B.E Computer Science and Engineering **2018-2019**

Semester-I

18BECS101 **Mathematics-I** **4H-4C**

(Calculus and Linear Algebra for Computer Science Engineers)

Instruction Hours/week: L:3 T:1 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- The objective of this course is to familiarize the prospective engineers with techniques in basic calculus and linear algebra.
- It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.
- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To acquaint the student with mathematical tools needed in evaluating integrals and their usage.
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To make the student to solve various Engineering problems.

COURSE OUTCOMES:

The students will learn:

- To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from various applications, they will have a basic understanding of Beta and Gamma functions.
- Fluency in integration using standard methods, including the ability to find an appropriate Method for a given integral.
- The essential tools of matrices and linear algebra including linear transformations, Eigenvalues and diagonalization.
- To apply differential and integral calculus to notions of curvature and to improper integral and proper integrals.
- To solve the system of linear algebraic equations.
- To analyze and evaluate the basic concepts of mathematics like matrix operation, vector spaces and calculus.

UNIT I - Matrices (9)

Matrices, vectors: addition and scalar multiplication, matrix multiplication; Linear systems of equations, linear Independence, rank of a matrix, determinants, Cramer's Rule, inverse of a matrix, Gauss elimination and Gauss-Jordan elimination. Simple problems using Scilab.

UNIT II - Vector spaces (9)

Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps),range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank nullity theorem, composition of linear maps, Matrix associated with a linear map.

UNIT III - Vector spaces **(9)**

Eigen values, eigenvectors, symmetric, skew-symmetric, and orthogonal Matrices, Eigen bases. Diagonalization; Inner product spaces.

UNIT IV - Calculus **(9)**

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.

UNIT V - Calculus **(9)**

Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule; Maxima and minima.

Total Hours: 60

TEXT BOOKS:

1. G.B. Thomas and R.L. Finney**,** Calculus and Analytic geometry, 9th Edition,Pearson**,** (2002).
2. Erwin kreyszig**,** Advanced Engineering Mathematics, 9th Edition,John Wiley & Sons, (2006).
3. Veerarajan T, Engineering Mathematics for first year,Tata McGraw-Hill, New Delhi, (2008)**.**

REFERENCES:

1. Hemamalini. P.T, Engineering Mathematics**,** McGraw Hill Education (India) Private Limited, New Delhi, .(2014)**.**
2. Ramana B.V, Higher Engineering Mathematics, 11th Reprint, Tata McGraw Hill New Delhi, (2010)**.**
3. D. Poole**,** Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, (2005).
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, (2008).
5. B.S. Grewal, Higher Engineering Mathematics, 35th Edition, Khanna Publishers, (2000).
6. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, (2009)

WEBSITES:

1) https://www.coursera.org/learn/linear-algebra-machine-learning
2) https://www.edx.org/learn/linear-algebra
3) https://nptel.ac.in/courses/111106051/

B.E Computer Science and Engineering **2018-2019**

Semester-I

18BECS102 **English** **4H-3C**

Instruction Hours/week: L:2 T:0 P:2 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES

- To enable students to attain fluency and accuracy to inculcate proficiency in professional communication to meet the growing demand in the field of Global communication.
- To help students acquire their ability to speak effectively in real life situations.
- To inculcate the habit of reading and to develop their effective reading skills.
- To ensure that students use dictionary to improve their active and passive vocabulary.
- To enable students to improve their lexical, grammatical and communicative competence.
- To improve the student's communication skill at interview level.

COURSE OUTCOMES

Upon completion of this course, the students will be able to:

- Effectively use English language for communication: verbal & non –verbal.
- Express comprehension and acquisition of speaking & writing ability.
- Improve the student confidence in using English language in real life situations.
- Develop word power: lexical, grammatical and communication competence.
- Prepare the students to write business letters and other forms of technical writing.
- Demonstrate the students to prepare for oral communication in formal contexts.

Unit I -Basic Writing Skills **(9)**

Sentence Structures - Use of phrases and clauses in sentences - Importance of proper punctuation - Creating coherence- Organizing principles of paragraphs in documents - Techniques for writing precisely

Unit II - Vocabulary Building **(9)**

The concept of Word Formation - Root words from foreign languages and their use in English - Acquaintance, with prefixes and suffixes from foreign languages in English to form derivatives. - Synonyms, antonyms, and standard abbreviations.

Unit III - Grammar and Usage **(9)**

Subject-verb agreement - Noun-pronoun agreement - Misplaced modifiers – Articles – Prepositions – Redundancies – Clichés

Unit IV - Listening and Reading Skills **(9)**

Note taking- viewing model interviews – listening to informal conversations – improving listening / reading comprehension – reading model prose / poems – reading exercise.

UnitV.**-Writing Practices** **(9)**

Comprehension - Précis Writing - Essay Writing Listening Comprehension - Common Everyday Situations: Conversations and Dialogues - Communication at Workplace – Interviews - Formal Presentations.

Note: Students shall have hands on training in improving listening skill in the language laboratory @ 2 periods per each unit.

Total Hours: 45

TEXT BOOKS:

1. Sangeeta Sharma, Meenakshi Raman, Technical Communication: Principles and Practice, 2nd Edition, OUP, New Delhi, (2015),
2. Sanjay Kumar and Pushpa Lata, Communication Skills, Oxford University Press, (2011),

REFERENCES:

1. Liz Hamp - Lyons and Ben Heasly, Study Writing, Cambridge University Press, (2006).
2. F.T. Wood.,Remedial English Grammar, Macmillan, (2007).
3. Michael Swan, Practical English Usage, OUP, (1995),

WEBSITES:

1) https://nptel.ac.in/courses/109106067/
2) https://www.edx.org/learn/english
3) https://www.coursera.org/browse/language-learning/learning-english

B.E Computer Science and Engineering **2018-2019**

Semester-I

18BECS141 **Semi- Conductor Physics** **7H-5C**

(Theory & Lab.)

Instruction Hours/week: L:3 T:1 P:3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

(i) Theory

COURSE OBJECTIVES:

- To understand the fundamentals of quantum physics and their applications.
- To inculcate the characteristics of electronic materials through basics.
- To divulge knowledge on the basics of semiconducting materials for diode applications.
- To introduce the features of light interaction with semiconductor for optoelectronic applications.
- To impart the basic knowledge of new semiconducting materials for engineering applications.
- To understand the features of low dimensional materials for engineering field.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to

- Develop the idea of quantum mechanics through applications.
- Apply the concepts of quantum theory for various methodologies.
- Explain the basic ideas of classical electron theory and energy band structures.
- Illustrate the basics of semiconductor physics and its applications in various electronic devices.
- Identify the basic properties and functioning of optical materials for optoelectronics.
- Summarize the features of low dimensional materials for engineering applications.

Unit 1 - Quantum Mechanics **(9)**

Introduction to quantum theory, merits of quantum theory, black body radiation, laws of blackbody radiation, dual nature of matter and radiation, de Broglie wavelength, uncertainty principle, Schrodinger's wave equation, time dependent and time independent equations, physical significance of wave function, particle in one dimensional box , degenerate and non-degenerate states, scanning electron microscope.

Unit 2 - Electronic materials **(9)**

Free electron theory, energy band diagrams, Bloch theorem -Kronig-Penny model (to introduce origin of band gap), Energy bands in solids, Direct and indirect bandgaps, Types of electronic materials: metals, semiconductors and insulators, density of states, occupation probability, Fermi level, effective mass, phonons.

Unit 3 - Semiconductors **(9)**

Intrinsic and extrinsic semiconductors, Dependence of Fermi level on carrier-concentration and temperature (equilibrium carrier statistics), carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, metal-semiconductor junction (Ohmic and Schottky).

Unit 4 - Light-semiconductor interaction **(9)**

Optical transitions in bulk semiconductors: absorption, emission and scattering -Transition rates (Fermi's golden rule), optical loss and gain; photovoltaic effect, exciton, Drude model, LED, solar cell, photo diode.

Unit 5 - Engineered semiconductor materials **(9)**

Density of states in 2D, 1D and 0D (qualitatively), practical examples of low-dimensional systems such as quantum wells, wires, and dots: design, fabrication, methods of fabrication (CVD, PVD), Coulomb blockade, single electron transistor, Giant Magneto Resistance, Spintronics.

Total Hours: 45

TEXT BOOKS:

1. Bhattacharya D.K. &PoonamT.,Engineering Physics, Oxford University Press, (2015).
2. Ganesan.S and Baskar.T, Engineering Physics I, GEMS Publisher, Coimbatore, (2015).
3. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc, (2016).

REFERENCES:

1. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., ,(2007).
2. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley, (2008).
3. A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York, (2007).

WEBSITES:

1) https://www.coursera.org/learn/semiconductor-physics
2) https://www.edx.org/course/semiconductor-fundamentals
3) https://nptel.ac.in/courses/108108122/

(ii) Laboratory

COURSE OBJECTIVES:

- To develop basic laboratory skills and demonstrating the application of physical principles.
- To prepare for the lab experiment and perform individually a wide spectrum of experiments.
- To present experimental data in various appropriate forms like tabulation, and plots.
- To analyze, Interpret and Summarize experimental results.
- To communicate clearly understanding of various experimental principles, instruments/setup, and procedure.
- To develop the skills for understanding basic electric circuits.

COURSE OUTCOME:
Upon completion of this course the students will be able to:

- The students will have the knowledge on Physics practical experiments and that knowledge will be used by them in different engineering and technology applications.
- Prepare for the lab experiment and perform individually a wide spectrum of experiments.
- Present experimental data in various appropriate forms like tabulation, and plots.
- Analyze, Interpret and Summarize experimental results.
- Communicate clearly understanding of various experimental principles, instruments/setup, and procedure.
- Prepare to develop the skills for understanding basic electric circuits.

LIST OF EXPERIMENTS – PHYSICS

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of disc
2. Non-uniform bending - Determination of young's modulus
3. Uniform bending – Determination of young's modulus
4. Lee's disc Determination of thermal conductivity of a bad conductor
5. Potentiometer-Determination of thermo e.m.f of a thermocouple
6. Laser- Determination of the wave length of the laser using grating
7. Air wedge - Determination of thickness of a thin sheet/wire
8. Optical fibre -Determination of Numerical Aperture and acceptance angle
9. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids
10. Determination of Band gap of a semiconductor.
11. Spectrometer- Determination of wavelength using grating.
12. Viscosity of liquids-Determination of co-efficient of viscosity of a liquid by Poiseuille's flow

Total Hours: 45

B.E Computer Science and Engineering **2018-2019**

Semester-I

18BECS142 **Programming For Problem Solving** **7H-5C**

(Theory & Lab.)

Instruction Hours/week: L:3 T:0 P:4 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

(i) Theory

COURSE OBJECTIVES:

- To Identify and understand the working of key components of a computer program.
- To Identify and understand the various kinds of keywords and different data types of C programming
- To Understand, analyze and implement software development tools like algorithm,
- To develop pseudo codes and programming structures.
- To Study, analyze and understand logical structure of a computer program, and different constructs to develop a program in "C" language.
- To discuss programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Formulate simple algorithms for arithmetic and logical problems, Translate the algorithms to programs (in C language) and Test and execute the programs and correct syntax and logical errors
- Implement conditional branching, iteration and recursion
- Decompose a problem into functions and synthesize a complete program using divide and conquer approach
- Use arrays, pointers and structures to formulate algorithms and programs
- Apply programming to solve matrix addition and multiplication problems and searching and sorting problems
- Apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.

Unit I – Introduction to Programming **(9)**

Introduction to components of a computer system disks, memory, processor, where a program is stored and executed, operating system, compilers - Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart / Pseudocode with examples. From algorithms to programs; source code, variables with data types variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Unit II – Arithmetic expressions, precedence, Conditional Branching and Loops **(9)**

Arithmetic expressions and precedence – Conditional Branching- Loops-Writing and evaluation of conditionals and consequent branching-Iteration and loops.

Unit III - Array and Basic Algorithms **(9)**

Arrays-Arrays1-D, 2-D,Character arrays and Strings, Searching, Basic Sorting Algorithms-Bubble

Insertion and Selection sorting, Finding roots of equations, notion of order of complexity through example programs (no formal definition required).

Unit IV - Function and Recursion **(9)**

Functions including using built in libraries Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference, **Recursion:** Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function. Quick sort or Merge sort.

Unit V - Structure, Pointers and File Handling **(9)**

Structures, Defining structures and Array of Structures,

Pointers: Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation), File handling.

Total Hours: 45

TEXT BOOKS:

1. E. Balagurusamy, Computing Fundamentals and C Programming, TMH Education, 5th Edition, (2017).
2. E. Balaguruswamy, Programming in ANSIC, Tata McGraw-Hill, 7th Edition, (2017).

REFERENCES:

3. Byron Gottfried, Schaum's, Outline of Programming with C, McGraw-Hill, 3rd Edition, (2017).
4. Brian W.Kernighan and Dennis M.Ritchie, The C Programming Language, Prentice Hall of India, 2nd Edition, (2015).

