring.

Reference Books:

1. Balbir Singh-Electrical Drawing
2. Arora -Electrical wiring
3. BVS Rao -Maintenance and Operation of Electrical Equipment –Vol-I-TMH
4. S.Rao -Testing, Commissioning Operation & Maintenance of Electrical equipment -TMH
5. CRDargar -Electrical Installation design and drawing -New Asian publishers.

Online resources:

1. http://ocw.tufts.edu
2. http://ocw.upm.es
3. www.open.edu/openlearn/
4. http://nptel.ac.in/courses/

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. III SEMESTER
BASIC MECHANICAL ENGINEERING (Open Elective-I)
(for other Departments)

Instruction : 2Hours/week	SEE Marks : 60	Course Code : OE300ME
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The course will enable the students to: learn the basic principles of Mechanical Engineering in the areas of Heat transfer, Refrigeration, power generation and Manufacturing processes.	At the end of the course, students will be able to: 1. understand the modes of heat transfer and different types heat exchangers. 2. Study the working principles of IC engines and gas turbines. 3. know the principles of refrigeration and psychrometry. 4. study the basic manufacturing processes.

UNIT– I

Heat Transfer: Basic modes of heat transfer, Fourier's law of conduction, Newton's Law of cooling, Stefan– Boltzman Law of radiation and one dimensional steady state conduction heat transfer through plane walls without heat generation.

Heat Exchangers: classification and applications of heat exchangers in industry, derivation of LMTD in parallel and counter– flow heat exchangers and problems.

UNIT– II

IC Engines: Working of Four Stroke and Two Stroke Petrol and Diesel Engine with p– V diagrams, Valve timing diagram, Calculation of Indicated power, Brake power, Specific Fuel Consumption, Mechanical and Thermal efficiencies.

Gas Turbines: Classification, calculation of efficiency of simple open gas turbine cycle (Joule cycle/Brayton cycle) and applications.

UNIT– III

Refrigeration: Types of Refrigeration systems–Air Refrigeration system, vapor compression system, COP and representation of cycle on T-S and p-h diagrams, Types and properties of refrigerants, eco– friendly refrigerants, Introduction to Psychrometry and Psychrometry processes.

UNIT– IV

Manufacturing Processes: Welding, Brazing, Soldering, brief description of process and parameters, associated principles of gas welding, arc welding.

Machining Processes: Turning, Milling and Drilling.

Introduction to Additive Manufacturing and its applications.

Learning Resources:

1. RK Rajput, "Thermal Engineering", Laxmi Publications, 2005
2. C. Sachdeva," Fundamentals of Engineering heat and mass transfer", Wiley Eastern Ltd., 2004.
3. PN Rao,"Manufacturing Technology, Vol. 1 & 2", Tata McGraw hill Publishing Co., 2010.
4. V K Manglik , "Elements of Mechanical Engineering", PHI Learning Pvt Ltd, 2013
5. Chua CK, Leong K.F, "Rapid Prototyping Principles – Principles and applications in Manufacturing", 3rd Edition, Cambridge University Press India Private Limited, 2000

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. III SEMESTER
MECHANICAL TECHNOLOGY (Open Elective-I)
(for other Departments)

Instruction : 2 Hours / week	SEE Marks :60	Course Code : OE310ME
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The objective of this course is to: learn the basic principles of excavating equipment, conveying equipment hoisting equipment, concrete producing equipment and pneumatic equipment	On completion of the course the student will be able to: 1. Identify the operations of various earth moving equipments for maintenance and selection with respect to their applications. 2. Justify various conveying equipment for transporting material based on working principles. 3. Study various types of hoisting equipment in civil engineering applications. 4. Examine various aggregate and concrete producing equipments used in concrete production and working of pneumatic equipment.

UNIT-I

Excavating Equipment: General description, operation, maintenance and selection of the following: Earth moving and Excavating Equipment: Shovels, Dragline, Clamshell, Cable excavator, Bucket wheel excavator, Tractor, Bulldozer, Scraper, Trenchers, Grader, Earth Compactors.

UNIT-II

Conveying Equipment: Belt conveyor, Screw Conveyor, Bucket Conveyor, Apron Conveyor, Aerial Ropeway.

UNIT-III

Hoisting Equipment: Hoist winch, Differential and Worm geared chain hoists, Fork lift trucks, Guyed and stiffly derricks, swing and non– swing mobile crane, whirler crane, Construction elevator, passenger lift and Bucket elevators.

UNIT– IV

Aggregate and Concrete Producing Equipment: Crushers – Jaw, Gyratory, Hammer and Roll Crushers, Screens – Stationary, Shaking and Vibrating screens. Concrete mixers and Concrete pumps.

Pneumatic Equipment: Reciprocating air– compressor, construction pneumatic tools; jack hammer, paving breaker, Rock drill, concrete vibrator.

Learning Resources:

1. R.L. Peurifoy, "Construction Planning Equipment and Methods", 7th Ed., McGraw-Hill Publishers, 1956
2. Mahesh Varma, "Construction Equipment and its planning and application", Metropolitian books Co, Delhi, 2004
3. Goodes Spence,"Building and Civil Engineering Plant", Crosby Lock Wood, 1995

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. III SEMESTER
INTRODUCTION TO SCRIPTING LANGUAGES (Open Elective-I)
(for other Departments)

Instruction: 2 Hrs /week	SEE Marks :60	Course Code :OE310IT
Credits : 2	CIE Marks: 40	Duration of SEE : 3Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
This course will enable the students to acquire basic skills for writing python scripts.	1. Write a python script to solve a basic problem using structured programming constructs 2. Write a python script to solve a basic problem using object oriented programming constructs 3. Create and use python modules. 4. Create a project skeleton 5. Use automated testing to test a python module

Unit – I

Introduction to Python, running a python script, writing comments, using variables, operators, strings and text, format specifiers , printing information. passing command line arguments, prompting users, parameters, unpacking variables.

Unit – II

Decision making : if and else if, repetition : while loops and for loops, lists , operations on list , tuples, dictionaries , operations on dictionaries.

Unit – III

Defining functions, passing arguments to functions , returning values from functions, Exception handling.

Unit – IV

Modules , Classes and Objects, is – a relationship : inheritance, has-a relationship : composition. Creating project skeleton and automated testing.

Learning Resources

1. Allen B. Downey, Think Python, 2nd Edition, Green Tea Press
2. https://www.python.org

DEPARTMENT OF MATHEMATICS

SYLLABUS FOR B.E. III SEMESTER

LINEAR ALGEBRA AND ITS APPLICATIONS (Open Elective-I)

Course Outcomes: At the end of the course the students will learn:

Instruction :2 Hours / week	SEE Marks :60	Course Code : OE310MA
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

1. The concepts of vector spaces, bases and dimension and change of bases. These concepts are useful to generate Code Words to improve the quality of transmissions.
2. The concepts of linear transformations and isomorphism and these concepts are useful in Computer Graphics.
3. The concepts of inner product spaces Orthonormal bases. These concepts are useful in Least Square Approximations, which is used in engineering applications and statistics.

UNIT – I: 8 hrs

Vector Spaces: Definition of Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis

UNIT – II: 7 HRS

Linear Transformations: The Null Space and Range, Isomorphisms, Matrix Representation of a Linear Transform

UNIT – III: 6 HRS

Inner Product Spaces: The Dot Product on R^n and Inner Product Spaces

UNIT – IV: 6 HRS

Inner Product Spaces: Orthonormal Bases, Orthogonal Complements

Text Books:

1. Introduction to linear algebra with applications, Jim DeFranza, Daniel Gagliardi, Tata McGraw-Hill
2. An introduction to Linear Algebra, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd

Reference Books:

1. Elementary Linear algebra, Anton and Rorres, Wiley India Edition
2. Advanced Engineering Mathematics, Erwin Kreysing, Wiley Publication
3. Elementary Linear algebra, ron Larson, Cengage Learning

VASAVICOLLEGE OFENGINEERING (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
SCHEME OF INSTRUCTION AND EXAMINATION FOR B.E. IV-SEMESTER w.e.f. 2018-19
(Students admitted in A.Y. 2017-18) - CBCS

S No.	Course Code	Course Name	Scheme of Instruction				Scheme of Examination			
			Periods per week				Duration in Hrs	Maximum Marks		Credits
			L	T	D	P		SEE	CIE	
1	PC410IT	Data Base Management Systems	3	1	-	-	3	60	40	3
2	PC420IT	Object Oriented Programming	3	1	-	-	3	60	40	3
3	PC430IT	Computer Organization	3	-	-	-	3	60	40	3
4	PC440IT	Data Communications	3	-	-	-	3	60	40	3
5	PC450IT	Design & Analysis of Algorithms	3	1	-	-	3	60	40	3
6	HS410EH	Finishing School-II: Communication Skills in English - II	2	2	-	-	3	60	40	2
7	MC300EH	Human Values & Professional Ethics-I	1	-	-	-	2	50	30	1
8	OE4XXXX	Open Elective – II	1	-	-	-	2	40	30	1
9	OE4XXXX	Open Elective –III	2	-		-	3	60	40	2
PRACTICALS										
10	PC411IT	Data Base Management SystemsLab	-	-	-	2	3	50	30	1
11	PC421IT	Object Oriented Programming Lab	-	-	-	2	3	50	30	1
12	P419IT	Mini Project-II	-	-	-	2	-	-	30	1
		Total	21	5	-	6	-	610	430	24
		Grand Total	32				-	1040		

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
DATABASE MANAGEMENT SYSTEMS

Instruction: 3+1Hrs /week	SEE Marks :60	Course Code :PC410IT
Credits :3	CIE Marks: 40	Duration of SEE :3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Explain the need of database for storing, accessing and updating the data; eliminate redundant data; allow multiple users to be active at one time and protect the data from unauthorized access.	1. Understand functional components of the DBMS 2. Develop ER model for a given problem and map ER it to Relational model 3. Devise queries using Relational Algebra and SQL 4. Design a normalized database schema using different normal forms. 5. Understand transaction processing, concurrency control and recovery techniques

UNIT – I

Introduction to DBMS: Overview, File system vs DBMS, Advantages of DBMS, Database System Applications, Relational Databases, Object – Based and Semi-structured Databases, Data Storage and Querying, Database Architecture, Database Users and Administrators.

Database Design and the E-R Model:Overviewof the Design Process, The E-R Model, Constraints, E-R Diagrams, E–R Design Issues, Weak Entity Sets, Extended E-R Features.

UNIT – II

Relational Model: Structure of Relational Databases, Reduction to Relational Schemas, Other Aspects of Database Design.

Relational Algebra: Fundamental Relational-Algebra Operations, Additional Relational – Algebra Operations, Extended Relational - Algebra Operations, Null Values.

UNIT – III

Structured Query Language: Data Definition, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Complex Queries, Views, Modification of the Database, Joined Relations.

Advanced SQL and PLSQL: SQL Data Types and Schemas, Integrity Constraints, Authorization, SQL functions, procedural SQL, embedded SQL, cursors, ODBC and JDBC, triggers and active database.

UNIT – IV

Schema Refinement: Features of Good Relational Design, Functional-Dependency Theory, Decomposition Using Functional Dependencies, Normalization, First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT – V

Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability.

Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes, Deadlock Handling.

Recovery System :Aries, Log-Based Recovery, Media recovery.

Suggested Reading :

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, Database System Concepts, 6th Edition, McGraw-Hill International Edition, 2010.
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, Third Edition, McGraw-Hill International Edition, 2003.
3. Elmasri, Navathe, Somayajulu and Gupta, Fundamentals of Database System, 6th Edition, Pearson Education, 2011.
4. Patric O'Neil, Elizabeth O'Neil, Database-principles, programming, and performance,Morgan Kaufmann Publishers, 2001.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
OBJECT ORIENTED PROGRAMMING

Instruction: 3+1 Hrs /week	SEE Marks : 60	Course Code :PC420IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
explain the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, building simple GUI applications.	1. Understand fundamental concepts in Object oriented approach. 2. Develop object-oriented programs using the concepts of exception handling and multi threading. 3. Demonstrate the usage of Java I/O streams to handle user input and output. 4. Design and develop GUI programs. 5. Develop Applets for web applications.

UNIT- I

Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables-scope and lifetime, Operators, Control statements, Structure of a Java class, Classes, Methods, Inheritance, and Command Line Arguments.

Arrays: One-dimensional arrays, creating an array, declaration of arrays, initialization of arrays, two-dimensional arrays.

Packages: Creation, importing a package and user defined package.

Interfaces: Defining interfaces, extending interfaces, implementing interfaces.

UNIT- II

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.

UNIT- III

Basic I/O Streams: Java I/O classes and interfaces, Files, Stream and Byte classes, Character Streams, Serialization.

Exploring java.lang: Object, Wrapper classes, String, StringBuffer, System

Exploring java.util: Scanner, StringTokenizer, BitSet , Date, Calendar, Timer.

UNIT- IV

Introducing AWT working with Graphics: AWT Classes, Working with Graphics.

Event Handling: The Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces.

Awt Controls: Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckboxGroup, Choice Controls, Using Lists, Managing Scroll Bars, Using TextField, Using TextArea, Understanding Layout Managers, Menu bars and Menus, Dialog Boxes, FileDialog, Exploring the controls, Menus ,and Layout Managers.

UNIT- V

Applet Programming: Introduction, how applets differ from applications, building applet code, applet life cycle, HTML-APPLET tag, passing parameters to applets.

Suggested Reading:

1. Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill, 2006.
2. James M Slack, Programming and Problem solving with JAVA, Thomson Learning, 2002.
3. C Thomas Wu, An Introduction to Object Oriented Programming with Java 5th edition, McGraw Hill Publishing, 2010.
4. Y. Daniel Liang , An Introduction to JAVA Programming, Tata McGraw Hill, 2009.
5. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
COMPUTER ORGANIZATION

Instruction: 3 Hrs /week	SEE Marks : 60	Course Code :PC430IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Gain knowledge about the architectural details of a computer and interfacing the different peripherals.	1. Describe the organization of computer and various instruction formats 2. Discuss the design of control unit. 3. Identify various peripheral device architectures and operations. 4. Classify different memory systems and mapping techniques 5. Identify the importance of pipelining and multiple function units in the design of high-performance processors.

Unit I: Basic Structure of Computers
Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Memory locations and Addresses, Memory operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly language, Additional Instructions

Unit II: Basic Processing Unit
Register Transfer Language and Micro operations: Register Transfer Language, Register Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic logic shift unit.
MICROPROGRAMMED CONTROL: Control memory, address sequencing, micro program example, Design of control unit, hardwired control, micro programmed control.

Unit III: Input Output organization
Peripheral devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, and Priority interrupt, Direct Memory Access.

Unit IV: Memory System

Some Basic Concepts, Semiconductor RAM Memories, Read -Only memories, Cache Memories, Performance considerations, Virtual Memories, Memory Management Requirements, Secondary Storage-Magnetic Hard disks, Optical Disks, Magnetic Tape Systems

Unit V: Pipelining

Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data path and control considerations, Super Scalar Operation

Suggested Reading:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization, 5th Edition, McGraw Hill, 2002.
2. M. M. Mano, Computer System Architecture, 3rd Edition, Prentice Hall, 1994.
3. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002.

References :

1. J .P. Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.
2. Pal Chouduri, Computer Organization and Design, 2nd Ed. Prentice Hall of India, 2007
3. D. A. Patterson and J. L. Hennessy, "Computer Organization and Design - The Hardware/Software Interface", 2005.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
DATA COMMUNICATIONS

Instruction: 3 Hrs /week	SEE Marks : 60	Course Code :PC440IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Familiarize with the basics of Data Communications and Transmission media. Describe various encoding techniques, transmission modes, data link protocols, multiplexing techniques and Ethernet.	1. Demonstrate the basic components of communication model. 2. Describe the different encoding schemes. 3. Understand the different flow and error control techniques. 4. Explain the bandwidth utilization techniques. 5. Understand different categories of Ethernets.

UNIT-I: Introduction: Data Communications, Networks. Network models: Layered tasks - The OSI model-Layers in the OSI model, TCP/IP protocol suite. Analog and Digital: Data and Signals, Transmission media, Transmission Impairments, Data rate limits, Performance.

UNIT-II: Physical Layer: Digital Transmission: Digital-to-Digital Conversion, Analog-to-Digital Conversion. Analog Transmission: Digital-to-Analog Conversion, Analog to Analog Conversion. Transmission Modes: Parallel Transmission, Serial Transmission.

UNIT-III: Data Link Layer: Error detection and correction: Introduction, Block coding, Linear Block codes, Cyclic Codes, Checksum. Data Link control: Framing, Flow and Error control, Protocols-Noiseless channels, Noisy channels, HDLC, Performance Issues.

UNIT-IV: Multiplexing: Frequency Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing. Asymmetric Digital Subscriber line, xDSL. Circuit Switching, Packet Switching & Frame Relay. ATM: Protocol Architecture, ATM Logical Connection, ATM Cells, Transmission of ATM cells.

UNIT-V: Wired LANs: Ethernet: IEEE Standards, Standard Ethernet-MAC sub layer, Physical Layer, Bridged, switched and full duplex Ethernets. Fast Ethernet: MAC Sublayer, Physical sublayer, Gigabit Ethernet: MAC Sublayer, Physical Layer.

Text Books:

1. Behrouz A. Forouzan, "Data Communications and Networking", 4th Edition, Tata McGraw Hill, 2011.
2. William Stallings, "Data and Computer Communications", Tenth Edition, Pearson Education, 2013.

Suggested Reading:

1. H. Taub, D L Schilling, G Saha, "Principles of Communications", 3rd Edition, Pearson Education, 2007.
2. Simon Haykin, " Communication Systems", John Wiley & Sons, 2004.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
DESIGN & ANALYSIS OF ALGORITHMS

Instruction: 3+1 Hrs /week	SEE Marks : 60	Course Code :PC450IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Analyze the performance of different algorithms for their time and space complexities and for a given problem, design the optimal solution using various algorithms design techniques	1. Analyze asymptotic run-time complexity of algorithms including formulating recurrence relations 2. Design algorithms using greedy strategy, divide and conquer approach, and analyze them. 3. Describe the dynamic-programming approach and explain when an algorithmic design situation calls for it. 4. Apply algorithmic design paradigms like Backtracking and Branch-and-bound for solving problems. 5. Formulate Non deterministic algorithms for NP hard and NP complete problems.

UNIT-I

Introduction: Algorithm Specification, Performance analysis, Space Complexity, Time Complexity, Amortized Complexity Asymptotic Notation(O, Omega, Theta), Masters theorem, Performance Measurement,

UNIT-II

Divide- and Conquer: The general method, Binary Search, Merge sort quick sort, Strassen's Matrix Multiplication.

Greedy Method: The general method, Knapsack problem, Job sequencing with deadlines, optimal merge patterns, Huffman Codes.

UNIT-III

Dynamic Programming and Traversal Technique: Bellman-Ford Algorithm, Multistage graph, All-Pairs Shortest Paths, Optimal Binary Search trees, 0/1 Knapsack, Traveling Salesman Problem

UNIT-IV

Backtracking and Branch and Bound: The 8-Queens Problem, Graph Coloring, Hamiltonian cycles, 0/1 Knapsack Problem, Traveling salesperson problem

UNIT-V

NP-Hard and NP-Completeness: Basic concepts, NP-hard graph problems-Clique Decision Problem, Node Cover Decision Problem, NP-Hard Scheduling Problem - Job shop scheduling, NP-Hard code scheduling problems – Code generation with common sub-expression.