WEBSITES:

1) https://www.coursera.org/learn/problem-solving
2) https://www.edx.org/learn/problem-solving
3) https://www.udemy.com/topic/problem-solving/
4) https://swayam.gov.in/nd1_noc19_cs43/preview

(ii) Laboratory

COURSE OBJECTIVES:

- To provide an awareness to Computing and C Programming
- To know the correct and efficient ways of solving problems
- To learn to develop algorithm for simple problem solving
- To write programs to solve mathematical problems.
- To develop pseudo codes and programming structures.
- To discuss programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Formulate the algorithms for simple problems
- Translate given algorithms to a working and correct program
- Correct syntax errors as reported by the compilers
- Identify and correct logical errors encountered at run time
- Write iterative as well as recursive programs
- Represent data in arrays, strings and structures and manipulate them through a program

List of Experiments

Lab 1: Familiarization with programming environment
Lab 2: Simple computational problems using arithmetic expressions-Circumstances and Area of Circle
Lab 3: Problems involving if-then-else structures-Amstrong Number and Find the Largest of Three number, Even/Odd, Prime numbers.
Lab 4: Loops, while and for loops- sum of series, Factorial, Fibonacci
Lab 5:1DArray manipulation-Searching and Sorting
Lab 6: Matrix problems-Matrix Addition and multiplications,String operations
Lab 7: Simple functions-Sqrt,Math, Pow,
Lab 8and 9: Numerical methods problems- Root finding, numerical differentiation, numerical integration
Lab 10: Recursive functions- Factorial, Fibonacci
Lab 11: Pointers-Call by Value and Call by reference, structures- Display student records
Lab 12: File operations-open,read,write,close

Total Hours: 45

B.E Computer Science and Engineering **2018-2019**

Semester-II

18BECS201 **Probability And Statistics** **4H-4C**

Instruction Hours/week: L:3 T:1 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To familiarize the students with statistical techniques.
- To equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.
- To gain knowledge in measures of central tendency.
- Acquire skills in handling situations involving more than one random variable and functions of random variables.
- Be introduced to the notion of sampling distributions and have acquired knowledge of statistical techniques useful in making rational decision in management problems.
- Be exposed to statistical methods designed to contribute to the process of making scientific judgments in the face of uncertainty and variation.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Formulate the ideas of probability, random variables and various discrete and continuous probability distributions and their properties.
- Apply the basic ideas of statistics including measures of central tendency, correlation and regression.
- Apply the statistical methods of studying data samples.
- Perform Test of Hypothesis as well as calculate confidence interval for a population parameter for single sample and two sample cases.
- Understand the concept of the sampling distribution of a statistic, and in particular describe the behavior of the sample mean and hypothesis testing.
- Apply problem solving techniques to solve real world events.

UNIT I - Basic Probability **(9)**

Probability spaces, conditional probability, Bayes' rule, independence; Discrete random variables, Independent random variables, the multinomial distribution, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum,
Correlation coefficient, Chebyshev's Inequality.

UNIT II - Random Variables **(9)**

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.Bivariate distributions and their properties, conditional densities.

UNIT III - Basic Statistics **(9)**

Measures of Central tendency: Moments, skewness and Kurtosis - Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

UNIT IV - Applied Statistics **(9)**

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations.

UNIT V - Small samples **(9)**

Test for single mean, difference of means and correlation coefficients, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

Total Hours: 60

TEXT BOOKS:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, (2014).
2. Bali N., Goyal M, A text book of Engineering Mathematics, 7th Edition, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd), (2010).
3. P.G.Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, UniversalBook Stall, (2003).

REFERENCES:

1. S. Ross, A First Course in Probability, 6th Edition, Pearson Education India, (2002).
2. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Edition, Wiley, (1968).
3. Veerarajan T, Engineering Mathematics (for semester III), Tata McGraw-Hill, (2010).

WEBSITES:

1) https://www.edx.org/course/probability-basic-concepts-discrete-random-variabl
2) https://swayam.gov.in/nd1_noc20_ma22/preview

B.E Computer Science and Engineering **2018-2019**

Semester-II

18BECS241 **Chemistry – I** **7H-6C**

(Theory & Lab.)

Instruction Hours/week: L:3 T:1 P:3 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

(i) Theory

COURSE OBJECTIVES:

- To understand the terminologies of atomic and molecular structure
- To study the basics of Periodic properties, Intermolecular forces
- To study about spectroscopic technique
- To understand the thermodynamic functions
- To comprehend the basic organic chemistry and to synthesis simple drug.
- To understand the chemical principles in the projects undertaken in field of engineering and technology

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Rationalise periodic properties such as ionization potential, electro negativity, oxidation states and electro negativity.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- Rationalise bulk properties and processes using thermodynamic considerations.
- List major chemical reactions that are used in the synthesis of molecules.
- Integrate the chemical principles in the projects undertaken in field of engineering and technology

UNIT I - Atomic and molecular structure **(9)**

Schrodinger equation. Particle in a box solutions and their applications. Equations for atomic and molecular orbitals. Energy level diagrams of diatomic molecules. Pi-molecular orbitals of butadiene and benzene and aromaticity. Introduction to Crystal field theory.

UNIT II - Periodic properties, Intermolecular forces and potential energy surfaces **(9)**

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electro negativity, polarizability, oxidation states, coordination numbers. Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena.

UNIT III - Spectroscopic techniques and applications **(9)**

Spectroscopy (Principles and Instrumentation only).Electronic spectroscopy. Vibrational and rotational spectroscopy. Applications. Surface characterization techniques SEM and TEM. Fluorescence and its applications in medicine.

UNIT IV - Use of free energy in chemical equilibria **(9)**

Thermodynamic functions: energy, entropy and free energy. Significance of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation, reduction and solubility equilibria. Use of free energy considerations in metallurgy through Ellingham diagrams.

UNIT V - Organic reactions and synthesis of a drug molecule (9)

Introduction to organic reactions and its mechanism involving substitution, addition, elimination, oxidation, reduction, cyclization and ring opening. Synthesis of a commonly used drug molecule.

Total Hours: 60

TEXT BOOKS:

1. B. H. Mahan, University chemistry, Pearson Education, (2010).
2. M. J. Sienko and R. A. Plane, Chemistry: Principles and Applications, (2012)
3. C. N. Banwell, Fundamentals of Molecular Spectroscopy, McGraw-Hill, (1994).

REFERENCES:

1. B. L. Tembe, Kamaluddin and M. S. Krishnan, Engineering Chemistry (NPTEL Web-book)
2. P. W. Atkins, Physical Chemistry, Oxford University Press, (2009).
3. K. P. C. Volhardt and N. E. Schore, 5th Edition, Organic Chemistry: Structure and Function, W.H. Freeman, (2014).
4. P C Jain & Monica Jain, Engineering Chemistry, Dhanpat Rai Publishing Company, (2015).

WEBSITES:

1) https://swayam.gov.in/nd2_arp19_ap51/preview
2) https://www.swayamprabha.gov.in/index.php/program/current/20
3) https://www.coursera.org/learn/chemistry-1
4) https://www.edx.org/learn/chemistry

(ii) Laboratory

COURSE OBJECTIVE

- To provide students with practical knowledge of quantitative analysis of materials by classical and instrumental methods for developing experimental skills in building technical competence.
- To study about spectroscopic technique
- To understand the thermodynamic functions
- To comprehend the basic organic chemistry and to synthesis simple drug.
- To study the basics of Periodic properties, Intermolecular forces
- To determine the partition coefficient of a substance between two immiscible liquids.

COURSE OUTCOMES

Upon completion of this course, the students will be able to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
- Synthesize a small drug molecule and analyse a salt.
- Perform Test of Hypothesis as well as calculate confidence interval for a population parameter for single sample and two sample cases.
- Understand the concept of the sampling distribution of a statistic, and in particular describe the behavior of the sample mean and hypothesis testing.
- To apply problem solving techniques to solve real world events.

Choice of 10 experiments from the following:

1. Determination of surface tension and viscosity
2. Determination of Sodium Carbonate and Sodium Hydrogen Carbonate in a mixure using volumetric titration
3. Determination of Ca / Mg using complexometric titration
4. Thin layer chromatography
5. Determination of chloride content of water
6. Determination of the rate constant of a reaction
7. Conductometry - Determination of cell constant and conductance of solutions
8. pH Metry – Determination of Acid / Base
9. Potentiometry - determination of redox potentials and emfs
10. Saponification/acid value of an oil
11. Determination of the partition coefficient of a substance between two immiscible liquids
12. Adsorption of acetic acid by charcoal
13. Use of the capillary viscosimeters to the demonstrate of the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of egg.

Total Hours: 45

B.E Computer Science and Engineering **2018-2019**

Semester-II

18BECS242 **Basic Electrical Engineering** **6H-5C**

(Theory & Lab.)

Instruction Hours/week: L:3 T:1 P:2 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

i) Theory

COURSE OBJECTIVES:

- To impart basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- To impart the basic knowledge about the AC and DC Electric circuits.
- To introduce fundamental concepts and analysis techniques in electrical engineering to students across all disciplines.
- To understand the working of Electrical Machines and Transformers.
- To understand the working of Power Converters and components of low-voltage electrical installations.
- To discuss the applications of the basic concepts in Electrical engineering for multi-disciplinary tasks.

COURSE OUTCOMES:

Upon completion of this course the students will be able to:

- Demonstrate an understanding of the basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- Demonstrate an understanding of basic concepts of analysis of simple DC and AC circuits used in electrical and electronic devices
- Demonstrate an understanding of selection skill to identify the type of generators or motors required for particular application.
- Demonstrate an understanding of basic concepts of transformers their application in transmission and distribution of electric power.
- Demonstrate an understanding of the effects of electric shock and precautionary measures.
- Apply the basic concepts in Electrical engineering for multi-disciplinary tasks.

UNIT I - DC Circuits **(9)**

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems.Time-domain analysis of first-order RL and RC circuits.

UNIT II - AC Circuits **(9)**

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT III - Electrical Machines **(9)**

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

UNIT IV - Transformers And Power Converters (9)

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections. Overviews of DC-DC buck and boost converters, duty ratio control. Introduction to Single-phase and three-phase voltage source inverters.

UNIT V - Electrical Installations (9)

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, RCCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Total Hours: 60

TEXT BOOKS:

1.V. D. Toro, Electrical Engineering Fundamentals, Prentice Hall India, (1989).
2. D. P. Kothari and I. J. Nagrath, Basic Electrical Engineering, Tata McGraw Hill, (2010).

REFERENCES:

1. D. C. Kulshreshtha, Basic Electrical Engineering, McGraw Hill, (2009).
2. L. S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press, (2011).
3. E. Hughes, Electrical and Electronics Technology, Pearson, (2010).

WEBSITES:

1. https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering
2. https://www.edx.org/learn/electrical-engineering
3. https://swayam.gov.in/nd1_noc19_ee35/preview

(ii) Laboratory

COURSE OBJECTIVES:

- To impart basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- To impart the basic knowledge about the AC and DC Electric circuits.
- To introduce fundamental concepts and analysis techniques in electrical engineering to students across all disciplines.
- To understand the working of Electrical Machines and Transformers.
- To understand the working of Power Converters and components of low-voltage electrical installations.
- To discuss the applications of the basic concepts in Electrical engineering for multi-disciplinary tasks.

COURSE OUTCOMES :

At the end of this course, students will demonstrate the ability

- Demonstrate an understanding of the basic knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- Demonstrate an understanding of basic concepts of analysis of simple DC and AC circuits used in electrical and electronic devices

- Demonstrate an understanding of selection skill to identify the type of generators or motors required for particular application.
- Demonstrate an understanding of basic concepts of transformers their application in transmission and distribution of electric power.
- Demonstrate an understanding of the effects of electric shock and precautionary measures.
- Apply the basic concepts in Electrical engineering for multi-disciplinary tasks.

List of Experiments

1. Experimental verification of electrical circuit problems using Ohms law and Kirchoff's law.
2. Measurement of electrical quantities – voltage, current, power & power factor in R load.
3. Speed control of DC shunt motor
4. Draw the equivalent circuit of single phase Transformer by conducting OC &SC Test.
5. Measurement of energy using single phase energy meter.

Total Hours: 30

TEXT BOOKS:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.

REFERENCES:

1. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
2. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
3. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

B.E Computer Science and Engineering **2018-2019**

Semester-II

18BECS211 **Workshop / Manufacturing practices Laboratory** **5H-3C**

Instruction Hours/week: L:1 T:0 P:4 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To identify and use of tools, types of joints in carpentry, fitting, tin smithy and plumbing operations.
- To understand of electrical wiring and components.
- To Observe the function of lathe, shaper, drilling, boring, milling, grinding machines.
- To identify the need for heating of the Mild Steel and to understand the Hot Working of the metals in Black Smithy
- To demonstrate Manufacturing practices on CNC Machine tools.
- To discuss different types of solid state welding and other welding practices viz Arc welding, Gas welding, Brazing, Soldering etc.

COURSE OUTCOMES:

Upon completion of this course the students will be able to:

- To identify different Tools required for Wood working.
- Familiarize the students to different cutting fluids.
- Use the Cutting tools required for Metal working in the Fitting work.
- Identify the need for heating of the Mild Steel and to understand the Hot Working of the metals in Black Smithy
- Demonstrate Manufacturing practices on CNC Machine tools.
- Expose different types of solid state welding and other welding practices viz Arc welding, Gas welding, Brazing, Soldering etc.

i) Lectures & videos: **(10)**

Detailed contents

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods **(3)**
2. CNC machining, Additive manufacturing **(1)**
3. Fitting operations & power tools **(1)**
4. Electrical &Electronics **(1)**
5. Carpentry **(1)**
6. Plastic moulding, glass cutting **(1)**
7. Metal casting **(1)**
8. Welding (arc welding & gas welding), brazing **(1)**

ii) Workshop Practice: **(60)**

9. Machine shop **(10)**
10. Fitting shop **(8)**
11. Carpentry **(6)**
12. Electrical & Electronics **(8)**
13. Welding shop **(8 hours (Arc welding 4 Periods + gas welding 4 Periods)**

14. Casting **(8)**
15. Smithy **(6)**
16. Plastic moulding & Glass Cutting **(3)**
17. Plumbing Exercises **(3)**

TEXT BOOKS:

1. Jeyachandran, K. and Balasubramanian, S, A Premier on Engineering Practices Laboratory, Anuradha Publications, Kumbakonam, (2007).
2. Jeyapoovan, T., Saravanapandian, M, Engineering Practices Lab Manual, Vikas Publishing House Pvt. Ltd, Chennai, (2006).
3. Bawa, H.S, Workshop Practice, Tata McGraw – Hill Publishing Company Limited, New Delhi, (2007).