Suggested Reading:

1. Horowitz E. and Sahani S: Fundamentals of Computer Algorithm, Second edition, University Press, 2007.
2. Anany Levitin, Introduction to the Design & Analysis, of Algorithms, Pearson Education, 2003.
3. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", Third edition, MIT, 2010
4. Aho, Hopcroft, Ulman, The Design and Analysis of Computer Algorithm, Pearson Education, 2000.
5. Parag H.Dave, Himanshu B. Dave, Design and Analysis of Algorithms, Pearson Education, 2008.

SYLLABUS FOR B.E IV SEMESTER

FS - II: COMMUNICATION SKILLS IN ENGLISH-II

Subject Code : HS420EH	Instruction : 2+2 Hrs/ week	CIE – Marks : 40
SEE – Marks : 60	SEE - Duration : 3 Hours	Credits: 02

Course Objectives	Course Outcomes
1. identify the various features and functions of human language and communication. 2. develop the habit of listening effectively so as to analyze the speaker's tone and tenor. 3. choose appropriate words so as to speak and write accurately. 4. read various types of texts and sift information correctly. 5. study organizational structures and behavioral patterns and adapt appropriately.	At the end of the course, students will be able to: 1. Participate in group and forum discussions by providing factual information, possible solutions, and examples. 2. Debate on a topic by picking up the key points from the arguments placed. 3. Provide logical conclusions to the topics under discussions and summarize with 70% comprehension. 4. Prepare, present, and analyze reports. 5. Choose appropriate words and tone to present accurate, specific, and factual reports and apply reading skills, including how to approach different types of literature 6. Compose a summary of beginning high level reading text that identifies the thesis and key supporting details.

Unit 1: Professional Discussions and Debates

Module Overview:

The module enables the students to build strategies for effective interaction and help them in developing decisive awareness and personality maintaining emotional balance.

Learning Outcome:

The students should be able to:

- Participate in group and forum discussions by providing factual information, possible solutions, and examples.
- Debate on a topic by picking up the key points from the arguments placed.

Competencies:

- Analytical and Probing Skills
- Interpersonal Skills

Topics Covered:

Topic1 - Discussing

Topic 2 - Debating

Topic Level Details

Topic1 - Discussing

Learning Outcome:

The students should be able to explore and support issues by adding explanations and examples.

Competencies:

- Thinking
- Assimilating

Topic 2 - Debating

Learning Outcome:

The students should be able to develop their case and present their points using relevant facts and logic.

Competencies:

- Comprehending key points of the debate and note decisive points including supporting details.
- Construct a logical chain of arguments and decisive points.
- Writing a review about a product by providing reasons, causes, and effects

Unit 2: Drawing Conclusions

Unit Overview:

This module is intended to provide necessary inputs that enable the students to draw conclusions out of a discussion and provide reports.

Learning Outcome:

Students should be able to:

- Provide logical conclusions to the topics under discussion.
- Prepare, present, and analyze reports.

Competencies:

- Reasoning skills - Coherent and logical thinking
- Reporting and Analyzing skills.

Topics Covered:

Topic 1 - Concluding

Topic 2 - Importance of Logic

Topic Level Details:

Topic 1 - Concluding

Learning Outcome:

The students should be able to conclude a discussion or deliberation with appropriate reasoning.

Competencies:

- Analyzing the points discussed.
- Connecting all points without gaps.
- Identifying clinchers.
- Communicating the decisions

Unit 3 - Reporting

Learning Outcome:

The Students should be able to choose appropriate words and tone to present accurate, specific, and factual reports.

Competencies:

- Reporting an incident
- Writing/Presenting a project report

Unit 4 - Reading for Context

Learning Outcomes

Upon completion of the course, students should be able to:

1. Compose a summary of beginning high level reading text that identifies the thesis and key supporting details.
2. Summarize with 70% comprehension..
3. Apply reading skills, including how to approach different types of literature.

Competencies

Develop metacognitive strategies

Topics

a. Recognition of author's purpose
b. Awareness of stylistic differences
c. Discernment of fact and opinion
d. Evaluation of fact and opinion
e. Recognition of propaganda techniques

2. Present vocabulary building methods
3. Use comprehension and vocabulary strategies to raise reading rate.

Unit 5- Develop critical reading skills:

- Theme Detection
- Note making and Inference
- Summary and main idea identification

SYLLABUS FOR B.E IV SEMESTER

HUMAN VALUES AND PROFESSIONAL ETHICS – I

Subject Code : MC300EH	Instruction : 1 Hrs/ week	CIE Marks : 30
SEE Marks : 40	SEE - Duration : 2 Hours	Credits: 01

Course Objectives	Course Outcomes
1. Get a holistic perspective of value- based education. 2. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations. 3. Understand professionalism in harmony with self and society. 4. Develop ethical human conduct and professional competence. 5. Enrich their interactions with the world around, both professional and personal.	At the end of the course, students will be able to: 1. Gain a world view of the self, the society and the profession and obtain a holistic vision about value-based education and professional ethics. 2. Make informed decisions. 3. Start exploring themselves in relation to others and their work –constantly evolving into better human beings and professionals 4. Inculcate Human values into their profession. 5. Validate their aspirations through right understanding of human relationship and see the co-relation between the human values and prevailing problems. 6. Strike a balance between physical, mental, emotional and spiritual parts their being

UNIT-I

Human and Ethical values

What are they? --The Indian concept of values-- Modern approach to the study of values - Basis for Moral Judgement--- A new approach to Human Values-- freedom, creativity, love, wisdom, concern.

UNIT-II

Canons of Ethics

Virtue Ethics-- Ethics of Duty-- Ethics of Responsibility-- Factors to be considered in making Ethical Judgments.

UNIT-III

The Value of time

The importance of managing time-- Factors that hinder time management--Benefits of time management-- Using time judiciously-- practical strategies to manage time.

UNIT-IV

The Power of Positive thinking

Nature and Scope of Positive thinking-- Methods to change one's thinking---Strategies to change the cycle of one's thinking.

UNIT-V

The Value of Setting Goals

Goal setting-- Importance of setting goals for oneself--Achieving excellence through SMART goals.

Learning Resources:

- B.L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
- A.N Tripathy, 2003 Human values, New Age International Publishers.
- EG Seebauer & Robert L. Berry,2000, Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.
- Mike Martin and Ronald Schinzinger "Ethics in Engineering "McGraw Hill
- Charles E Haris, Micheal J Rabins, " Engineering Ethics "Cengage Learning
- Caroline Whitback < Ethics in Engineering Practice and Research, Cambridgs University Press
- Georgs Reynolds, Ethics in Information Technology", Cengage Learning
- Charles D.Fleddermann, " Engineering Ethics", Pearson Education /Prentice Hall, New Jersey,2004 (Indian Reprint)

Relevant Websites, CD's and Documentaries

- Value Education website, Http://www.universalhumanvalues.info
- UPTU webiste, Http://www.uptu.ac.in
- Story of stuff, Http://www.storyofstuff.com
- AlGore, 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

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
DATABASE MANAGEMENT SYSTEMS LAB

Instruction: 2Hrs /week	SEE Marks :50	Course Code :PC411IT
Credits :1	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objective:	Course Outcomes:
The course will enable the students to:	At the end of the course student will be able to:
learn various SQL and PL/SQL constructs and enable them to develop small size database applications.	1. Design and implement a database schema 2. Devise queries using SQL commands 3. Develop application programs using PLSQL 4. Generate reports for given requirements

1. DDL Commands:

a. Creation of tables with appropriate integrity constraints
b. Usage of alter, drop commands

2. DML Commands:

a. Data Insertion and Updating
b. Usage of truncate command

3. TCL and DCL Commands:

a. Setting privileges
b. save point, commit and rollback commands

4. SQL Queries:

a. Simple SQL queries using Select
b. SQL Built-in functions
c. SQL Operators and Nested queries
d. Joins and aggregate functions
e. Grouping and ordering commands

5. PL/SQL:

a. Blocks, Select Statement and control statements
b. Stored procedures and functions
c. Exception Handling
d. Cursors
e. Triggers

6. Generating reports based on different queries

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
OBJECT ORIENTED PROGRAMMING LAB

Instruction: 2Hrs /week	SEE Marks : 50	Course Code :PC421IT
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objective:	Course Outcomes:
The course will enable the students to:	At the end of the course student will be able to:
learn Object Oriented Programming concepts using Java, essentials of Java Class Library, and event driven graphical user interface programming.	1. Develop Java programs on Object Oriented programming concepts. 2. Implement programs by using lang and util packages. 3. Design and develop programs to process I/O 4. Create applications involving GUI with AWT, and web applications using Applets.

JAVA API (java.lang package)

1. A program to illustrate the concept of arrays in Java.
2. A program to demonstrate the use of command line arguments.
3. A program to illustrate the concept of inheritance.
4. A program to illustrate the concept of dynamic polymorphism.
5. A program to illustrate the concept of abstract class.
6. A program to demonstrate various access specifiers and their scope using packages.
7. A program to demonstrate how multiple inheritance is achieved using interfaces.
8. A program to demonstrate exception handling by using throw, finally & multiple catch statements.
9. A program to illustrate the concept of user-defined exception.
10. A program to create multiple threads using Thread class and Runnable interface.
11. A program to illustrate the concept of thread synchronization.

JAVA API (java.util package)

12. a) A program to demonstrate the use of Scanner class to read user input.
    b) A program to demonstrate the use of String Tokenizer.
    c) A program to demonstrate the use of Timer and Timer Task.

JAVA API(java.io package)

13. a)A program to illustrate the use of File Input Stream and File Output Stream
    b)A program to illustrate the use of Buffered Input Stream and Buffered Output Stream.
    c) A program to illustrate the use of Object Input Stream and Object Output Stream.

JAVA API (java.awt , java.awt.event packages)

14. a)An application involving GUI with different controls.
    b)An application involving GUI with menus.
    c)An application involving GUI with event handling.

JAVA API (java.applet package)

15. A web application using Applets.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
MINI PROJECT-II

Instruction: 2Hrs /week	SEE Marks :--	Course Code :P419IT
Credits : 1	CIE Marks: 30	Duration of SEE :--

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Develop and implement a project using any of the programming languages/simulation tools/electronic components.	1. Apply theoretical knowledge to design solutions for real life problems. 2. Demonstrate the ability to locate and use technical information from multiple sources. 3. Develop team spirit and demonstrate an understanding of professional ethics. 4. Demonstrate the ability to communicate effectively in speech and in writing. 5. Develop the capability for lifelong learning through advanced technology.

1. During the implementation of the projects, Personnel Software Process (PSP) has to be followed.
2. Two reviews will be conducted.
3. Report of the project work has to be submitted for evaluation.

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS
B.E- IV SEMESTER (2018-19)

B.E- IV SEM OPEN ELECTIVE-I COURSES			
Dept	Title	Code	credits
CIVIL	Green Buildings	OE410CE	1
CSE	Cyber Security	OE410CS	1
ECE	Medical Electronics	OE 410EC	1
EEE	Non-Conventional Energy Sources	OE410EE	1
IT	Introduction to Software Engineering	OE410IT	1
Mech	Value Analysis and Value Engineering	OE400ME	1
B.E- IV SEM OPEN ELECTIVE-III COURSES			
CIVIL	Disaster Management	OE420CE	2
CSE	Introduction to Python Programming	OE420CS	2
ECE	Sensors for Engineering Applications	OE420EC	2
	Basics of Wireless Communications	OE430EC	2
EEE	Electric Heating and Illumination	OE420EE	2
IT	Introduction to Database Management Systems	OE420IT	2
Mech	Cooling of Electronic Components	OE410ME	2

BASIC SCIENCES

B.E- IV SEM OPEN ELECTIVE-I COURSES			
Dept	Title	Code	credits
CHEM	Electronic engineering materials	OE400CH	1
	Polymer Technology	OE410CH	1
	Industrial Pollution and its Control	OE420CH	1
PHY	Display Devices	OE400PH	1
	Fundamentals of Vacuum technology	OE410PH	1
	Introduction to Non- Destructive Testing	OE420PH	1
B.E- IV SEM OPEN ELECTIVE-II COURSES			
CHEM	Electrochemical Energy Systems	OE430CH	2
	Corrosion Science and Technology	OE440CH	2
PHY	Fundamentals of Cryogenics	OE430PH	2
	Smart Materials and Applications	OE440PH	2
	Fundamentals of thin film Technology	OE450PH	2

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR B.E. IV-SEMESTER
GREEN BUILDINGS
Open Elective-II (to other Branches)

Instruction :1 Hours/week	SEE Marks : 40	Course Code : OE410CE
Credits :1	CIE Marks : 30	Duration of SEE: 3 Hours

Course Objective:	Course Outcomes
• Learn the principles of the planning and the orientation of the buildings. • Acquire the knowledge on various aspects of green buildings.	At the end of the course, students will be able to: 1. Explain the principles of the building planning 2. Study the by-laws and provide facilities for rain water harvesting. 3. Application of renewable energy system for green building 4. Benefit to the environment with the green building technique

UNIT-I

Planning of building: Principles of planning, Relevant building bylaws, site selection for buildings, orientation of buildings, common errors in planning, Provision of rain water harvesting

UNIT-II

Green Building Technologies: Introduction- Necessity - Concept of Green building. Principles of green building – Selection of site and Orientation of the building – usage of low energy materials – effective cooling and heating systems – effective electrical systems – effective water conservation systems - Certification systems- Green Rating for Integrated Habitat Assessment (GRIHA) and Leadership in Energy and Environmental Design (LEED), case studies

Suggested Books:

1. Shahane, V. S, "Planning and Designing Building", Poona, 2004.
2. Michael Bauer, Peter Mösle and Michael Schwarz "Green Building – Guidebook for Sustainable Architecture" Springer, 2010.
3. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison "Green Building Handbook" Volume I, Spon Press, 2001.

References Books:

1. MiliMajumdar, "Energy-efficient buildings in India" Tata Energy Research Institute, 2002.
2. TERI "Sustainable Building Design Manual- Volume I & II" Tata Energy Research Institute, 2009.

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR B.E. IV-SEMESTER
DISASTER MANAGEMENT
Open Elective-III (to other Branches)

Instruction :2 Hours/week	SEE Marks : 60	Course Code : OE420CE
Credits :2	CIE Marks : 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	*Upon the completion of this course the students will be expected 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 with international & national policies and programmes with reference to the disaster reduction. 2. Understand various types of natural disaster, their occurrence, Effects, Mitigation and Management Systems in India 3. Understand different types of manmade disasters, their occurrence, Effects, Mitigation and Management Systems in India. 4. Explain the utility of geography information systems (GIS), Remote sensing technology in all phases of disaster mitigation and 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 and desertification zones, Geographical based disasters – Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures.

UNIT-III

Human induced hazards – chemical industrial hazards, major power breakdowns, traffic accidents, etc.

UNIT-IV

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

Suggested Books:

1. Rajib, S and Krishna Murthy, R.R.(2012) "Disaster Management Global Challenges and Local Solutions", Universities Press, Hyderabad, 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, Tata McGraw Hill Company, New Delhi, 2012.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E IV SEMESTER
CYBER SECURITY (open elective-II)
(for other Branches)

Instruction: 1Hr /week	SEE Marks :40	Course Code :OE410CS
Credits :1	CIE Marks: 30	Duration of SEE : 2Hrs

Course objectives	Course outcomes
Students should be able to	At the end of the course, Students will be able to
• Utilize the concepts of cyber security to safeguard from threats and infection spread through the internet	1. Explain the concepts of confidentiality, availability and integrity 2. Explain the basics of fraud techniques used by a hacker 3. Explore the common exploitation mechanisms and inspect data sniffing over the network 4. Determine the ways an organization attempts to discover threats

UNIT I- CYBER SECURITY FUNDAMENTALS

Network and Security concepts: Information assurance fundamentals, Basic Cryptography, Public key encryption, DNS, Firewalls, Virtualization. Attacker Techniques and Motivations: How hackers cover their tracks, Fraud Techniques, Threat Infrastructure

UNIT II – EXPLOITATION

Techniques to gain foothold: Shellcode, Integer overflow, Stack based buffer overflow, Format String Vulnerabilities, SQL Injection, Web Exploit Tools, Misdirection, Reconnaissance, and Disruption Methods. Malicious Code-Worms, Virus, Rootkits, Spyware, Escalation of privileges, Stealing information – MITM attack.

Suggested Books:

1. James Graham, Ryan Olson, Rick Howard, "Cyber Security Essentials", Auerbach Publications , CRC Press, 2011
2. Mike Shema, "Anti-Hacker Tool Kit (Indian Edition)", Mc Graw Hill, 2014
3. Cyber Security - Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunit Belpure, Publication Wiley , 2011

Online Resources:

1. https://www.edx.org/micromasters/ritx-cybersecurity
2. https://www.coursera.org/specializations/cyber-security
3. http://nptel.ac.in/courses/106105031/

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E IV SEMESTER
INTRODUCTION TO PYTHON PROGRAMMING
(open elective-III for other Branches)

Instruction: 2 Hrs /week	SEE Marks :60	Course Code :OE420CS
Credits :2	CIE Marks: 40	Duration of SEE : 3Hrs

Course objective	Course outcomes
Students should be able to	At the end of the course, students will be able to
• Acquire problem solving skills • Develop flow charts • Learn programming and solve problems using Python language	1. Design python programs using arithmetic expressions and decision making 2. Design modular python programs using functions 3. Design programs using strings and list 4. Develop programs using tuples and dictionaries

UNIT-I

Introduction to Python – variables, expressions and statements, order of operations

Conditionals-Modulus operators, Boolean expressions, logical operators, conditional execution, alternative executions, chained conditional, nested conditional

Iteration - *while* statement

UNIT-II

Functions- function calls, type conversion and coercion, mathematical functions, User-defined functions, parameters and arguments.

Recursion

UNIT-III

Strings – string length, string traversal, string slices and string comparison with examples, strings are immutable, find function, string module

List –list values, accessing elements, list traversal, list length, list membership, list and for loop, list operations with examples

UNIT-IV

Tuples-Mutability, tuple assignment, tuple as return values

Dictionaries- dictionary operations, dictionary methods, aliasing and copying, counting letters using dictionaries

Suggested Books:

1. Downey A, How to think like a Computer Scientist :Learning with Python, 1st Edition(2015), John Wiley
2. Lambert K.A, Fundamentals of Python –First Programs, 1st Edition(2015), Cengage Learning India
3. Perkovic L, Introduction to Computing using Python,2/e, (2015), John Wiley

Reference Books:

1. Stewart Venit and Elizabeth Drake, Prelude to Programming: Concepts and Design, 6th Edition(2015), Pearson India
2. Mark J Guzdial, Introduction to Computing and programming in Python, 3rdEdition(2013), Pearson India
3. Allen Downey, Think Python, 2nd Edition(2015), Shroff Publisher Orielly

Online Resources:

1. http://nptel.ac.in/courses/117106113/34
2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-01sc-introduction-to-electrical-engineering-and-computer-science-i-spring-2011/python-tutorial/
3. www.scipy-lectures.org/intro/language/python_language.html

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

SYLLABUS FOR B.E. IV SEMESTER

MEDICAL ELECTRONICS (Open Elective-II)

(for other Branches)

Instruction: 1 Hr /week	SEE Marks : 40	Course Code : OE410EC
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course Objective:	Course Outcomes
1. Will study the human body and various physiological systems 2. Will understand various transducers used in bio-medical applications 3. Will acquire good knowledge about various ICU, Electro surgery and imaging equipment	At the end of the course, students will be able to: 1. Identify the instruments used for various physiological measurements and bio-potential recordings 2. Understand the working principles and operation of life supporting and medical imaging systems 3. Learn and analyse the advanced hospital equipment used in health care industry. 4. Apply different medical imaging techniques for diagnosis purposes.