REFERENCES:

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K, Elements of Workshop Technology", Vol. I and Vol. II Media promoters and publishers private limited, (2008 & 2010).
2. Gowri P. Hariharan and A. Suresh Babu, Manufacturing Technology – I, Pearson Education, (2008).
3. Kalpakjian S. And Steven S. Schmid, Manufacturing Engineering and Technology, Pearson Education India Edition, (2002).
4. Roy A. Lindberg, Processes and Materials of Manufacture, Prentice Hall India. (1998).
5. Rao P.N., Manufacturing Technology, Vol. I and Vol. II, Tata McGraw Hill House, (2017).

WEBSITE:

1. https://swayam.gov.in/nd2_ntr20_ed10/preview

B.E Computer Science and Engineering **2018-2019**

Semester-II

18BECS212 **Engineering Graphics And Design** **5H-3C**

Instruction Hours/week: L:1 T:0 P:4 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES

- To understand the importance graphics in engineering
- To learn basic engineering drawing formats
- To develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings.
- To learn to take data and transform it into graphic drawings.
- To prepare the students to communicate effectively and to use the techniques, skills, and modern engineering tools necessary for engineering practice
- To discuss the theory of projection.

COURSE OUTCOMES

Upon completion of this course the students will be able to:

- Know and understand the conventions and the method of engineering drawing.
- Interpret engineering drawings using fundamental technical mathematics.
- Construct basic and intermediate geometry.
- Improve their visualization skills so that they can apply these skills in developing new products.
- Improve their technical communication skill in the form of communicative drawings.
- Comprehend the theory of projection.

UNIT I -INTRODUCTION (9)

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Layout of drawing sheets, sizes of drawing sheets, different types of lines used in drawing practice geometric constructions, principles of dimensioning– linear, angular, aligned system, unidirectional system, parallel dimensioning, chain dimensioning, location dimension and size dimension. Conic sections including the Ellipse, Parabola and Hyperbola (eccentricity method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales

UNIT II -ORTHOGRAPHIC PROJECTIONS (9)

Principles of Orthographic Projections- Need for importance of multiple views and their placement – First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT III - PROJECTION OF POINTS, LINES AND PLANE SURFACES (9)

Projections of Points and lines located in the first quadrant inclined to both planes - Determination of true lengths and true inclinations; Projection of polygonal surface and circular lamina inclined to both reference planes

UNIT IV -PROJECTION OF SOLIDS (9)

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT V -ISOMETRIC PROJECTIONS & COMPUTER GRAPHICS (9)

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple solids, truncated prisms, pyramids, cylinders and cones; Conversion of Isometric Views to Orthographic Views and Vice-versa

Overview of Computer Graphics, listing the computer technologies that impact on graphical communication, demonstrating knowledge of the theory of CAD software, Introduction to 3D modeling packages

TOTAL HOURS: 60

TEXT BOOKS:

1. Venugopal K and Prabhu Raja V, (2010), Engineering Graphics, New Age International Publishers.
2. C M Agrawal and Basant Agrawal, (2012), Engineering Graphics, Tata McGraw Hill, New Delhi.
3. James D. Bethune, (2015 &2016), Engineering Graphics with AutoCAD Pearson Education.

REFERENCES:

1. Narayana, K.L. & P Kannaiah, (2008),Text book on Engineering Drawing, Scitech Publishers.
2. Bureau of Indian Standards, (2003).Engineering Drawing Practices for Schools and Colleges SP 46, (2003), BIS, New Delhi.
3. Shah, M.B. & Rana B.C. (2008).Engineering Drawing and Computer Graphics, Pearson Education.
4. Bhatt N.D., Panchal V.M. & Ingle P.R, (2014), Engineering Drawing, Charotar Publishing House.

WEBSITE:

1. https://nptel.ac.in/courses/112103019/

B.E-CSE **2018-2019**

18BECS301 MATHEMATICS –III (DIFFERENTIAL CALCULUS) 4H-4C

Instruction Hours/week: L: 3 T: 1 P: 0 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

COURSE OBJECTIVES

- To introduce sequence and series and Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems
- To understand the concept of functions of several variables and vector identities.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage
- Evaluate first order differential equations including separable, homogeneous, exact and linear Solvable for p, x and y, Clairaut's form.
- Solving differential equation of certain type and Power series solutions of Legendre polynomials, Bessel functions of the first kind and their properties.
- To explain basic knowledge and understanding in one field of materials, differential calculus

COURSE OUTCOMES

The students will learn:

- To solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
- To understand the ideas of limits and continuity and an ability to calculate with them and apply them and also to calculate grad, div and curl in Cartesian and other simple coordinate systems.
- To apply integration to compute multiple integrals, area, volume, integrals in polar and Cartesian coordinates, in addition to change of order and vector integration.
- To solve first order differential equations utilizing the standard techniques for separable, exact, linear, Bernoulli cases.
- To solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
- This course equips students to have basic knowledge and understanding in one field of materials, differential calculus

UNIT I - Sequences and series:

Convergence of sequence and series, tests for convergence, power series, Taylor's series. Series for exponential, trigonometric and logarithmic functions

UNIT II - Multivariable Calculus (Differentiation)

Limit, continuity and partial derivatives, directional derivatives, total derivative, Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.

UNIT III - Multivariable Calculus (Integration)

Multiple Integration: double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Applications: areas and volumes , Center of mass and Gravity (constant and variable densities). Theorems of Green, Gauss and Stokes, Simple applications involving cubes and rectangular parallelepipeds.

UNIT IV - First order ordinary differential equations

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT V- Ordinary differential equations of higher orders

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

SUGGESTED READINGS

1. G.B. Thomas and R.L. Finney**,** (2002),Calculus and Analytic geometry, 9th Edition,Pearson**,**.
2. Erwin kreyszig**,** (2006),Advanced Engineering Mathematics, 9th Edition,John Wiley & Sons**.**
3. Veerarajan T**,** (2008),Engineering Mathematics for first year,Tata McGraw-Hill, New Delhi.
4. Ramana B.V**,** (2010),Higher Engineering Mathematics, 11th Reprint, Tata McGraw Hill New Delhi.
5. Hemamalini. P.T**,**(2014),Engineering Mathematics**,** McGraw Hill Education (India) Private Limited, New Delhi.
6. D. Poole**,** (2005),Linear Algebra: A Modern Introduction, 2nd Edition,Brooks/Cole.
7. N.P. Bali and Manish Goyal, (2010), A text book of Engineering Mathematics, Laxmi Publications.
8. B.S. Grewal, (2010), Higher Engineering Mathematics, 36th Edition, Khanna Publishers.
9. V. Krishnamurthy, (2005),V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press.

B.E-CSE **2018-2019**

18BECS302	**ENVIRONMENTAL STUDIES**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES

- To give a comprehensive insight into natural resources
- Understand ecosystem and biodiversity.
- To educate the ways and means of the environment
- To protect the environment from various types of pollution.
- To impart some fundamental knowledge on human welfare measures.
- Understand various Social issues and its effect on environment

COURSE OUTCOMES

Upon completion of this course the student will be able to:

- Prepare them to go eco-friendly and help preserving the nature and environment.
- Educate the means in preserving the environment.
- Understand the various types of pollution and environmental status.
- Enhance the fundamental knowledge on human welfare measures and sustainable and unsustainable development.
- Get an insight on various Social issues and how it effects the environment
- Demonstrate a general understanding of the breadth and interdisciplinary nature of environmental issues.

UNIT I - Introduction To Environmental Studies And Natural Resources

Definition, Scope and Importance – Need for public awareness -Forestresources: Useandover-exploitation, deforestation- Water resources-Use and over-utilization of surface and ground water, floods, drought, conflicts over water- Land resources-Land as a resource, land degradation, man induced landslides, soil erosion and desertification –Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources- Food resources-World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture- Energy resources-Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources- role of an individual in conservation of natural resources.

UNIT II - Ecosystem

Chemistry and Environment- Environmental segments, Composition and Structure of atmosphere Concept of an ecosystem- Structure, components and function of an ecosystem Energy flow in the ecosystem – Food chain, Food web and Ecological pyramids, Structure and function of Terrestrial ecosystem (Forest, Desert and Grassland ecosystem) and Aquatic ecosystem (Fresh water and Marine ecosystem).

UNIT III - Biodiversity

Introduction to biodiversity, Definition- Geneticdiversity, Species diversity and Ecosystem diversity.Biogeographical classification of India, Importance of biodiversity-Value of biodiversity - Hot Spots of biodiversity-Threats to biodiversity - Endangered and Endemic Species of India – Conservation of biodiversity- In-Situ and Ex-Situ conservation of biodiversity.

UNIT IV - Environmental Pollution

Definition – causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution and Thermal pollution. Solid waste management-causes, effects and control measures of urban and industrial wastes– Role of an individual in prevention of pollution–Disaster management-earthquake, tsunami, cyclone and landslides.

UNIT V - Social Issues And Environment

From Unsustainable to Sustainable development, Urban problems related to energy sources, Water conservation, Rain water harvesting and Watershed management, Resettlement and rehabilitation of people, its problems and concerns, Environmental ethics- Issues and possible solutions- Climate change- Green house effect and Global warming, Acid rain, Ozone layer depletion, Wasteland reclamation- Environment Protection Act- Human Rights- Value education, Role of Information Technology in Environment and Human health-Human Safety- Population growth, Variation of population among nations-Population explosion.

TEXT BOOKS:

1. Dr. Ravikrishnan, A,(2012),Environmental Science, Sri Krishna Hi tech Publishing Company Private Ltd., Chennai
2. Anubhakaushik, C.P. Kaushik,(2010),Environmental Science and Engineering, New Age International (P) Ltd., New Delhi.
3. William P.Cunningham,(2008), Principles of Environmental Science, Tata McGraw -Hill Publishing Company, New Delhi.

REFERENCES:

1. Linda D. Williams, (2005), Environmental Science Demystified, Tata McGraw -Hill Publishing Company Ltd., New Delhi.
2. BharuchaErach,(2005), Environmental Science Demystified Mapin Publishing (P) Ltd., Ahmedabad.
3. Tyler Miller G. Jr,(2004) Environmental Science, Thomson & Thomson Publishers, New Delhi
4. Trivedi, R.K. and Goel, P.K,(2003), Introduction to Air Pollution, Techno-Science Publications, Jaipur.

B.E-CSE **2018-2019**

18BECS311 **IT WORKSHOP (SCILAB PROGRAMS)** **4H-3C**

Instruction Hours/week: L:0 T:0 P: 4 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To familiarization of the syntax, semantics, data-types
- To use the library functions of numerical computing languages SCILAB
- To create application of such languages for implementation/simulation and visualization of basic mathematical functions relevant to electronics applications.
- To understand the algebra concepts.
- To analyze the program and the correctness.
- To understand Linear algebra and Signal processing concepts

COURSE OUTCOMES:

- Understand the main features of the SCILAB program development environment to enable their usage in the higher learning.
- Implement simple mathematical functions/equations in numerical computing environment such as SCILAB.
- Interpret and visualize simple mathematical functions and operations thereon using plots/display.
- Analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using SCILAB tools
- Perform simulation/implementation of various applications
- Good understanding of Linear algebra and Signal processing concepts

LIST OF EXPIREMENTS:

1. Study of basic SCILAB commands
2. Matrix constructors and operations
3. Matrix bitwise, relational & logical operations
4. Control structures (if-else, if-elseif –else, select)
5. Control structures (for, while, break and continue)
6. Graphics - 2d plots

B.E-CSE **2018-2019**

18BECS341 **ANALOG ELECTRONIC CIRCUITS** **3H-5C**

Instruction Hours/week: L:3 T:0 P:4 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To impart knowledge in electronic semiconductor devices & circuits
- Give importance to the various aspects of design & analysis.
- To provide knowledge about different types of amplifier & oscillator circuits and their design.
- To provide a thorough understanding of the operational amplifier circuits and their functions
- To design and analysis the applications in op-amp.
- To discuss linear and non-linear applications of op-amp

COURSE OUTCOMES:

Upon completion of this course the student will be able to:

- Understand the characteristics of electronic devices including diodes, BJT and MOSFET.
- Design and analyze various rectifier and amplifier circuits.
- Design sinusoidal and non-sinusoidal oscillators.
- Understand the functioning of OP-AMP and design OP-AMP based circuits.
- Understand Differential, multi-stage and operational amplifiers
- Design and analyse Linear and Nonlinear applications of op-amp

UNIT 1: Diode circuits (4 Hours)

P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, Zener diodes, clamping and clipping circuits.

UNIT 2: BJT circuits (8 Hours)

Structure and I-V characteristics of a BJT; BJT as a switch. BJT as an amplifier: small-signal model, biasing circuits, current mirror; common-emitter, common-base and common-collector amplifiers; Small signal equivalent circuits, high-frequency equivalent circuits

UNIT 3: MOSFET circuits (8 Hours)

MOSFET structure and I-V characteristics. MOSFET as a switch. MOSFET as an amplifier: small-signal model and biasing circuits, common-source, common-gate and common-drain amplifiers; small signal equivalent circuits - gain, input and output impedances, trans-conductance, high frequency equivalent circuit.

UNIT 4: Differential, multi-stage and operational amplifiers (8 Hours)

Differential amplifier; power amplifier; direct coupled multi-stage amplifier; internal structure of an operational amplifier, ideal op-amp, non-idealities in an op-amp (Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product)

UNIT 5: Linear and Nonlinear applications of op-amp (14 Hours)

Idealized analysis of op-amp circuits. Inverting and non-inverting amplifier, differential amplifier, instrumentation amplifier, integrator, active filter, P, PI and PID controllers and lead/lag compensator using an op-amp, voltage regulator, oscillators (Wein bridge and phase shift). Analog to Digital Conversion. Hysteretic Comparator, Zero Crossing Detector, Square-wave and triangular-wave generators. Precision rectifier, peak

detector. Monoshot.

TEX BOOKS:

1. A. S. Sedra and K. C. Smith, "Microelectronic Circuits", New York, Oxford University Press, 1998.
2. J. V. Wait, L. P. Huelsman and G. A. Korn, "Introduction to Operational Amplifier theory and applications", McGraw Hill U. S., 1992.
3. J. Millman and A. Grabel, "Microelectronics", McGraw Hill Education, 1988.

REFERENCES:

1. P. Horowitz and W. Hill, "The Art of Electronics", Cambridge University Press, 1989.
2. P. R. Gray, R. G. Meyer and S. Lewis, "Analysis and Design of Analog Integrated Circuits", John Wiley & Sons, 2001.

Laboratory:

COURSE OBJECTIVES:

- To learn the characteristics of basic electronic devices such as Diode, BJT
- To understand the basic operation and configuration of linear integrated circuits
- To impart knowledge in electronic semiconductor devices & circuits
- Give importance to the various aspects of design & analysis.
- To provide knowledge about different types of amplifier & oscillator circuits and their design.
- To provide a thorough understanding of the operational amplifier circuits and their functions

COURSE OUTCOMES:

On completion of this laboratory course, the student should be able to:

- Understand the characteristics of electronic devices including diodes, BJT and MOSFET.
- Design and analyze various rectifier and amplifier circuits.
- Design sinusoidal and non-sinusoidal oscillators.
- Understand the functioning of OP-AMP and design OP-AMP based circuits.
- Understand Differential, multi-stage and operational amplifiers
- Design and analyse Linear and Nonlinear applications of op-amp

List of Experiments:

1. Characteristics of PN Junction Diode
2. Construct clipper and clamper using diodes.
3. Characteristics of Zener Diode
4. Common Emitter input-output Characteristics.
5. Characteristics of MOSFET
6. Inverting, Non inverting using Op-amp.
7. Differential amplifier using Op-amp
8. Integrator and Differentiator using Op-amp.
9. Waveform generator using Op-amp

B.E-CSE **2018-2019**

18BECS342 **DATA STRUCTURE & ALGORITHMS** **3H-5C**

Instruction Hours/week: L: 3 T:0 P:4 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To impart the basic concepts of data structures and algorithms.
- To understand concepts about searching and sorting techniques
- To understand basic concepts about stacks, queues, lists, trees and graphs.
- To enable them to write algorithms for solving problems with the help of fundamental data structures
- To understand Tree and Graph data structures
- To discuss the methods to implement Linear and Non-Linear data structures.

COURSE OUTCOMES:

- To analyze the algorithms to determine the time and computation complexity and justify the correctness.
- To implement Linear Search and Binary Search.
- To construct the Stacks, Queues and linked list student, perform relevant operations and to analyze and determine the time and computation complexity.
- To write algorithms for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in terms of Space and Time complexity.
- To implement Graph search and traversal algorithms and determine the time and space complexities
- Students will be able to implement Linear and Non-Linear data structures.

UNIT 1:

Introduction: Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. **Searching:** Linear Search and Binary Search Techniques and their complexity analysis.

UNIT 2:

Stacks and Queues: ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms and complexity analysis. ADT queue, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each types of Queues: Algorithms and their analysis.

UNIT 3:

Linked Lists: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Header nodes, Doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree; Tree operations on each of the trees and their algorithms with complexity analysis. Applications of Binary Trees. B Tree, B+ Tree: definitions, algorithms and analysis.

UNIT 4:

Sorting and Hashing: Objective and properties of different sorting algorithms:
Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort; Performance and Comparison among all the methods, Hashing.

UNIT 5:

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

TEXT BOOKS:

1. "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.

REFERENCES:

1. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company

2. "How to Solve it by Computer", 2nd Impression by R. G. Dromey, Pearson Education.

B.E-CSE **2018-2019**

18BECS342 **DATA STRUCTURE & ALGORITHMS** **3H-5C**

Instruction Hours/week: L: 3 T:0 P:4 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Analyze performance of algorithms.
- Choose the appropriate data structure and algorithm design method for a specified application.
- Determine which algorithm or data structure to use in different scenarios
- Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs
- Demonstrate understanding of various sorting algorithms, including bubble sort, selection sort, heap sort and quick sort.
- Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.

COURSE OUTCOMES:

- Able to understand the importance of structure and abstract data type, and their basic usability in different applications through different programming languages.
- Able to analyze and differentiate different algorithms based on their time complexity.
- Able to understand the linked implementation, and its uses both in linear and non-linear data structure.
- Able to understand various data structure such as stacks, queues, trees, graphs, etc. to solve various computing problems.
- Able to implement a given problem by applying the linear and non linear data structure
- Able to identify the strength and weakness of data structures.

LIST OF EXPERIMENTS

1. Implementation of List using Arrays
2. Implementation of Singly Linked List
3. Implementation of Linked Stack
4. Implementation of Linked Queue
5. Implementation of any two stack applications
6. Implementation of Insertion Sort
7. Implementation of Merge Sort
8. Implementation of Quick Sort
9. Implementation of Insertion operation in Binary Search Tree
10. Implementation of Tree Traversals
11. Implementation of Hashing with any one collision resolution method
12. Implementation of Dijkstra's Shortest Path Algorithm

B.E-CSE **2018-2019**

18BECS343	**DIGITAL ELECTRONICS**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

(i) Theory

COURSE OBJECTIVES:

- To present the Digital fundamentals, Boolean algebra and its applications in digital systems.
- To familiarize with the design of various combinational digital circuits using logic gates.
- To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits.
- To explain the various semiconductor memories and related technology.
- To introduce the electronic circuits involved in the design of logic gates.
- To discuss the design procedures to design basic sequential circuits

COURSE OUTCOMES:

Upon completion of this course the student will be able to:

- Understand the characteristics and operations of logic functions and logic gates.
- Design and implement Combinational and Sequential logic circuits.
- Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- Understand the functions of semiconductors and memories.
- Use PLDs to implement the given logical problem.
- Apply the design procedures to design basic sequential circuits

UNIT 1:Fundamentals of Digital Systems and logic families (7Hours)

Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.

UNIT 2: Combinational DigitalCircuits (7Hours)

Standard representation for logic functions, K-map representation, simplification Of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer,De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder,serialadder, ALU, elementary ALU design, popular MSI chips, digital comparator,paritychecker/generator, code converters, priority encoders, decoders/drivers for display devices-M method of function realization.

UNIT 3: Sequential circuits and systems (7Hours)

A 1-bit memory, the circuit properties of Bistable latch, the clocked SR flip flop, J- K-T andDtypesflipflops,applicationsofflipflops,shiftregisters,applicationsofshiftregisters,serialtoparal lel converter, parallel to serial converter, ring counter, sequence generator, ripple(Asynchronous) counters, synchronous counters, counters design using flip flops,specialcounter IC's, asynchronous sequential counters, applications of counters.

UNIT 4: A/D and D/A Converters (7Hours)

Digital to analog converters: weighted resistor/converter, R-2R Ladder D/Aconverter,specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/Dconverter,successive approximation A/D converter, counting A/D converter, dual slope A/D converter/Converter using

Voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs.

UNIT 5: Semiconductor memories and Programmable logic devices. (7Hours)

Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).

TEXT BOOKS:

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

REFERENCES:

1. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

B.E-CSE **2018-2019**

18BECS343 **DIGITAL ELECTRONICS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To study various logic gates.
- To study different combinational circuits.
- To study different sequential circuits
- To implement combinational function using logic gates
- To do simulation of simple combinational and sequential circuits

COURSE OUTCOMES:

Upon completion of this course the student will be able to:

- Understand the characteristics and operations of logic functions and logic gates.
- Design and implement Combinational and Sequential logic circuits.
- Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- Understand the functions of semiconductors and memories.
- Use PLDs to implement the given logical problem.
- Apply the design procedures to design basic sequential circuits

List of Experiments

1. Study of Gates & Flip-flops.
2. Design and implementation of arbitrary functions and Code Converters using logic gates
3. Design and implementation of four-bit adder/subtractor
4. Implementation of combinational logic function using multiplexers
5. Design and Implementation of Shift Registers.
6. Design and implementation Synchronous Counters.
7. Design and implementation Ripple Counter.
8. Simulation of combinational circuits using VHDL/Verilog
9. Simulation of sequential circuits using VHDL/Verilog
10. Design and implementation of Magnitude Comparator (2-Bit).
11. Design and implementation Encoders and Decoders.

B.E-CSE **2018-2019**

18BECS401 **DISCRETE MATHEMATICS** **4H-4C**

Instruction Hours/week: L:4 T:0 P:0 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

COURSE OBJECTIVES

- To understand the basic concepts of set theory.
- To extend student's logical and mathematical maturity and ability to deal with abstraction.
- To understand the concepts and significance of lattices and boolean algebra which are widely used in computer science and Engineering.
- To familiarize the applications of algebraic structures.
- To understand the basic concepts of graph theory.
- To discuss logical reasoning to solve a variety of problems.

COURSE OUTCOMES

The students will learn:

- To aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
- To apply a given logic sentence express it in terms of predicates, quantifiers, and logical connectives.
- To be exposed to concepts and properties of algebraic structures such as groups, rings and fields.
- To Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra
- To develop the given problem as graph networks and solve with techniques of graph theory.
- To apply logical reasoning to solve a variety of problems.

UNIT I - Sets, Relation and Function

Basic operations on sets, Cartesian products, disjoint union (sum), and power sets. Different types of relations, their compositions and inverses. Different types of functions, their compositions and inverses.

UNIT II -Logic and Proofs

Propositional logic – Propositional equivalences – Predicates and quantifiers – Nested quantifiers – Rules of inference – Introduction to proofs – Proof methods and strategy.

UNIT III-Lattices and Boolean Algebra

Partial ordering– Posets – Lattices as posets – Properties of algebraic systems – Sub lattices – Direct product and homomorphism– Some special lattices – Boolean algebra.

UNIT IV–Algebraic Structures

Algebraic systems-Semi groups and monoids - Groups – Subgroups – Homomorphism's –Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.

UNIT V - Graphs

Graphs and graph models – Graph terminology and special types of graphs–Matrix representation of graphs and graph isomorphism– Connectivity – Euler and Hamilton paths.

TEXT BOOKS:

1. K. H. Rosen, Discrete Mathematics and its Applications, 7th Edition, Tata McGraw-Hill, Pub. Co. Ltd., New Delhi, Special Indian Edition, 2011.
2. Tremblay, J.P. and Manohar.R, " Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, 30thReprint, 2011.
3. Grimaldi, R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", 4th Edition, Pearson Education Asia, Delhi,2007.

REFERENCES:

1.Koshy, T. "Discrete Mathematics with Applications", Elsevier Publications,2006.
2.S.Lipschutz, S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.
3.C. L. Liu, Elements of Discrete Mathematics, 2nd Ed., Tata McGraw-Hill,2000.
4.N. Deo, Graph Theory, Prentice Hall of India,1974.

B.E-CSE **2018-2019**

18BECS402 **ORGANIZATIONAL BEHAVIOR** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To gain a solid understanding of human behavior in the workplace from an individual or a group.
- To gain organizational perspective and frameworks and tools to effectively analyze and approach various organizational situations.
- To gain behavioral attitude for individuals and group levels.
- To lead and motivate others to complete their tasks.
- To discuss the performance behavior at individual and group levels.
- To inculcate the ability to lead and motivate others to succeed.

COURSE OUTCOMES:

Upon completion of this course the student will be able to:

- Understand and apply principles of organizational dynamics
- Apply principles relating to systems, culture, structure and change the processes
- Develop critical analytical skills that will help them diagnose situations pertaining to human behavior
- generate effective solutions for the same.
- Understand performance behavior at individual and group levels.
- Develop the ability to lead and motivate others to succeed.