UNIT – I

Human Body: An overview – the Cell Body fluids – Musculo Skeletal Systems – circulatory system respiratory system – Gastro Intentestinal System – Nervous system – Endo Crine System – the body as a control system components of the man instrument system. Sources of Bio electric potentials – Bio-potential electrodes – Electrodes for ECG, EEG, EMG, EOG and ERG.

Bio Signal Acquisition: types of bio signals, noise reduction strategies, physiological signal amplifiers, differential amplifiers, isolation amplifiers, chopper stabilized amplifiers, multiple input circuits,

UNIT - II

Bio Medical Instruments/Equipment: Operation theatre: surgical diathermy - OT table - OT lamps – Anesthesia Machine – Multi-para patient monitor.

Therapeutic Equipment: Short wave diathermic, microwave diathermy, ultrasound diathermy - bladder simulators.

Life supporting: Ventilators, pace makers, dialysis machines.

Specialized Medical Equipment: Defibrillator, blood gas analyzer blood cell counter – multi channel ECG and EEG m/c – foetal dopller and foetal monitor – Heart-lung machine.

Medical Imaging Systems: Operation and working principles – X-ray m/c – C-arm – CT Scanner – Ultra Sound Scanner – Colour Doppler – Gamma Camera – MRI – OPG – Pet Scanner – Video Endo scope.

Suggested Reading:

1. Joseph J.Carr, John M. Brown "Introduction to Biomedical Equipment Technology", 4/e, 2001.
2. Leslie Cromwell, Fred J. Weibell, Erich A. P Feiffer, "Biomedical Instruments and Measurements", 2/e, PHI.
3. RS Khandpur "Hand Book of Bio Medical Instrumentation", 3/e, McGraw Hill Education (I) Pvt. Ltd., 2014.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

SYLLABUS FOR B.E. IV SEMESTER

SENSORS FOR ENGINEERING APPLICATIONS (Open Elective-III)

(for other Branches)

Instruction: 2 Hrs /week	SEE Marks : 60	Course Code :OE420EC
Credits : 2	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objective:	Course Outcomes
1. The student will come to know the various stimuli that are to be measured in real life instrumentation. 2. He will be able to select the right process or phenomena on which the sensor should depend on 3. He will be aware of the various sensors available for measurement and control applications.	At the end of the course, students will be able to: 1. Appreciate the operation of various measuring and control instruments which they encounter in their respective fields. 2. Visualize the sensors and the measuring systems when they have to work in areas of interdisciplinary nature and also think of sensors and sensors systems when a for a new situation they encounter in their career. 3. Identify & select the right process or phenomena on which the sensor should depend on. 4. Know various stimuli that are to be measured in real life instrumentation.

UNIT - I

Introduction: What is a sensor and what is a transducer? Electrical sensor – need for sensors in the modern world. Different fields of sensors based on the stimuli - various schematics for active and passive sensors.

General characteristics and specifications of sensors – Implications of specifications uses of sensors – measurement of stimuli - block diagram of sensor system. Brief description of each block.

UNIT - II

Sensors for mechanical systems or mechanical sensors - Displacement - acceleration and force - flow of fluids – level indicators – pressure in fluids – stress in solids. Typical sensors - wire and film strain gauges, animometers, piezo electric and magnetostrictive accelerometers, potentiometric sensors, LVDT.

UNIT - III

Thermal sensors – temperature – temperature difference – heat quantity. Thermometers for different situation – thermocouples thermistors – color pyrometry.

Optical sensors: light intensity – wavelength and color – light dependent resistors, photodiode, photo transistor, CCD, CMOS sensors.

Radiation detectors : radiation intensity, particle counter – Gieger Muller courter (gas based), Hallide radiation detectors.

UNIT - IV

Magnetic sensors: magnetic field, magnetic flux density – magneto resistors, Hall sensors, super conduction squids.

Acoustic or sonic sensors: Intensity of sound, frequency of sound in various media, various forms of microphones, piezo electric sensors.

Electrical sensors: conventional volt and ammeters, high current sensors, (current transformers), high voltage sensors, High power sensors.

High frequency sensors like microwave frequency sensors, wavelength measuring sensors.

MEMs and MEM based sensors.

Suggested Reading:

1. Doebelin, "Measurement Systems: Application and Design", McGraw Hill Kogakusha Ltd.
2. Julian W. Gardner, Vijay K. Varadan, Osama O. Awadelkarim "Microsensors, MEMS and Smart Devices", New York: Wiley, 2001.
3. Henry Bolte, "Sensors – A Comprehensive Sensors", John Wiley.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

SYLLABUS FOR B.E. IV SEMESTER

BASICS OF WIRELESS COMMUNICATIONS (Open Elective-III)

(for other Branches)

Instruction: 2 Hrs /week	SEE Marks : 60	Course Code :OE430EC
Credits : 2	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objective	Course Outcomes
1. To provide fundamental principles and concepts required to understand the wireless communication systems.	At the end of the course, students will be able to: 1. Demonstrate the fundamental knowledge of wireless communication systems. 2. Differentiate between large scale & small scale fading channel effects. 3. Calculate the path loss, coverage area and power budgeting related aspects. 4. Acquaint with recent advancements and developments in the area of wireless communication systems.

UNIT - I

Introduction to Wireless Communication Systems: Evolution of Mobile Radio Communications, Examples of Wireless Communications Systems.

The Cellular Concept – System Design Fundamentals: Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and System Capacity, Improving Coverage and Capacity in Cellular Systems.

UNIT - II

Mobile Radio Propagation: Large Scale Path Loss: Introduction to Radio wave Propagation, Free Space Propagation Model, Reflection, Ground Reflection (Two-Ray) Model, Diffraction, Scattering.

Mobile Radio Propagation: Small Scale Fading and Multipath: Small Scale Multipath Propagation, Small – Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types of Small-Scale Fading.

UNIT - III

Multiple Access Techniques for Wireless Communications: Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA), Space Division Multiple Access (SDMA).

UNIT - IV

Wireless Systems and Standards: Global System for Mobile (GSM), CDMA Digital Cellular Standard (IS-95), Bluetooth and Personal Area Networks (PANs).

Suggested Reading:

1. Theodore S. Rappaport, Wireless Communications Principles and Practices, 2nd edition, Pearson Education.
2. David Tse, Pramodh Viswanath, Fundamentals of Wireless Communication, 2005, Cambridge University Press.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SYLLABUS OF B.E IV- SEMESTER
NON-CONVENTIONAL ENERGY SOURCES (Open Elective –II)

Instruction: 1Hrs /week	SEE Marks :40	Course Code :OE410EE
Credits :1	CIE Marks: 30	Duration of SEE : 2Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
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.	After completion of the course, students will be able to: 1. Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells. 2. Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation. 3. Explore the concepts involved in wind energy conversion system by studying its components, types and performance. 4. Illustrate ocean energy and explain the operational methods of their utilization. 5. Acquire the knowledge on Geothermal energy.

UNIT-I:

Need for Non-conventional energy sources, Types of Non-Conventional energy sources

Fuel cells: Definition-Design and Principle of operation with special reference to H2O2-Solid oxide electrolyte cells-Advantages and Disadvantages of fuel cells-Applications of Fuel cells.

Solar Energy: Solar radiation and its measurements-Solar energy collectors: Flat Plate and Concentrating Collectors- solar pond -Applications of Solar energy.

Biomass Energy: Definition-Biomass conversion technologies.

UNIT-II:

Wind Energy: Nature of wind-Basic components of Wind Energy Conversion System(WECS)-Wind energy collectors: Horizontal and vertical axis rotors-Advantages and Disadvantages of WECS - Applications of wind 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.

Geothermal Energy: Types of Geothermal resources- Applications of Geothermal Energy.

Suggested Reading:

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SYLLABUS OF B.E IV- SEMESTER
ELECTRIC HEATING AND ILLUMINATION (Open Elective – III)

Instruction: 2 Hrs /week	SEE Marks :60	Course Code :OE420EE
Credits :2	CIE Marks: 40	Duration of SEE : 3Hrs

Course objective:	Course Outcomes:
1. This subject gives a comprehensive idea in utilization of electrical power such as electric heating, electric welding and illumination	At the end of the course, students will be able to: 1. Identify a heating schemes for heating application 2. Welding schemes for welding application 3. Describe and measure units illumination. 4. Identify various lamps and fittings for street, factory and flood lighting schemes.

UNIT-I

Industrial Heating: Advantages and methods of electric heating. Description, operation and performance of resistance ovens, Design of elements. Core type furnace, Coreless type furnace, High frequency eddy current heating, Dielectric heating, Arc furnace.

UNIT-II

Electric Welding : Resistance welding, Welding transformer and its rating. Various types of Electric arc welding and Electric resistance welding.

UNIT-III

Illumination fundamentals: Introduction, nature and production of light, Sensitivity of the eye, Units of light. The inverse square law and cosine law, Solid angle, Lighting calculations, Determination of M.S.C.P, Rousseau's construction

UNIT-IV

Various illumination methods, Discharge lamps, Sodium vapour lamps, Mercury vapour lamps, Flourescent lamps, LED Lamps, Starting and power factor corrections, Stroboscopic effects, Noen signs, Application to factory lighting, Street lighting and Flood lighting.

SUGGESTED READING:

1. Art & Science of Utilization of Electrical Energy-Partab,Dhanpat Rai & Sons
2. Utilization of Electrical Power including Electric drives and Electric traction – J.B.Gupta, S.K. Kataria& Sons
3. Generation, Distribution and Utilization of Electrical Energy – C.L.Wadhwa New Age international (P) Limited,1997

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
INTRODUCTION TO SOFTWARE ENGINEERING(Open Elective-II)
(for other Branches)

Instruction: 1 Hr /week	SEE Marks : 40	Course Code : OE410IT
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Understand the various SDLC models	1. Apply SW engineering methods, practices and their appropriate application. 2. Analyze the software engineering layered technology and Process frame work. 3. Demonstrate the significance of software requirements. 4. Develop the ability to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project.