UNIT 1: INTRODUCTION TO ORGANIZATIONAL BEHAVIOUR

Concept of Organizational Behaviour (OB), History , Nature and scope of OB, Key elements in OB, Inter-disciplinary contribution to OB, Managerial Roles

UNIT 2: INDIVIDUAL BEHAVIOUR, VALUES & PERSONALITY

Concept of Individual Differences, Values commonly studied across culture, Fundamentals and Determinants of Personality, Big Five Dimensions, Personality Theory, Personality Traits

UNIT 3: LEARNING & PERCEPTION AND MOTIVATION

Fundamentals of Learning, Learning Theories - Classical Conditioning Theory, Operant Conditioning Theory, Social Learning Theory, Behavior Modification, Definition of Perception, Perceptual Process, Common Perceptual Errors Motivation : Basic concept of Motivation, Theories of Motivation – Maslow, Herzberg's Two Factor Theory, ERG, McClelland , Equity and Vroom's Expectancy Theory

UNIT 4: LEADERSHIP AND GROUP DYNAMICS

Introduction, Leadership Theories - Trait Theories, Behavioral Theories and Situational Theories Group Dynamics : Defining and classifying groups, Stages of group development, Group Properties – Roles, Norms, Status, Size and Cohesiveness, Group Decision making

UNIT 5: MANAGING CHANGE IN ORGANIZATION AND ORGANIZATIONAL CULTURE

Definition, Forces of Change, Causes for Resistance to Change, Overcoming Resistance to change, Force Field Analysis and Kotter's Model for Change Organizational Culture: Meaning, Strong Culture vs. Weak Culture, Creating & sustaining Culture, Socialization

TEXT BOOKS:

1. Robbins, S.P.Judge, T.A. &, Sanghi, Seema. Organizational Behavior, Pearson, 13th Edition, 2009.
2. Pareek, U, Understanding Organizational Behavior, Oxford University Press, 3rd Edition, 2011.
3. Luthans,F. .Organizational Behaviour, Tata McGraw Hill, 18th Edition, 2018.

REFERENCES:

1. Sekaran,U. Organizational Behaviour: Text and Cases, Tata Mc Graw Hill, 2nd Edition, 2014.
2. Kreitner, R. &Kinicki, A. Organizational Behavior, McGrawHill/Irwin, 10rd Edition, 2012.

B.E-CSE **2018-2019**

18BECS441 COMPUTER ORGANIZATION &ARCHITECTURE 3H-5C

Instruction Hours/week: L: 3 T:0 P:4 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

THEORY:

COURSE OBJECTIVES:

To expose the students to the following:

- How Computer Systems work & the basic principles
- Instruction Level Architecture and Instruction Execution
- The current state of art in memory system design
- How I/O devices are accessed and its principles.
- To provide the knowledge on Instruction Level Parallelism
- To impart the knowledge on micro programming

COURSE OUTCOMES:

- Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
- Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
- Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
- Design a memory module and analyze its operation by interfacing with the CPU
- Apply design techniques to enhance performance using pipelining, parallelism and RISC methodology
- Exemplify in a better way the I/O and memory organization

UNIT 1:

Functional blocks of a computer: CPU, memory, input-output subsystems, control unit.

Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.

Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-andadd, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.

UNIT 2:

Introduction to x86 architecture.

CPU control unit design: hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU.

Memory system design: semiconductor memory technologies, memory organization.

UNIT 3:

Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged

and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB

UNIT 4:

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.

UNIT 5:

Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies.

TEXT BOOKS:

1. "Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by CarlHamacher, McGraw Hill Higher Education.

REFERENCES:

1. "Computer Architecture and Organization", 3rd Edition by John P. Hayes, WCB/McGraw-Hill
2. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
3. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

LABORATORY:

COURSE OBJECTIVES:

To expose the students to the following :

- How Computer Systems work & the basic principles
- Instruction Level Architecture and Instruction Execution
- The current state of art in memory system design
- How I/O devices are accessed and its principles.
- To provide the knowledge on Instruction Level Parallelism
- To impart the knowledge on micro programming

COURSE OUTCOMES:

- Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
- Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
- Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
- Design a memory module and analyze its operation by interfacing with the CPU
- Apply design techniques to enhance performance using pipelining, parallelism and RISC methodology
- Exemplify in a better way the I/O and memory organization

List of Experiments:

1. Write the working of 8085 simulator GNUsim8085 and basic architecture of 8085 along with small introduction.

2. Study the complete instruction set of 8085 and write the instructions in the instruction set of 8085 along with examples.

3. Write an assembly language code in GNUsim8085 to implement data transfer instruction.

4. Write an assembly language code in GNUsim8085 to store numbers in reverse order in memory location.

5. Write an assembly language code in GNUsim8085 to implement arithmetic instruction.

6. Write an assembly language code in GNUsim8085 to add two numbers using lxi instruction.

7. Write an assembly language code in GNUsim8085 to add two 8 bit numbers stored in memory and also storing the carry.

8. Write an assembly language code in GNUsim8085 to find the factorial of a number.

9. Write an assembly language code in GNUsim8085 to implement logical instructions.

10. Write an assembly language code in GNUsim8085 to implement stack and branch instructions.

B.E-CSE **2018-2019**

18BECS442	**OPERATING SYSTEMS**	**3H-5C**

Instruction Hours/week: L:3 T:0 P:4 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

THEORY:

COURSE OBJECTIVES:

To learn the fundamentals of Operating Systems:

- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To create the processes and threads.
- To discuss about OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

COURSE OUTCOMES:

- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time and Response Time.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.
- For a given I/O devices and OS (specify) develop the I/O management functions
- Develop OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers. System structure, Allocation methods (contiguous, linked, indexed)

UNIT 1:

Introduction: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.

Processes: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching

Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads,

UNIT 2:

Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing,

Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc.

UNIT 3:

Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

Memory Management: Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition– Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging.

UNIT 4:

Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

UNIT 5:

I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms

File Management: Concept of File, Access methods, File types, File operation, Directory structure, File ,free space management (bit vector ,linked list ,grouping)directory implementation (linear list ,hash table)efficiency and performance.

Disk Management: Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks

TEXT BOOKS:

1. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.
2. Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall of India.

REFERENCES:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
4. Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates

LABORATORY:

COURSE OBJECTIVES:

To learn the fundamentals of Operating Systems:

- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To create the processes and threads.
- To discuss about OS as part of a uniform device abstraction by performing operations for

synchronization between CPU and I/O controllers.

COURSE OUTCOMES:

- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time and Response Time.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.
- For a given I/O devices and OS (specify) develop the I/O management functions
- Develop OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers. System structure, Allocation methods (contiguous, linked, indexed)

LIST OF EXPERIMENTS

(Implement the following on LINUX platform. Use C for high level language implementation)

1. Shell programming
   - command syntax
   - write simple functions
   - basic tests
2. Shell programming
   - loops
   - patterns
   - expansions
   - substitutions
3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
5. Write C programs to simulate UNIX commands like ls, grep, etc.
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
7. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time
8. Implement the Producer – Consumer problem using semaphores.
9. Implement some memory management schemes – I
10. Implement some memory management schemes – II
11. Case study: “awk” Scripting Language

B.E-CSE **2018-2019**

18BECS443 DESIGN AND ANALYSIS OF ALGORITHMS 3H-5C

Instruction Hours/week: L:3 T:0 P:4 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

THEORY:

COURSE OBJECTIVES:

- To analyze the worst-case, average case and the best case
- To write fundamental algorithmic strategies
- To demonstrate a various Graph and Tree Algorithms
- To compare tractable and intractable problems
- To explain advanced topics in algorithm
- To explain algorithms in common engineering design situation

COURSE OUTCOMES:

Upon completion of this course, the student will be able to:

- Analyze worst-case, average case and the best-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
- Analyze fundamental algorithmic strategies
- Analyze various Graph and Tree Algorithms
- Understand Tractable and Intractable Problems
- Understand Advanced Topics like Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE
- To write the effective algorithms to solve engineering problems

UNIT 1:

Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

UNIT 2:

Fundamental Algorithmic Strategies: Brute-Force, Greedy,Dynamic Programming, Branch-and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving , Bin Packing, Knap Sack TSP. Heuristics – characteristics and their application domains.

UNIT 3:

Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.

UNIT 4:

Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.

UNIT 5:

Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE

TEXT BOOKS:

1. Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest and Clifford Stein, MIT Press/McGraw-Hill.
2. Fundamentals of Algorithms – E. Horowitz et al.

REFERENCES:

1. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
2. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
3. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.

LABORATORY:

COURSE OBJECTIVES:

- To analyze the worst-case, average case and the best case
- To write fundamental algorithmic strategies
- To demonstrate a various Graph and Tree Algorithms
- To compare tractable and intractable problems
- To explain advanced topics in algorithm
- To explain algorithms in common engineering design situation

COURSE OUTCOMES:

Upon completion of this course, the student will be able to:

- Analyze worst-case, average case and the best-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
- Analyze fundamental algorithmic strategies
- Analyze various Graph and Tree Algorithms
- Understand Tractable and Intractable Problems
- Understand Advanced Topics like Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE
- To write the effective algorithms to solve engineering problems

1. Divide and Conquer

a. Implement Binary Search using Divide and Conquer approach

b. Implement Quick Sort using Divide and Conquer approach

2. Dynamic Programming

a. Find the minimum number of scalar multiplication needed for chain of matrix

b. Implement all pair of Shortest path for a graph (Floyed- Warshall Algorithm)

c. Implement Traveling Salesman Problem

d. Implement Single Source shortest Path for a graph (Dijkstra , Bellman Ford Algorithm)

3. Brunch and Bound

a. Implement 15 Puzzle Problem

4. Backtracking :

a. Implement 8 Queen problem

b. Hamiltonian Problem

5. Greedy method

a. Knapsack Problem

b. Minimum Cost Spanning Tree by Kruskal's Algorithm

B.E-CSE **2018-2019**

18BECS501	**SIGNALS AND SYSTEMS**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the basic properties of various signals
- To know the methods of characterization of LTI systems in time domain
- To analyze the application of Fourier Analysis for Ideal Filtering
- To analyze continuous time signals and system in the Fourier and Laplace domain
- To analyze discrete time signals and system in the Fourier and Z transform domain

COURSE OUTCOMES:

Upon completion of the course the student will be able to :

- Describe signals mathematically and understand how to perform mathematical operations on signals.
- Be familiar with commonly used signals such as the unit step, ramp impulse function, sinusoidal functions and complex exponentials.
- Determine if a given system is linear/causal/stable
- Determine the frequency components present in a deterministic signal
- Characterize LTI systems in the time domain and frequency domain
- Compute the output of an LTI system in the time and frequency domains

UNIT-I INTRODUCTION TO SIGNALS AND SYSTEMS

Energy and power signals, continuous and discrete time signals, continuous and discrete amplitude signals. System properties: linearity: additivity and homogeneity, shift-invariance, causality, stability, realizability.

UNIT-II LTI SYSTEMS AND ANALYSIS

Linear shift-invariant (LSI) systems, impulse response and step response, convolution, input-outputbehavior with aperiodic convergent inputs. Characterization of causality and stability of linear shift

invariant systems. System representation through differential equations & difference equations.

UNIT-III FOURIERSERIES AND FOURIER TRANSFORM

Periodic and semi-periodic inputs to an LSI system, the notion of a frequency response and its relation tothe impulse response, Fourier series representation, the Fourier Transform, convolution/multiplicationand their effect in the frequency domain, magnitude and phase response, Fourier domain duality. TheDiscrete-Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT). Parseval'sTheorem.The idea of signal space and orthogonal bases,

UNIT-IV LAPLACE TRANSFORM ANALYSIS

The Laplace Transform, notion of eigen functions of LSI systems, a basis of eigen functions, region of convergence, poles and zeros of system, Laplace domain analysis, solution to differential equations andsystem behavior.

UNIT-V Z TRANFORM AND SAMPLING

The z-Transform for discrete time signals and systems- eigen functions, region of convergence, z-domainanalysis.State-space analysis and multi-input, multi-output representation. The state-transition matrix and its role.The Sampling Theorem and its implications- Spectra of sampled signals. Reconstruction: idealinterpolator, zero-order hold, first-order hold, and so on. Aliasing and its effects. Relation betweencontinuous and discrete time systems.

TEXT BOOKS:

1. A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems", Prentice Hall, 1983.
2. R.F. Ziemer, W.H. Tranter and D.R. Fannin, "Signals and Systems - Continuous and Discrete", 4th edition, Prentice Hall, 1998.
3. Papoulis, "Circuits and Systems: A Modern Approach", HRW, 1980.
4. B.P. Lathi, "Signal Processing and Linear Systems", Oxford University Press, c1998.
5. Douglas K. Lindner, "Introduction to Signals and Systems", McGraw Hill International Edition: c1999.

REFERENCES:

1. Simon Haykin, Barry van Veen, "Signals and Systems", John Wiley and Sons (Asia) Private Limited, c1998.
2. Robert A. Gabel, Richard A. Roberts, "Signals and Linear Systems", John Wiley and Sons, 1995.
3. M. J. Roberts, "Signals and Systems - Analysis using Transform methods and MATLAB", TMH, 2003.
4. J. Nagrath, S. N. Sharan, R. Ranjan, S. Kumar, "Signals and Systems", TMH New Delhi, 2001.
5. Ashok Ambardar,"Analog and Digital Signal Processing", 2nd Edition, Brooks/ Cole Publishing Company (An international Thomson Publishing Company), 1999.

B.E-CSE **2018-2019**

18BECS502 FORMAL LANGUAGE & AUTOMATA THEORY 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Develop a formal notation for strings, languages and machines.
- Design finite automata to accept a set of strings of a language.
- Prove that a given language is regular and apply the closure properties of languages.
- Design context free grammars to generate strings from a context free language and convert them into normal forms.
- Prove equivalence of languages accepted by Push Down Automata and languages generated by context free grammars
- Identify the hierarchy of formal languages, grammars and machines.
- Distinguish between computability and non-computability and Decidability and undecidability.

COURSE OUTCOMES:

- Write a formal notation for strings, languages and machines.
- Design finite automata to accept a set of strings of a language.
- For a given language determine whether the given language is regular or not.
- Design context free grammars to generate strings of context free language
- Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars
- Write the hierarchy of formal languages, grammars and machines.
- Distinguish between computability and non-computability and Decidability and undecidability.

UNIT 1:

Introduction: Alphabet, languages and grammars, productions and derivation, Chomsky hierarchy of languages. Regular languages and finite automata: Regular expressions and languages, deterministic finite automata (DFA) and equivalence with regular expressions, nondeterministic finite automata (NFA) and equivalence with DFA

UNIT 2 :

Regular Languages : Regular grammars and equivalence with finite automata, properties of

regular languages, pumping lemma for regular languages, minimization of finite automata. Context-free languages and pushdown automata: Context-free grammars (CFG) and languages (CFL),

UNIT 3 :

Normal Forms:

Chomsky and Greibach normal forms, nondeterministic pushdown automata (PDA) and equivalence with CFG, parse trees, ambiguity in CFG, pumping lemma for context-free languages, deterministic pushdown automata, closure properties of CFLs. Context-sensitive languages: Context-sensitive grammars (CSG) and languages, linear bounded automata and equivalence with CSG.

UNIT 4 :

Turing machines: The basic model for Turing machines (TM), Turing- recognizable (recursively enumerable) and Turing-decidable (recursive) languages and their closure properties, variants of Turing machines, nondeterministic TMs and equivalence with deterministic TMs, unrestricted grammars and equivalence with Turing machines, TMs as enumerators.

UNIT 5 :

Undecidability: Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice s theorem, undecidable problems about languages.

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, Introduction to Automata Theory, Languages, and Computation, Pearson Education Asia.

REFERENCES:

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.
2. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.
3. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.
4. John Martin, Introduction to Languages and The Theory of Computation, Tata McGraw Hill.

B.E-CSE **2018-2019**

18BECS503 **PROFESSIONAL ETHICS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To enable the students to create an awareness on engineering ethics, to install moral and social values and loyalty and to appreciate the rights of others
- To develop managerial and entrepreneurial skills our Culture and Ethics
- Knowledge on the principles of management is essential for all kinds of people in all kinds of organizations.
- After studying this course, students will be able to have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling.
- Student should understand concepts of directing and controlling
- To create an awareness and practice through Engineering Ethics and Human Values.

COURSE OUTCOMES:

- To Discuss and communicate the management evolution and how it will affect future managers.
- Identify and evaluate social responsibility and ethical issues involved in business situations and logically articulate own position on such issues.
- To Practice the process of management's four functions: planning, organizing, leading, and controlling.
- To evaluate leadership styles to anticipate the consequences of each leadership style.
- To understand the nature of professional responsibility and be able to identify the ethical elements in decisions.
- To develop critical thinking skills and professional judgment and understand practical difficulties of bringing about change.

UNIT I ENGINEERING ETHICS (9)

Senses of 'Engineering Ethics' – variety of moral issued – types of inquiry – moral dilemmas – moral autonomy – Kohlberg's theory – Gilligan's theory – consensus and controversy – Models of Professional Roles – theories about right action – Self–interest – customs and religion – uses of ethical theories.

UNIT II FACTORS OF CHANGES (9)

Forces that shape culture, social control – Meaning, Agencies, Institution, Customs, Values, Folkways, Norms and Laws. Social changes – Meaning and nature – Theories.

UNIT III HISTORICAL DEVELOPMENT, PLANNING, ORGANISING (9)

Definition of Management – Management and Administration – Development of Management Thought – Contribution of Taylor and Fayol – Functions of Management – Steps involved in Planning – Objectives – Setting Objectives – Process of Managing by Objectives – Strategies, Policies and Planning Premises– Forecasting – Decision–making – Formal and informal organization – Organization Chart.

UNIT IV DIRECTING AND CONTROLLING (9)

Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment –Process of Communication – System and process of Controlling – Requirements for effective control – Control of Overall Performance – Direct and Preventive Control – Reporting

UNIT V ENTREPRENEURSHIP AND MOTIVATION (9)

Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur – Entrepreneurship in Economic Growth– Major Motives Influencing an Entrepreneur – Achievement Motivation Training, self Rating, Business Game, Thematic Apperception Test – Stress management, Entrepreneurship Development Programs – Need, Objectives.

TEXT BOOKS:

1. Harold Koontz & Heinz Weihrich Essentials of Management Tata McGraw-Hill, New Delhi. 2008
2. Khanka S.S Entrepreneurial Development S.Chand & Co. Ltd. Ram Nagar, NewDelhi. 1999
3. Mike Martin and Roland Schinzinger Ethics in Engineering McGraw-Hill, NewYork. 2005

REFERENCES:

1. Tripathy P.C and Reddy P.N, Principles of Management Tata McGraw-Hill, New Delhi. 2007
2. Rabindra N Kanungo Entrepreneurship and innovation Sage Publications, New Delhi. 1998
3. Charles E Harris, Michael S. Protchard and Michael J Rabins Engineering Ethics – Concepts and Cases Wadsworth Thompson Learning, (Indian Reprint now available), New Delhi. 2000

WEBSITES:

1. http://www.managementstudyguide.com/taylor_fayol.htm
2. http://tutor2u.net/business/gcse/people_motivation_theories.htm
3. http://lfkkb.tripod.com/eng24/gilliganstheory.html
4. http://www.developingeyes.com/five-types-of-entrepreneurs/

B.E-CSE **2018-2019**

18BECS541 **DATABASE MANAGEMENT SYSTEMS** **4H-5C**

Instruction Hours/week: L:3 T:0 P:4 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

THEORY:

COURSE OBJECTIVES:

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
- To understand and use data manipulation language to query, update, and manage a database
- To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

COURSE OUTCOMES:

- For a given query write relational algebra expressions for that query and optimize the developed expressions
- For a given specification of the requirement design the databases using E R method and normalization.
- For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2.
- For a given query optimize its execution using Query optimization algorithms
- For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
- Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

UNIT 1

Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML).

Data models: Entity-relationship model, network model, relational and object oriented data models, integrity constraints, data manipulation operations.

UNIT 2:

Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.

Relational database design: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design.

Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.

UNIT 3:

Storage strategies: Indices, B-trees, hashing.

Transaction processing: Concurrency control, ACID property, Serializability of

scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.

UNIT 4:

Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.

UNIT 5:

Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.

TEXT BOOKS:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.

REFERENCES:

1 "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.

2 "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education

3 "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley

LABORATORY:

COURSE OBJECTIVES:

- Master the basic concepts and appreciate the applications of database systems.
- Master the basics of SQL and construct queries using SQL.
- Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.
- Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.
- Mater sound design principles for logical design of databases, including the E-R method and normalization approach.
- Master the basics of query evaluation techniques and query optimization.

COURSE OUTCOMES:

After completion of this course, the students would be able to

- Understand, appreciate and effectively explain the underlying concepts of database technologies
- Design and implement a database schema for a given problem-domain
  Normalize a database
- Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.
- Design and build a GUI application.

LIST OF EXPERIMENTS

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. High-level language extension with Cursors.
4. High level language extension with Triggers
5. Procedures and Functions.
6. Embedded SQL.
7. Database design using E-R model and Normalization.
8. Design and implementation of Payroll Processing System.
9. Design and implementation of Banking System.
10. Design and implementation of Library Information System.
11. Database connectivity using JDBC
12. Database connectivity using ODBC

18BECS542 **OBJECT ORIENTED PROGRAMMING** **4H-5C**

Instruction Hours/week: L:2 T:0 P:4 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

THEORY:

COURSE OBJECTIVES:

- The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests.

COURSE OUTCOMES:

Upon completion of the course the student will be able to :

- Specify simple abstract data types and design implementations, using abstraction functions to document them.
- Develop Java programs using OOP principles
- Develop Java programs with the concepts of inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Write Programs for handling runtime errors using exception.
- Write Programs to handle various Input / Output Streams.

UNIT I Fundamentals of Object-Oriented Programming (9)

Introduction to Object oriented programming – Benefits and Applications of OOP- structural programming versus object oriented programming - Simple Java Program - Data Types – Operators – Expressions - Decision Making and Loop control Statements - The? : Operator - Arrays-Strings – Getting input in java.

UNIT II Classes, Objects and Methods (9)

Defining a Class-Creating Objects-Accessing Class Members-Constructors-Methods Overloading-Static Members-Nesting of Methods-Final Variables and Methods- Final Classes- Finalize Methods-Visibility Control

UNIT III Inheritance and Interfaces (9)

Motivation - Inheritance: Extending a Class – Types of Inheritance - Overriding Methods - Interfaces in Java (Interface and Implement) - Multiple inheritance – Examples

UNIT IV Managing Errors and Exception Handling (9)

Motivation – Exception handling – Exception hierarchy – Throwing and Catching exceptions - Syntax of Exception Handling Code - Types of Errors -Multiple Catch Statements - Using Finally Statement -User defined Exceptions - Using Exceptions for Debugging.

UNIT V Input /Output Streams (9)

Motivation - I/O Streams - Concept of Streams- Stream Classes- Byte Stream Classes- Character Stream Classes-Using Streams-Other Useful I/O Classes- Using the File Class- Input /Output Exceptions-Creation of Files-Reading/Writing Characters-Reading/Writing Bytes - Handling Primitive Data Types - Concatenating and Buffering Files-Random Access Files-Interactive Input and Output-Other Stream classes.

TEXT BOOKS:

1. Barbara Liskov, Program Development in Java, Addison-Wesley, 2001

REFERENCES:

1. Any book on Core Java
2. Any book on C++

LABORATORY:
COURSE OBJECTIVES:

- A competence to design, write, compile, test and execute straightforward programs using a high level language
- An awareness of the need for a professional approach to design and the importance of good documentation to the finished programs.
- Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Demonstrate the ability to use simple data structures like arrays in a Java program. □

COURSE OUTCOMES:

- Understand the principles of OOP
- Be able to demonstrate good object-oriented programming skills in Java
- Understand the capabilities and limitations of Java
- Be able to describe, recognise, apply and implement selected design patterns in Java
- Be familiar with common errors in Java and its associated libraries.

LIST OF EXPERIMENTS

1. Create Java package with simple stack and queue class
2. Write a Java program to perform Complex number manipulation
3. Write a Java program for Date class similar to java.util package
4. Write a Java program for implementing dynamic polymorphism in java
5. Write a Java program for ADT stack using Java interface
6. Write a Java program for DNA file creation
7. Develop a simple paint like program using applet
8. Develop a scientific calculator using java
9. Developing a template for linked list
10. Develop a multi threaded producer consumer Application
11. Write a Java program for generating prime numbers and Fibonacci series
12. Write a Java program for Multithreaded GUI application

B.E-CSE **2018-2019**

18BECS641 **COMPILER DESIGN** **3H-5C**

Instruction Hours/week: L:3 T:0 P:4 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

THEORY:

COURSE OBJECTIVES:

- To understand and list the different stages in the process of compilation.
- Identify different methods of lexical analysis
- Design top-down and bottom-up parsers
- Identify synthesized and inherited attributes
- Develop syntax directed translation schemes
- Develop algorithms to generate code for a target machine

COURSE OUTCOMES:

On completion of the course, the students will be able to:

- build lexical analyzers and use them in the construction of parsers;
- express the grammar of a programming language;
- build syntax analyzers and use them in the construction of parsers;
- perform the operations of semantic analysis;
- discuss the merits of different optimization schemes.
- Able to design and Implement a simple compiler

UNIT 1:

The aim is to learn how to design and implement a compiler and also to study the underlying theories. The main emphasis is for the imperative language. Introduction: Phases of compilation and overview.

UNIT 2:

Lexical Analysis (scanner): Regular languages, finite automata, regular expressions, from regular expressions to finite automata, scanner generator (lex, flex).Syntax Analysis (Parser): Context-free languages and grammars, push-down automata, LL(1) gram-mars and top-down parsing, operator grammars, LR(O), SLR(1), LR(1), LALR(1) grammars and bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator (yacc, bison)

UNIT 3:

Semantic Analysis: Attribute grammars, syntax directed definition, evaluation and flow of attribute in a syntax tree.
Symbol Table: Its structure, symbolattributes and management. Run-time environment: Procedure activation, parameter passing, value return, memory allocation, and scope. Intermediate Code Generation: Translation of different language features, different types of intermediate forms.

UNIT 4:

Code Improvement (optimization): Analysis: control-flow, data-flow dependence etc.; Code improvement local optimization, global optimization, loop optimization, peep-hole optimization etc. Architecture dependent code improvement:
instruction scheduling (for pipeline), loop optimization (for cache memory) etc. Register allocation and target code generation

UNIT 5:

Advanced topics: Type systems, data abstraction,compilation of Object Oriented features and non-imperative programming languages.

TEXT BOOKS:

1. Compilers Principles, Techniques and Tools, Alfred Aho, Ravi Sethi, Jeffrey D Ullman, Pearson Education Asia, 2nd Edition, 2013.
2. Compiler Design in C, Allen I Holub, Prentice Hall of india, 2006.

REFERENCES:

1. Engineering a compiler, Keith Cooper and linda Torczon, 2nd edition, 2011.
2. Introduction to Compiler Techniques, Bennet.J.P, Tata McGraw-Hill, 2007.
3. Lex & Yacc, John R.Levine, Tony Mason, Doug Brown, 2nd Edition (October 1992) O'Reilly & Associates.
4. Compiler Construction: Principles and Pratice, Kenneth c.Louden, Thomson Learning, 2006.

WEBSITES:

1. http://www.tenouk.com/ModuleW.html/
2. http://www.mactech.com/articles/mactech/Vol.06/06.04/Lexical Analysis/index.html

LABORATORY:

COURSE OUTCOMES:

- Upon the completion of Compiler Design practical course, the student will be able to:
- Understand the working of lex and yacc compiler for debugging of programs.
- Understand and define the role of lexical analyzer, use of regular expression and transition diagrams.
- Understand and use Context free grammar, and parse tree construction.
- Learn & use the new tools and technologies used for designing a compiler.
- Develop program for solving parser problems.
- Learn how to write programs that execute faster.