UNIT- I

Software Engineering framework and process models: Software Engineering, Process Frameworks, Process pattern, Perspective Models, Evolutionary Process Models, Agile Process Models

UNIT-II

Requirements Engineering: Requirements Engineering and Analysis, Scenario Based Modeling, Flow-Oriented Modeling, Creating a Behavioural Modeling.

Learning Resources:

1. Roger S.Pressman, Software Engineering: A Practitioner's Approach, Seventh Edition, Mcgraw Hill, 2009.
2. Pankaj Jalote An Integrated Approach To Software Engineering, Third Edition, Narosa Publishinghouse.2008
3. James F.Peter, WitoldPedrycz, Software Engineering. An Engineering Approach to John WileyInc.,2000
4. Ali Behforoz and Fedric J. Hadson, Softwre Engineering Fundamentals, Oxford University Press, 1997.
5. http://www.nptelvideos.in/2012/11/softwre-engineering.html

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E. IV SEMESTER
INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS
(Open Elective-III)
(for other Branches)

Instruction: 2 Hrs /week	SEE Marks : 60	Course Code :OE420IT
Credits : 2	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
The objective of the course is to explain the need of database for storing, accessing and updating the data, eliminate redundant data, allow multiple users to be active at one time and protect the data from unauthorized access.	1. Develop ER model for a given problem and understand functional components of the DBMS. 2. Devise queries using SQL. 3. Design a normalized database schema using different normal Forms. 4. Comprehend the properties of a transaction and understand the concept of transaction processing.

UNIT – I

Introduction: Database System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Databases Design, Database Architecture.

Database Design and the E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, Reduction of E-R model to relational schema.

UNIT – II

Relational Algebra: Fundamental Relational-Algebra Operations.

Structured Query Language: Data Definition, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Joined Relations, Integrity Constraints.

UNIT – III

Relational Database Design: Features of Good Relational Design, Functional-Dependency Theory, Normalization-Decomposition Using Functional Dependencies.

UNIT – IV

Transactions: Transaction Concepts, Transaction State, Implementation of Atomicity and Durability.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, Database System Concepts, Sixth Edition, McGrah-Hill International Edition, 2010.
2. Ramakrishnan, Gehrke, Database Management Systems, Third Edition, McGrah-Hill International Edition, 2003.
3. ElmasriNavathe, Somayajulu, Fundamentals of Database System, Fourth Edition, Pearson Education, 2006.
4. http://www.nptelvideos.in/2012/11/database-management-system.html

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. IV-SEMESTER
COOLING OF ELECTRONIC COMPONENTS (Open Elective -III)
(for other Departments)

Instruction : 2 Hours/week	SEE Marks : 60	Course Code : OE410ME
Credits : 2	CIE Marks: : 40	Duration of SEE : 3 Hours

Course Objective	Course Outcomes
The objectives of this course are to: expand the scope of the engineer to include the importance of effective heat transfer in electronic equipments. This should include the heat transfer processes occurring in electronic equipment, the methods of cooling and finally the analysis of thermal failure for electronic components.	On completion of the course the student will be able to: 1. anlyse heat transfer processes involved in cooling of electronics components. 2. analyse and define solution for thermal failure of electronic components . 3. identify the best cooling method for each individual application. 4. design of heat sinks and heat pipes for cooling purpose.

UNIT – I

Introduction To Electronics Cooling: Needs, Goals. Temperature effects on different failure modes, Fundamentals of heat transfer: Conduction, Convection and Radiation, Electronic equipment for Airplanes, Missiles, Satellites and spacecraft; electronic equipment for Ships and Submarines; electronic equipment for Communication systems and Ground support system; chassis and circuit boards cooling.

UNIT – II

Heat Transfer Principles in Electronics Cooling-I: Conduction Heat Transfer, Contact resistance, Extended surfaces, Transient Conduction

UNIT – III

Heat Transfer Principles in Electronics Cooling-II: Natural Convection in Electronic Devices, Forced Convection Heat Transfer, Forced Convection Correlations, Radiation Heat Transfer.

UNIT – IV

Electronics Cooling Methods in Industry: Heat Sinks, Heat Pipes and its selection.

Learning Resources:

1. Dave S. Steinberg, "Cooling Techniques for Electronic Equipment", Second Edition, John Wiley & Sons, 1991.
2. Frank P. Incropera, "Introduction to Heat Transfer ", Fourth Edition, John Wiley, 2002.
3. Yunus A. Cengel, Heat Transfer: A Practical Approach. McGraw-Hill, 2003.
4. YounesShabany, Heat Transfer: Thermal Management of Electronics, CRC Press Inc, 2010.
5. Chapman, A. J., "Heat Transfer", Macmillan Publishing Company, New York, 1974.

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. IV-SEMESTER
VALUE ANALYSIS AND VALUE ENGINEERING (Open Elective -II)
(for other Departments)

Instruction:1 Hour/week	SEE Marks : 40	Course Code: OE400ME
Credits: 1	CIE Marks: 30	Duration of SEE: 2 Hours

Course Objectives	Course outcomes
The objectives of this course are to: Understand the importance of value engineering and its application in their respective fields and its implementation.	On completion of this course, students will be able to: 1. choose the Concept of value engineering in their respective program to improve overall effectiveness. 2. Examine orientation and information phases of value engineering to provide training and analyse information. 3. Study the creative, evaluation and recommendation phases for implementation of value analysis. 4. perceive the concept of auditing process and its certification of value engineering.

UNIT-I

Introduction: Meaning of Value Engineering (VE), Difference from other initiatives, Value and its types, Relationship between value vis-à-vis person, time and environment, History of Value Engineering / Value Analysis / Value Management, World bodies of Value Engineering & their activities, Multi-disciplinary team approach in Value Engineering study.

VALUE ENGINEERING JOB PLAN: Introduction, comparison of job plans of various value engineering. Finance and human relations in VE.

ORIENTATION PHASE: training associates in Value Analysis and Value Engineering (VAVE). Different trainings and certifications available in VAVE, Method to conduct VAVE studies.

INFORMATION PHASE: information needed for VAVE, Method to collect and analyze information, ABC Analysis, Pareto Analysis, Breakeven analysis.

UNIT-II

FUNCTION ANALYSIS PHASE: Breakdown item into elements and sub-elements, questions to be asked, introduction to functions, practice session, types of functions (use and sell function), levels of function (basic and secondary), identify various functions, elements of cost, procedure for cost allocation, cost allocation to function, concept of worth, process flow

for determining worth, discussions on worth, meaning of FAST, use of FAST, different types of FAST. Ground rules of FAST, FAST diagram.
CREATIVE PHASE: Definition of creativity, misconceptions about creativity, introduction to creative techniques like TRIZ, 3P, lateral adoption and others
EVALUATION PHASE: selection of criteria, feasibility analysis, weighted evaluation methods, decision matrix.
RECOMMENDATION PHASE: Need for recommendation, method to make presentation, impact analysis and justification report, implementation plan, presentation skills.
IMPLEMENTATION PHASE: Detailed design, verification and validation, certification, change implementation.
AUDIT PHASE: Need for audit, types of audit, how to do audit.

Learning Resources:

1. S.S.Iyer: Value Engineering: A How to Manual, New age International Publisher- 2nd edition 2009
2. Anil Kumar Mukhopadhaya: Value Engineering Mastermind: From Concept to Value Engineering Certification. SAGE, New Delhi
3. Del. L.Yonker: Value engineering analysis and methodology, CRC press, New York
4. M.A.Bulsara, Dr.H.R. Thakkar, "Product Design And Value Engineering", charotar publishers, 1st edition 2015.
5. Lawrence D.Miles: Techniques of Value Analysis and Engineering: 3rd Edition New York
6. K.R.Chari : Value engineering

DEPARTMENT OF PHYSICS
SYLLABUS FOR B.E. IV SEMESTER
DISPLAY DEVICES (Open Elective-I)

Instruction :1 Hours / week	SEE Marks :40	Course Code : OE400PH
Credits : 1	CIE Marks :30	Duration of SEE : 2 Hours

Course objectives	Course outcomes
Students will be able to learn Basics of luminescence and display devices	At the end of the course students will be able to 1. List out different types of luminescence mechanisms 2. Classify types of display devices 3. Explain working of some display devices 4. Compare the output intensities emitted by LED, OLED et

UNIT-I:

Introduction to Luminescence, fluorescence, phosphorescence, principle and classification, luminescence mechanisms for various types and its applications.

UNIT-II:

Classification of display devices, working of Liquid crystal displays, comparison of LED and LCD, dynamic scattering display, OLEDS and their applications.

SUGGESTED BOOKS:

1. S. W. S. McKeever, Thermoluminescence of Solids, Cambridge University Press, 1988
2. Adrian Kita, Luminescent Materials and Applications, John Willey & Sons

DEPARTMENT OF PHYSICS

SYLLABUS FOR B.E. IV SEMESTER

FUNDAMENTALS OF VACCUM TECHNOLOGY (Open Elective-I)

Instruction :1 Hours / week	SEE Marks :40	Course Code : OE410PH
Credits : 1	CIE Marks :30	Duration of SEE : 2 Hours

Course objectives	Course outcomes
Students will be able to learn Fundamentals of vacuum technology	At the end of the course students will be able to 1. Define basic vacuum technology related notations. 2. Enumerate methods production of vacuum. 3. List out different vacuum gauges and their limitations. 4. Identify types of vacuum leaks.

UNIT-I:

Definition of vacuum, units of vacuum Vacuum ranges, evaporation theory-rate of evaporation, Hertz- Knudsen equation, types of evaporation, adsorption, desorption, Production of Vacuum, vacuum measurement, Vacuum pumps: pumping speed, throughput, Rotary oil pump, multi stage rotary pumps, diffusion pump, cryo-pump. Vacuum applications in various areas of engineering.