List of Experiments

1. Symbol table
2. Lexical analysis recognize in c
3. Lexical analyzer using lex tool
4. Generate yacc specification for a few syntactic categories: Arithmetic expression that uses operator +,-,* and /.
5. Letter followed by any number of letters or digits
6. Calculator using lex and yacc
7. BNF rules into YACC
8. Type Checking
9. Control flow analysis and data flow analysis
10. Implementation of any one storage allocation strategies(heap, stack, static)
11. Construction of DAG
12. Implement the back end of the compiler
13. Simple code optimization

B.E-CSE **2018-2019**

18BECS642 **COMPUTER NETWORKS** **3H-5C**

Instruction Hours/week: L:3 T:0 P:4 **Marks:** Internal:**40** External:**60** Total:**100**

End Semester Exam:3 Hours

THEORY:

COURSE OBJECTIVES:

- To develop an understanding of modern network architectures from a design and performance perspective.
- To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
- To provide an opportunity to do network programming
- To provide a WLAN measurement ideas.

COURSE OUTCOMES:

Upon Completion of the course the student will be able to

- Explain the functions of the different layer of the OSI Protocol.
- Draw the functional block diagram of wide-area networks(WANs), local area networks(LANs) and Wireless LANs (WLANs).
- Develop the network programming for a given problem related TCP/IP protocol.
- Configure DNS DDNS,TELNET, EMAIL, File Transfer Protocol(FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.
- Explain the types of transmission media with real time applications
- Implement any topology using network devices

UNIT 1:

Data communication Components: Representation of data and its flow Networks , Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.

UNIT 2:

Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA

UNIT 3:

Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

UNIT 4:

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

UNIT 5:

Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography

TEXT BOOKS:

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw- Hill.
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.

REFERENCES:

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.

LABORATORY:

COURSE OBJECTIVES:

- Understand fundamental underlying principles of computer networking
- Understand details and functionality of layered network architecture
- Apply mathematical foundations to solve computational problems in computer networking
- Utilizing Network tools and simulator

COURSE OUTCOMES:

- Understands computer networking concepts and vocabulary
- Understands the concept of protocols
- Has received experience with real implementations of the concepts

LIST OF EXPERIMENTS

1. Implementation of Sliding Window Protocol.
2. Study of Socket Programming and Client - Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Create a socket for HTTP for web page upload and download.
6. Write a program to implement RPC (Remote Procedure Call)
7. Implementation of Subnetting .
8. Applications using TCP Sockets like Echo client and echo server
9. Applications using TCP and UDP Sockets like File Transfer
10. Study of Network simulator (NS3), Wireshark

18BECC704 **BIOLOGY** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To convey that biology is an important and scientific discipline as Mathematics, Physics and Chemistry
- To convey the underlying criterion, such as morphological, biochemical or ecological concepts
- To convey that "Genetics is to biology what Newton's laws are to Physical Sciences".
- To convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine.
- The molecular basis of coding and decoding genetic information is universal.

COURSE OUTCOMES:

- Describe how biological observations of 18th Century that lead to major discoveries. Convey that classification per se is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological
- Highlight the concepts of recessiveness and dominance during the passage of genetic material
- from parent to offspring
- Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine
- Classify enzymes and distinguish between different mechanisms of enzyme action. Identify DNA as a genetic material in the molecular basis of information transfer. Analyze biological processes at the reductionistic level
- Apply thermodynamic principles to biological systems. Identify and classify microorganisms.

UNIT 1: Introduction **(9)**

Purpose: To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18th Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.

UNIT 2: Classification **(9)**

Purpose: To convey that classification per se is not what biology is all about. The underlying criterion, such as morphological, biochemical or ecological be highlighted. Hierarchy of life forms at phenomenological level. A common thread weaves this hierarchy Classification. Discuss classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and

Carbon utilisation -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitata- acquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. musculus

UNIT 3:Genetics **(9)**

Purpose: To convey that " Genetics is to biology what Newton's laws are to Physical Sciences" Mendel's laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.

UNIT 4: Biomolecules **(9)**

Purpose: To convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.

UNIT 5: Enzymes **(9)**

Purpose: To convey that without catalysis life would not have existed on earth

Enzymology: How to monitor enzyme catalysed reactions. How does an enzyme catalyse reactions? Enzyme classification. Mechanism of enzyme action. Discuss at least two examples. Enzyme kinetics and kinetic parameters. Why should we know these parameters to understand biology? RNA catalysis.

TEXT BOOKS:

1. Biology: A global approach: C a mp be ll, N. A. ; Reec e, J. B. ; Ur r y, L is a ; Ca in, M, L. ; Was ser ma n, S . A. ; Mino rsk y, P . V. ; Ja c kso n, R. B. Pearson Education Ltd
2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H.
John Wiley and Sons

REFERENCES:

1. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
2. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
3. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C.
Brown Publishers

COMPUTER SCIENCE AND ENGINEERING

PROFESSIONAL ELECTIVES

B.E-CSE **2018-2019**

18BECS5E01 **ADVANCED DATA STRUCTURES** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To extend the students' knowledge of algorithms and data structures
- To enhance their expertise in algorithmic analysis and algorithm design techniques.
- Expected to learn a variety of useful algorithms and techniques
- able to apply those algorithms and techniques to solve problems □

COURSE OUTCOMES:

- Solve problems using the procedural, functional, and object-oriented programming paradigms.
- Relates all binary heap trees to form a large binomial queue for large data structures creation.
- Analyze how to balance a binary search tree using rotation methods and color changing methods
- Solve problems using graph algorithms, including single-source and all-pairs shortest paths, and minimum spanning tree algorithms.
- Analyze the time and space complexity of advanced data structures and their supported operations
- Compare the time and space tradeoff of different advanced data structures and their common operations

UNIT I Fundamentals **(9)**

Asymptotic Notations – Properties of Big-oh Notation –Conditional Asymptotic Notation – Algorithm Analysis – Amortized Analysis – Introduction to NP-Completeness/NP-Hard – Recurrence Equations – Solving Recurrence Equations

UNIT II Heap Structures **(9)**

Priority Queues-Min/Max heaps – Leftist Heaps – Binomial Heaps – Fibonacci Heaps – Skew Heaps – lazy Binomial Heaps.

UNIT III Trees **(9)**

Counting Binary Trees-Huffman coding – Red-Black trees – Multi-way Search Trees –B-Trees – Splay Trees – Tries.

UNIT IV Set & Graph Algorithms **(9)**

Set ADT- Union & Find data structure and Applications- Graph traversals-DFS, BFS, Bi connected components, Cut vertices, Graph Matching, Network flow Problems

UNIT V Geometric Algorithms **(9)**

Segment Trees – 1-Dimensional Range Searching - k-d Trees – Line Segment Intersection – Convex Hulls - Computing the Overlay of Two Subdivisions - Range Trees – Voronoi Diagram.

Total Hours: 45

TEXT BOOKS:

1. T. Cormen, C. Leiserson, R. Rivest, C. Stein, Introduction to Algorithms, Prentice-Hall India, 2009.
2. Ellis Horowitz, Sartaj Sahni, Susan Anderson Freed, Fundamentals of Data Structures in C, Second Edition, University Press, 2008

REFERENCES:

1. Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, Data Structures using C and C++, Second Edition, PHI Learning Private Limited, 2010
2. Anany Levitin, Introduction to The Design & Analysis of Algorithms, Pearson Education, 3rd Edition, New Delhi, 2014.
3. Aho Hopcroft and Ullman, "Data Structures and Algorithms, Pearson Education, 4th Edition,2009.

B.E-CSE **2018-2019**

18BECS5E02 ADVANCED COMPUTER ARCHITECTURE 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To do an advanced study of the Instruction Set Architecture, Instruction Level Parallelism with hardware and software approaches, Memory and I/O systems and different multiprocessor architectures with an analysis of their performance
- To study the ISA design, instruction pipelining and performance related issues.
- To do a detailed study of ILP with dynamic approaches.
- To do a detailed study of ILP with software approaches.
- To study the different multiprocessor architectures and related issues.
- To study the Memory and I/O systems and their performance issues.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Demonstrate concepts of parallelism in hardware/software
- Understand the Concept of Parallel Processing and its applications
- Analyze the performance of different multiprocessor and multi-core architectures
- Develop the Pipelining Concept for a given set of Instructions
- Discuss memory organization and mapping techniques
- Describe architectural features of advanced processors.

UNIT I Pipelining and ILP

Fundamentals of Computer Design - Measuring and Reporting Performance - Instruction Level Parallelism and Its Exploitation - Concepts and Challenges - Overcoming Data Hazards with Dynamic Scheduling – Dynamic Branch Prediction - Speculation - Multiple Issue Processors – Case Studies.

UNIT II Advanced Techniques for Exploiting ILP (9)

Compiler Techniques for Exposing ILP - Limitations on ILP for Realizable Processors - Hardware versus Software Speculation - Multithreading: Using ILP Support to Exploit Thread-level Parallelism - Performance and Efficiency in Advanced Multiple Issue Processors - Case Studies.

UNIT III Multiprocessors (9)

Symmetric and distributed shared memory architectures – Cache coherence issues - Performance Issues – Synchronization issues – Models of Memory Consistency - Interconnection networks –

Buses, crossbar and multi-stage switches.

UNIT IV Multi-Core Architectures (9)

Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture – IBM cell architecture.- hp architecture.

UNIT V Memory Hierarchy Design (9)

Introduction - Optimizations of Cache Performance - Memory Technology and Optimizations - Protection: Virtual Memory and Virtual Machines - Design of Memory Hierarchies - Case Studies.

Total Hours: 45

TEXT BOOKS:

1. John L. Hennessey and David A. Patterson, Computer Architecture A Quantitative Approach, Morgan Kaufmann, New York 2006

REFERENCES:

1. Sima D, Fountain.T, and Kacsuk.P, Advanced Computer Architectures A Design Space Approach, Addison Wesley, New York. 2005
2. Kai Hwang, Advanced computer architecture Parallelism Scalability Programmability, Tata McGraw Hill, New Delhi2004
3. Vincent P.Heuring, Harry F.Jordan, Computer System Design and Architecture, Addison Wesley, New York. 2008
4. William Stallings, Computer Organization and Architecture – Designing for Performance, Pearson Education, Seventh Edition 2006

B.E-CSE **2018-2019**

18BECS5E03 **DESIGN PATTERNS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To Understand the concept of Design patterns and their importance
- To Understand the behavioral knowledge of the problems and their solutions
- To Relate the Creational, Structural , behavioral Design patterns
- To Apply the suitable design patterns to refine the basic design for given context

COURSE OUTCOMES:

Upon Completion of this course the student will be able to

- Identify the appropriate design patterns to solve object-oriented design problems
- Develop design solutions using creational patterns
- Able to design various types of patterns
- Apply structural patterns to solve design problems
- Construct design solutions using behavioral patterns
- Construct a design consisting of a collection of modules

UNIT I INTRODUCTION (9)

History and Origin of Patterns – Applying Design Patterns – Prototyping –Testing.

UNIT II DESIGN PATTERNS (9)

Kinds of Pattern – Quality and Elements – Patterns and Rules – Creativity and Patterns– Creational Patterns – Structural Patterns – Behavioral Patterns, Factory Patterns

UNIT III FRAMEWORKS (9)

State and Strategy of Patterns. Singleton, Composite, Functions and the Command Patterns, Adaptor, Proxy Pattern, Decorator Pattern – Pattern Frameworks and Algorithms.

UNIT IV CATALOGS (9)

Pattern Catalogs and Writing Patterns, Patterns and Case Study

UNIT V ADVANCED PATTERNS (9)

Anti-Patterns - Case Studies In UML and CORBA, Pattern Community

Total Hours: 45

TEXT BOOKS:

1. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, Design Patterns: Elements of Reusable Object-oriented Software, Pearson Education, 2015

2. James W- Cooper, Java Design Patterns – A Tutorial, Addison-Wesley, 2015

REFERENCES:

1. Craig Larman, Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and the unified, Process, Pearson Education India, 2014
2. Mowbray, Inside CORBA, Pearson Education India, 2014

B.E-CSE **2018-2019**

18BECS5E04 **ADVANCED DATABASES** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To Introduce and describe current and emerging database models and technologies.
- To Design and implement relational database solutions for general applications.
- To Explain the query processing and techniques involved in query optimization
- To Explain common database administration tasks, such as database monitoring, performance tuning, data transfer, and security.
- To Understand the concepts, current practices and issues of data warehouses and databases.

COURSE OUTCOMES:

Upon Completion of this course the student will be able to

- Know recent developments and current trend in database models.
- Develop applications for various relational databases
- Learn and optimize query processing techniques
- Evaluate designs and architectures for databases and data warehouses
- Analyze and develop tools for current issues in databases
- Organize strategic data in an enterprise and build a data Warehouse

UNIT I Relational Model Issues

ER Model – Normalization – Query processing – Query optimization – Transaction processing – Concurrency control – Recovery – Database tuning.

UNIT II Distributed Databases (9)

Parallel databases – Inter and intra query parallelism – Distributed database features – Distributed database architecture – Fragmentation – Distributed query processing – Distributed transactions processing – Concurrency control – Recovery – Commit protocols

UNIT III Object Oriented Databases (9)

Introduction to object oriented databases – Approaches – Modeling and design – Persistence – Query languages – Transaction – Concurrency – Multi version locks – Recovery – POSTGRES – JASMINE – GEMSTONE – ODMG model.