UNIT-II:

Measurement of vacuum, Vacuum gauges: thermocouple gauge, Pirani gauge, ionization gauge, Penning gauge, leak detection, Leak detection methods

SUGGESTED BOOKS:

1. M. N. Avadhanulu and P.G. Kshirsagar, Textbook of Engineering Physics, Revised Edition, S.Chand, 2015
2. Dr. V.V. Rao, Dr. T.B. Gosh, Dr. K.L. Chopra, Vacuum Science and Technology, Allied Publishers, New Delhi, 2008
3. John F. O'HanlonA User's Guide to Vacuum Technology, Jhon Willey and sons, 2006

DEPARTMENT OF PHYSICS

SYLLABUS FOR B.E. IV SEMESTER

INTRODUCTION TO NON- DESTRUCTIVE TESTING (Open Elective-I)

Instruction :1 Hours / week	SEE Marks :40	Course Code : OE420PH
Credits : 1	CIE Marks :30	Duration of SEE : 2 Hours

Course objectives	Course outcomes
Students will be able to learn Basics of acoustics and non-destructive testing	At the end of the course students will be able to 1. Illustrate non-destructive testing 2. Explain production mechanisms of ultrasonics 3. Differentiate various methods of non-destructive testing 4. Compare the non-destructive testing methods and identify suitable one for given application.

UNIT-I:

Ultrasonic waves and their properties, Production of ultrasonics by Piezo-electric and magnetostriction methods, Detection of ultrasonics, Acoustic grating: ultrasonic velocity measurement, cavitation, Applications: ultrasonic cleaning, Echo cardiogram (ECG), ultrasonic imaging.

UNIT-II:

Introduction to non- destructive testing (NDT)- objectives of NDT-advantages- types of defects-methods of NDT: Visual inspection, liquid penetration testing, acoustic detection: pulse echo method, ultrasonic inspection methods, Radiography: x-ray and gamma ray, Electromagnetic: eddy current testing, Acoustic Emission, Ultrasonic Testing (UT)

SUGGESTED BOOKS:

1. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage learning, 2014
2. M. N. Avadhanulu and P.G. KshirSagar, Textbook of Engineering Physics: Revised Edition, S.Chand, 2015
3. R K Gaur and S L Gupta, Engineering Physics, Dhanpat Rai, 2012

DEPARTMENT OF PHYSICS
SYLLABUS FOR B.E. IV SEMESTER
FUNDAMENTALS OF CRYOGENICS (Open Elective-II)

Instruction :2 Hours / week	SEE Marks :60	Course Code : OE430PH
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

Course objectives	Course outcomes
Students will be able to learn Liquefaction of gases Fundamentals of cryogenics	At the end of the course students will be able to 1. Define ranges of liquid temperatures 2. Narrate regenerative and cascade cooling processes. 3. Enumerate properties and use of cryogenic fluids. 4. Explore applications and use of cryostats and cryocoolers.

UNIT-I:

Introduction to low temperature Physics- Porous plug experiment: Joule Thomson effect, Theory of porous plug experiment- J-K effect for a Van der Waal's gas. Relation between inversion temperature, Boyle temperature and critical temperature.

UNIT-II:

Gas-Liquefaction-Regenerative cooling and cascade process- Liquefaction of air: Linde Process, Liquefaction of hydrogen, nitrogen, helium and oxygen.

UNIT-III:

Properties of cryogenic helium and Properties of Materials at Cryogenic Temperatures.

UNIT-IV:

Adiabatic demagnetization, practical applications of low temperatures, super fluidity Liquid He-II and He-III cryostat- Cryocoolers, Cryogenic Insulations-applications.

SUGGESTED BOOKS:

6. D.S. Mathur, Heat and thermodynamics, S. Chand & Co, 2008
7. MamataMukhopadhyay, Fundamentals of Cryogenic Engineering, PHI, 2010

DEPARTMENT OF PHYSICS

SYLLABUS FOR B.E. IV SEMESTER

SMART MATERIALS AND APPLICATIONS (Open Elective-II)

Instruction :2 Hours / week	SEE Marks :60	Course Code : OE440PH
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

Course objectives	Course outcomes
Students will be able to learn Essentials of smart materials • Different types of smart materials	At the end of the course students will be able to 1. List out various properties of functional materials 2. Identify smart materials based on properties and their appropriate usage. 3. Write different types of smart materials 4. Categorize suitable alloys for specific application.

UNIT I:

Introduction to functional materials, ferroelectricity, piezo electricity, pyroelectricity, Magnetostriction. Properties of smart materials such as piezo electric, magneto-strictive, electro-strictive, thermos-responsive

UNIT-II:

Electrochromic materials, photochromic materials, thermo-chromic materials, thermoelectric materials, smart gels, electro-rheological (ER) and Magnetorheological MR fluids

UNIT III:

Introduction to metal alloys, classification of metal alloys as ferrous and non-ferrous alloys. Properties and applications of ferrous and non-ferrous alloys.

Introduction to shape memory alloys (SMA)- advantages and disadvantages of SMAs- Austenite, martensite, shape memory effect and types of shape memory effects- temperature transformation

UNIT IV:

Properties and characteristics of engineering SMAs - Ni-Ti shape memory alloy, Cu-based shape memory alloys: Cu-Zn-Al, Cu-Al-Ni, ferromagnetic shape memory alloys Applications of SMAs.

SUGGESTED BOOKS:

1. K. Otsuka and C. M. Wayman, Shape memory Alloys, Cambridge University Press, 1999
2. Dimitris C. Lagoudas Shape Memory Alloys: Modeling and Engineering Applications, Springer, 2013
8. Vijay K. Varadan, K. J. Vinoy, S. Gopalakrishnan, Smart Material Systems and MEMS, John Wiley & Sons, 2006

DEPARTMENT OF PHYSICS

SYLLABUS FOR B.E. IV SEMESTER

FUNDAMENTALS OF THIN FILM TECHNOLOGY (Open Elective-II)

Instruction :2 Hours / week	SEE Marks :60	Course Code : OE450PH
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

Course objectives	Course outcomes
Students will be able to learn Fundamentals of thin film technology Properties and preparation mechanisms	At the end of the course students will be able to 1. Differentiate bulk materials and thin films 2. Explore growth process of thin films. 3. List out various thin film preparation techniques. 4. Narrate properties of thin films

UNIT-I:

Classification of films- nucleation and growth- nucleation theories: capillarity and atomistic models, substrate effect, film thickness effect.

UNIT-II:

Thin film deposition techniques- simple thermal evaporation-electron beam evaporation-sputtering (d.c and a.c), flash evaporation, Laser ablation- spin coating- molecular beam epitaxy- Film thickness measurement-ellipsometry, Fizeu (Tolonsky) technique, quartz crystal oscillator techniques.

UNIT-III:

Electrical conduction in metallic films- Continuous and discontinuous films, electrical, optical and dielectric properties of thin films

UNIT-IV:

fabrication of thin film resistor, capacitor, diode, anti-reflection coatings, gas sensors and temperature sensors.

SUGGESTED BOOKS:

1. Kasturi Chopra Thin Film Device Applications, Mac Graw Hill, New York, 2012
2. A. Goswami, thin film fundamentals, New age international, 2006
3. K.L. Chopra, thin film phenomenon, Mac Graw Hill, New York, 1990

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. IV SEMESTER
ELECTRONIC ENGINEERING MATERIALS (Open Elective-I)

Instruction :1 Hours / week	SEE Marks :40	Course Code : OE400CH
Credits : 1	CIE Marks :30	Duration of SEE :2 Hours

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 liquid crystals, their chemical constitution and behavior 2. To acquaint with different types of sensors and chemistry involved in them 3. To discuss the conductance in polymers and mechanism of conductance in undoped and doped polymers	1.Explain the classification, types and applications of liquid crystals 2. Discuss the principles, mechanism and applications of potentiometric and amperometric sensors 3. Explain the principle, mechanism and applications of fluorophore based, chromophore based and enzyme based fibre optic biosensors 4. Discuss the mechanism of conduction in undoped and doped polymers and applications of conducting polymers

UNIT-I: Liquid Crystals

Introduction, Classification: Thermotropic and Lyotropic liquid crystals. Chemical constitution & liquid crystalline behavior. Molecular ordering in liquid crystals: Nematic, Smectic and Cholesteric. Applications.

UNIT-II: Conducting Polymers and Sensors

a) Conducting Polymers: Introduction, Classification: Extrinsic and Intrinsic Conducting Polymers. Mechanism of conduction of doped and undoped polyacetylene& Polyaniline. Applications.
b) Sensors: Introduction, Potentiometric sensors, Amperometric sensors, Fluoride-ion-selective electrode. Fluorophore and Chromophore based Fiber-optic Biosensors. Enzyme Based Nonmediated Fiber Optic Biosensors.

Suggested Reading:

1. P.C.Jain and Monica Jain, "Engineering Chemistry", DhanpatRai Pub, Co., New Delhi (2002)
2. S.S. Dara "A text book of engineering chemistry" S.Chand&Co.Ltd., New Delhi (2006).
5. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning
6. A textbook of Polymer Science: Fred, Billmeyer Jr., Wiley India Third edition.
7. Chemistry of Advanced Materials: CNR Rao, RSC Publication
8. Billmeyar F. W., "Text book of Polymer Science", Wiley-Inter Science, New York, 2002.
9. Arora M. G., Singh M and Yadav M.S, "Polymer Chemistry", Anmol Publications, New Delhi, 2003.

Online resources:

1. www.nptel.ac.in
2. http://ndl.iitkgp.ac.in
3. http://ocw.mit.edu

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. IV SEMESTER
POLYMER TECHNOLOGY (Open Elective-I)

Instruction :1 Hours / week	SEE Marks :40	Course Code : OE410CH
Credits : 1	CIE Marks :30	Duration of SEE :2 Hours

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 and polymerization methods and effect of their structure on properties. 2. To acquaint with different types of moulding techniques. 3. To discuss the reinforced plastics and biomedical applications of polymers	1. Explain the classification and types of polymerization methods 2. Discuss the moulding constituents and moulding techniques. 3. Discuss the different polymer blends and engineering plastics. 4. Choose the polymers for different applications.

UNIT-I: Introduction, classification of polymers, methods of polymerization-Condensation polymerization (High temperature and low temperature methods), addition polymerization-bulk polymerization, solution polymerization, emulsion polymerization and suspension polymerization. Effect of polymer structure on properties.

UNIT-II: Moulding constituents of plastic, moulding techniques-Compression moulding, injection moulding, and extrusion moulding. Reinforced plastics, polymer blends and alloys, engineering plastics-polyamides, polycarbonates, polyurethanes. Polymers in medicine, biomedical applications of polymers.

Suggested Reading:

1. P.C.Jain and Monica Jain, "Engineering Chemistry", DhanpatRai Pub, Co., New Delhi (2002)
2. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi (2008).
3. S.S. Dara "A text book of engineering chemistry" S.Chand&Co.Ltd., New Delhi (2006).
4. Chemistry of Engineering Materials by R.P Mani and K.N.Mishra, CENGAGE learning

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. IV SEMESTER
INDUSTRIAL POLLUTION PREVENTION AND CONTROL (Open Elective-I)

Instruction :1 Hours / week	SEE Marks :40	Course Code : OE420CH
Credits : 1	CIE Marks :30	Duration of SEE : 2 Hours

OBJECTIVES	OUTCOMES
The course will enable the students :	At the end of the course students should be able to:
1. An overview of pollution in industries 2. Principles of various processes the treatment of air and water pollution	1. Explain the causes of pollution. 2. Describe the various sources of pollution. 3. Understand the effects of uncontrolled emissions. 4. Apply various methods to dispose the waste and minimize the pollution.

UNIT-I : Introduction, types of industrial waste, definition of pollutant, air pollutants- gases, hydro carbon pollutants, particulates - inorganic and organic particulates- effects of particulate pollutants, chlorofloro carbons(CFC)- cause of ozone depletion- harmful effects of cfc,photo chemical smog, air pollutant control methods: particulate emission control-gravitational setting chambers-cyclone separators, fabric filters, electrostatic precipitators.

UNIT-II: Water pollution: Definition of water pollution, types of water pollutants- Inorganic pollutants, toxic metals, organic pollutants, determental effects of Inorganic pollutants, toxic metals and organic pollutants, water pollution control methods-primary and secondary treatment.

Treatment and disposal of industrial wastes, treatment of wastes or effluents with organic impurities, treatment of wastes or effluents with inorganic impurities, the nature, effect and treatment of some important chemical wastes. Case study.

Suggested Reading:

1. B K Sharma, "Industrial Chemistry", GOEL publishing house, Meerut.
2. Pandey.G.N and Carney.G.C, "*Environmental Engineering"*, Tata McGrawHill, New Delhi,1989
3. Rose.G.R.D, "*Air pollution and Industry"*, Van Nostrand Reinhold Co., NewYork 1972
4. Freeman HM, "Industrial pollution prevention hand book", McGraw Hill.
5. James G Mann and Liu Y A, "Industrial water reuse and waste water minimization, McGraw Hill.

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. IV SEMESTER
ELECTROCHEMICAL ENERGY SYSTEMS(Open Elective-II)

Instruction :2 Hours / week	SEE Marks :60	Course Code : OE430CH
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

OBJECTIVES	OUTCOMES
The course will enable the students :	At the end of the course students should be able to:
1. To introduce the various terms to understand the efficiency of batteries. 1. To know the relevant materials required for the construction of primary and secondary batteries. 2. To familiarize with the reactions involved during charging and discharging processes. 3. To focus on the need of fuel cells and the concept of their construction and functioning 4. To emphasize on the merits and demerits of each type of battery.	1. Discuss the construction, electrochemistry, technology and applications of selected primary batteries 2. Discuss the construction, electrochemistry, technology and applications of few secondary batteries 3. Explain the working principle, electrochemistry, technology and applications of prominent fuel cells 4. Choose a suitable battery or a fuel cell for a given application 5. Evaluate different batteries or fuel cells in order to select a suitable battery or fuel cell for a given application

UNIT-I: Batteries- Fundamentals

Types of cells: Reversible and Irreversible cells, Primary, Secondary and Reserve batteries.

Battery characteristics: Free energy change, Electromotive force of battery, Ampere-Hour, Capacity, Power, Power density, Energy density, Efficiency, Cycle life, Tolerance to service conditions, Performance characteristics.

UNIT-II: Primary Batteries

Construction, electrochemistry and technology of Zinc-Air Battery, Nickel metal hydride battery,

Primary lithium batteries: Soluble Cathode Cells, Solid Cathode Cells- Lithium Manganese dioxide, Lithium-Vanadium Pentoxide battery, Solid electrolyte cells- Lithium polymer electrolyte Battery- Applications.

UNIT-III: Secondary Batteries

Construction, electrochemistry and technology of Maintenance Free Lead Acid battery (MFLA), Valve Regulated Lead Acid battery (VRLA), Absorbed Glass Mat Lead Acid battery (AGMLA). Nickel-Cadmium battery, Reserve battery.

Secondary Lithium batteries: Liquid organic electrolyte cells, polymer electrolyte cells, lithium ion cells, applications.

UNIT – IV: Fuel Cells

Introduction, classification based on temperature and nature of electrolyte. Working principle, components, applications and environmental aspects of Alkaline fuel cell (AFC)- Hydrogen-Oxygen alkaline fuel cell, Methyl alcohol - Oxygen alkaline fuel cell, Phosphoric acid fuel cell (PAFC), Molten carbonate fuel cell (MCFC), Polymer Electrolyte membrane Fuel cell (PEMFC), Solid oxide fuel cell (SOFC).

Suggested Reading

1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub, Co., New Delhi (2002)
2. S.S. Dara "A text book of engineering chemistry" S.Chand&Co.Ltd., New Delhi (2006).
3. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.
4. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning
5. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).
6. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.
7. Derek Pletcher and Frank C. Walsh, "Industrial Electrochemistry", Chapman and Hall, New York, 1993

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. IV SEMESTER
CORROSION SCIENCE AND TECHNOLOGY (Open Elective-II)

Instruction :2 Hours / week	SEE Marks :60	Course Code : OE440CH
Credits : 2	CIE Marks :40	Duration of SEE : 3 Hours

OBJECTIVES	OUTCOMES
The course will enable the students :	At the end of the course students should be able to:
1. To acquaint with the causes and factors influencing the rate of corrosion 2. To understand the different types of corrosion like dry, wet and galvanic corrosion and their relative impact 3. To familiarize with various preventive methods of corrosion such as cathodic protection, use of inhibitors, coatings, etc. 4. To know various industrial methods like electroplating, electroless plating.	1. Explain different types of corrosion with suitable examples 2. Analyze the given case study and diagnose the type of corrosion in a given corrosion problem 3. Discuss different factors that affect corrosion and passivation of metals 4. Select a suitable metallic coating for corrosion control of the equipment in a given application 5. Explain the mechanism by which organic coatings and inhibitors control corrosion of metals 6. Discuss the principles and application of cathodic protection and surface conversion coatings for corrosion control

UNIT-I: Chemical and Electrochemical Corrosion

Introduction - gravity, cause, Chemical and Electrochemical corrosion, Pilling – Bed worth rule, effect of nature of oxide layer on rate of chemical corrosion, Galvanic corrosion, electrochemical series and galvanic series. Formation of anodic and cathodic areas, Differential aeration corrosion -pitting, water line corrosion & crevice corrosion, stress corrosion, corrosion fatigue. Passivation of metals, polarization curve of passivating metals, effect of pH and potential-pH diagram for iron (Pourbaix Diagram) and polarization curve of iron, application of Pourbaix diagram for corrosion mitigation.

Factors influencing corrosion

a. Nature of metal: Relative position of metal in galvanic series, Over voltage, Relative areas of anode & cathode and Nature of corrosion product.

b. Nature of environment: Temperature, pH and Humidity.

UNIT-II: Corrosion Control by Metallic Coatings

Metallic coatings: Types - anodic & cathodic. Pre treatment of surface of base metal. Methods of application of metallic coatings: Hot dipping-galvanization - applications of galvanized RCC steel bars. Cladding, Electro plating & Electroless plating- Principle and their differences.

Electroplating of Cu coating on Fe, Electroless plating of Ni coating on Insulators, Preparation of PCB using Electroless plating.

UNIT-III: Corrosion Control by Inhibitors and Organic Coatings

Corrosion Inhibitors: Anodic, Cathodic and Vapour phase inhibitors.

Organic Coatings: Paints – constituents and their functions. Vitreous enamel coatings. Varnishes. Super hydrophobic and self healing coatings. Epoxy coatings on RCC steel bars- Impervious coatings.

UNIT-IV: Corrosion Control by Cathodic Protection and Surface Conversion

Cathodic protection: Principle, Sacrificial Anodic Protection (SAP), Impressed Current Cathodic Protection (ICCP). Application of Cathodic protection for bridges, ship hulls and underground pipelines.

Surface conversion coatings: Carburizing, Nitriding, Cyaniding.

Suggested Reading:

1. 1.P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub, Co., New Delhi (2002)
2. S.S. Dara "A text book of engineering chemistry" S.Chand & Co.Ltd., New Delhi (2006).
3. Chemistry of Engineering Materials by R.P Mani and K.N.Mishra, CENGAGE learning
4. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi (2008).
5. Principles and prevention of corrosion: Denny A Jones, Prentice Hall, 1996.
6. Derek Pletcher and Frank C. Walsh, "Industrial Electrochemistry", Chapman and Hall, New York, 1993
7. Fundamentals of Corrosion: Michael Henthorne, Chemical Engineering
8. Corrosion Engineering: Mars G Fontana, Mc Graw Hill, 1987

Online resources:

1. www.nptel.ac.in
2. http://ndl.iitkgp.ac.in
3. http://ocw.mit.edu