UNIT IV Emerging Systems (9)

Enhanced data models – Client/Server model – Data warehousing and data mining – Web databases – Mobile databases – XML and web databases.

UNIT V Current Issues (9)

Rules – Knowledge bases – Active and deductive databases – Multimedia databases – Multimedia data structures – Multimedia query languages – Spatial databases.

Total Hours: 45

TEXT BOOKS:

1. Thomas Connolly and Carlolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Pearson Education 2009.

REFERENCES:

1. R. Elmasri, S.B.Navathe, "Fundamentals of Database Systems", 6th Edition,Pearson Education, 2011.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 6 Edition, Tata McGraw Hill, 2010.
3. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8 Edition, Pearson Education, 2006.

B.E-CSE **2018-2019**

18BECS5E05 **ADVANCED OPERATING SYSTEMS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To learn the advance concepts of Operating Systems
- To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols
- To gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols
- To know the components and management aspects of Real timeand Mobile operating systems

COURSE OUTCOME:

Upon Completion of the course, the students will be able to:

- Discuss the various synchronization, scheduling and memory management issues
- Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
- Discuss the various resource management techniques for distributed systems
- Identify the different features of real time and mobile operating systems
- Install and use available open source kernel
- Modify existing open source kernels in terms of functionality or features used

UNIT I FUNDAMENTALS OF OPERATING SYSTEMS (9)

Overview – Synchronization Mechanisms – Processes and Threads - Process Scheduling – Deadlocks: Detection, Prevention and Recovery – Models of Resources – Memory Management Techniques.

UNIT II DISTRIBUTED OPERATING SYSTEMS (9)

Issues in Distributed Operating System – Architecture – Communication Primitives – Lamport's Logical clocks – Causal Ordering of Messages – Distributed Mutual Exclusion Algorithms – Centralized and Distributed Deadlock Detection Algorithms – Agreement Protocols.

UNIT III DISTRIBUTED RESOURCE MANAGEMENT (9)

Distributed File Systems – Design Issues - Distributed Shared Memory – Algorithms for Implementing

Distributed Shared memory–Issues in Load Distributing – Scheduling Algorithms – Synchronous and Asynchronous Check Pointing and Recovery – Fault Tolerance – Two-Phase Commit Protocol – Nonblocking Commit Protocol – Security and Protection.

UNIT IV REAL TIME AND MOBILE OPERATING SYSTEMS (9)

Basic Model of Real Time Systems - Characteristics- Applications of Real Time Systems – Real Time Task Scheduling - Handling Resource Sharing - Mobile Operating Systems – Micro Kernel Design - Client Server Resource Access – Processes and Threads - Memory Management – File system.

UNIT V CASE STUDIES (9)

Linux System: Design Principles - Kernel Modules - Process Management Scheduling – Memory Management - Input-Output Management - File System - Interprocess Communication. iOS and Android: Architecture and SDK Framework - Media Layer - Services Layer - Core OS Layer – File System.

Total Hours: 45

TEXT BOOK:

1. Mukesh Singhal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2001.

REFERENCES:

1. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "Operating System Concepts", Seventh Edition, John Wiley & Sons, 2004.
2. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005.
3. Rajib Mall, "Real-Time Systems: Theory and Practice", Pearson Education India, 2006.
4. Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", Fourth Edition, Payload media

B.E- CSE **2018-2019**

18BECS5E06 **C# and .NET** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To Learn the technologies of the .NET framework
- To Know the object oriented aspects of C#
- To Understand concepts of assemblies, interfaces and collections
- To apply application development in ADO.NET
- Learn web based applications on .NET(ASP.NET)

COURSE OUTCOMES:

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

- List the major elements of .NET framework
- Explain how C# fits into the .NET platform
- Analyze and apply the concepts of assemblies, interfaces and collections
- Develop, debug, compile and run simple applications of C#
- Implement applications in ADO.NET
- To develop Assemblies and Deployment in .NET, Mobile Application Development.

UNIT I Introduction (9)

Overview of .NET – Advantages of .NET over the other languages – Overview of .NET binaries – Intermediate Language – Metadata – .NET Namespaces – Common language runtime – Common type system – Common language specification – C# fundamentals – C# class – object – string formatting – Types – scope – Constants – C# iteration – Control flow – Operators – Array – String – Enumerations – Structures – Custom namespaces – Object oriented programming concepts –Class – Encapsulation – Inheritance – Polymorphic – Casting.

UNIT II Assemblies (9)

Assemblies – Versioning – Attributes – Reflection – Viewing metadata – Type discovery – Reflecting on a type –Marshaling – Remoting – Understanding server object types – Specifying a server with an interface – Building a server – Building the client – Exception handling – Garbage collector.

UNIT III Interfaces and Collections (9)

Interfaces and collections – Enumerator – Cloneable objects – Comparable objects – Collections – Indexes – Delegates – Events – Multithreaded programming. Programming with windows form controls – Windows form control Hierarchy – Adding controls – TextBox – CheckBoxes – RadioButtons – GroupBoxes – ListBoxes – ComboBoxes – TrackBar – Calender – Spin Control – Panel – ToolTips –ErrorProvider – Dialog Boxes.

UNIT IV IO Namespace and ADO .NET (9)

Input and output – Introduction to System. IO .namespace – File and folder operations – Stream class – Introduction to ADO .NET – Building data table – Data view – Data set – Data relations – ADO.NET managed providers – OleDb managed provider – SQL.

UNIT V ASP .NET and Web Services (9)

Web development and ASP.NET – Web applications and web servers – HTML form development – Client side scripting – GET and POST – ASP.NET application – ASP.NET namespaces – creating sample C# web Applications. Understanding Web Security – Windows authentication – Forms authentication – Web services – Web services – Web service clients – The City View application.

Total Hours: 45

TEXT BOOK:

1. Andrew Troelsen, "C# and the .NET Platform", A! Press, 6th edition, 2012.

REFERENCE:

1. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 3rd edition,2008.

B.E-CSE **2018-2019**

18BECS5E07 **SERVLETS AND JSP** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Write servlets using the Java programming language (Java servlets)
- Understand and manage HTTP sessions in a web application
- Create servlet filters and listeners
- Write pages created with Java Server Pages technology (JSP pages)
- Create easy-to-maintain JSP pages using the Expression Language and the JSP Standard Tag Library (JSTL)
- Use integrated development environments (IDEs) and application servers for Java EE development and deployment

COURSE OUTCOMES:

- Construct and deploy small-to-medium scale web applications found in intranet and low-volume commercial sites by using JavaServer Page (JSP page) technology and servlets.
- Apply Model-View-Controller (MVC) architecture to projects in EE environments.
- Create servlet filters and listeners.
- Understand and manage HTTP sessions in a web application.
- Create easy-to-maintain JSP pages using Expression Language and the JSP Standard Tag Library (JSTL).
- Analyze, design, develop and deploy web applications with Java EE 6 SDK and the application server Oracle WebLogic Server

UNIT I SERVLETS

(9)

Web Application - Java Servlets - Servlet Lifecycle - Servlet Context - Session management - Building the first Servlet - Deploying the Servlet

UNIT II INTRODUCTION TO JSP (9)

Introduction to Java Server Pages - Features of JSP - Basic HTML Tags - JSP Tag library - JSP Page Life cycle - Developing a Simple Java server Page - - JSP Processing Model - Comments and Character Coding - MVC architecture - 3-tier architecture - Advantages of JSP over competing technologies

UNIT III JSP SCRIPTING ELEMENTS AND DIRECTIVES (9)

Forms of Scripting Elements - Predefined Variables - Examples using Scripting Elements - JSP Directives - JSP Page Directive - JSP Include Directive

UNIT IV JSP ACTIONS AND CUSTOM TAGS (9)

JSP Actions - include Action - forward Action - plugin Action - Java Beans - Bean Related – Actions - Custom Tag - Types of Tags - Creating Custom Tags

UNIT V ADVANCE CUSTOM TAGS AND JSTL (9)

Introduction - Using Simple Tag - Using tag files - JSP Standard Tag Library – purpose JSTL - Using Expression Language - Using JSTL

Total Hours: 45

TEXT BOOKS:

1. Mahesh P. Matha, "JSP and Servlets: A Comprehensive Study", Prentice-Hall of India Pvt.Ltd, 2013.
2. Joel Murach and Michael Urban," Murachs Java Servlets & JSP ", 3rd Edition, 2014.
3.Giulio Zambon" Beginning JSP, JSF and Tomcat: Java Web Development", Apress Kindle edition, 2012.

REFERENCES:

1. Santosh Kumar K , "Jdbc, Servlets, And Jsp Black Book", Dreamtech Press , New edition 2008.
2. Panduranga, S.N., Goyal, "Beginning Jsp 2", Springer/A Press ,Edition1,2004.
3. Phil Hanna, "The Complete reference JSP 2.0", Tata McGraw-Hill Education, 2003.

WEBSITES:

1. www.jsptut.com/
2. www.**tutorial**spoint.com/**jsp**/
3. www.javatpoint.com/**jsp-tutorial**

B.E-CSE **2018-2019**

18BECS5E08 **USER INTERFACE DESIGN** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To study the concept of menus, windows, interfaces.
- To study about business functions.
- To study the characteristics and components of windows.
- To study the various controls for the windows.
- To study about various problems in windows design with color, text, graphics
- To implement the basics and in-depth knowledge about UID. It enables the students to take up the design the user interface, design, menu creation and windows creation and connection between menu and windows.

COURSE OUTCOMES:

Upon Completion of the course, the students will be able:

- To demonstrate knowledge of some theories of design of user interfaces
- To demonstrate knowledge of different interaction styles
- To analyze a user interface from a communication perspective
- To demonstrate an awareness of the relation between interaction design and user expectations.
- To design the user interface, design, menu creation and windows creation and connection between menu and windows.
- To study the Testing Methods.

UNIT- I Introduction (9)

Introduction- Importance-Human-Computer interface-characteristics of graphics interface-Direct manipulation graphical system - web user interface-popularity-characteristic & principles.

UNIT- II UI Design Process (9)

User interface design process- obstacles-usability-human characteristics in design - Human interaction speed-business functions-requirement analysis-Direct-Indirect methods-basic business functions-Design standards-system timings - Human consideration in screen design - structures of menus - functions of menus-contents of menu-formatting -phrasing the menu - selecting menu choice-navigating menus-graphical menus.

UNIT- III UI Controls (9)

Windows: Characteristics-components-presentation styles-types-managements-organizations-operations-web systems-device-based controls: characteristics-Screen -based controls: operate control - text boxes-selection control-combination control-custom control-presentation control.

UNIT- IV Web Page Designing (9)

Text for web pages - effective feedback-guidance & assistance-Internationalization-aaccessibility-Icons-Image-Multimedia -coloring.

UNIT- V UI Tests (9)

Windows layout-test: prototypes - kinds of tests - retest - Information search - visualization - Hypermedia - www - Software tools.

Total Hours: 45

TEXT BOOKS:

1. Wilbent. O. Galitz, The Essential Guide to User Interface Design, John Wiley& Sons, 2007

REFERENCES:

1. Ben Sheiderman, Design the User Interface, Pearson Education, 5th edition,2010
2. Alan Cooper, The Essential of User Interface Design, Wiley – Dream Tech Ltd,2002

B.E-CSE **2018-2019**

18BECS6E01 **INTERNET OF THINGS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the basics of Internet of Things
- To get an idea of some of the application areas where Internet of Things can be applied
- To understand the middleware for Internet of Things
- To understand the concepts of Web of Things
- To understand the concepts of Cloud of Things with emphasis on Mobile cloud computing
- To understand the IOT protocols

COURSE OUTCOMES:
Upon completion of the course, the students will be able to:

- Understand the concepts of Internet of Things
- Identify and design the new models for various applications using IoT
- Design business intelligence and information security for WoB (Web of Things)
- Analyze various protocols for IoT
- Design a middleware for IoT
- Analyze and design different models for network dynamics

UNIT I INTRODUCTION (10)

Definitions and Functional Requirements –Motivation – Architecture - Web 3.0 View of IoT– Ubiquitous IoT Applications – Four Pillars of IoT – DNA of IoT - The Toolkit Approach for End-user Participation in the Internet of Things. Middleware for IoT: Overview – Communication middleware for IoT –IoT Information Security

UNIT II IOT PROTOCOLS (8)

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security

UNIT III WEB OF THINGS (10)

Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing – Cloud Middleware – Cloud

Standards
– Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture

UNIT IV INTEGRATED (9)

Integrated Billing Solutions in the Internet of Things Business Models for the Internet of Things - Network Dynamics: Population Models – Information Cascades - Network Effects - Network Dynamics: Structural Models - Cascading Behavior in Networks - The Small-World Phenomenon

UNIT V APPLICATIONS (8)

The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things: Clustering, Synchronisation and Software Agents. Applications - Smart Grid – Electrical Vehicle Charging

Total Hours: 45

TEXT BOOK:

1. The Internet of Things in the Cloud: A Middleware Perspective - Honbo Zhou – CRC Press – 2012

REFERENCES:

1. Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles-(Eds.) – Springer – 2011
2. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press - 2010
3. The Internet of Things: Applications to the Smart Grid and Building Automation by - Olivier Hersent, Omar Elloumi and David Boswarthick - Wiley -2012
4. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key applications and Protocols", Wiley, 2012

B.E-CSE **2018-2019**

18BECS6E02 **NETWORK ROUTING ALGORITHMS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To expose the students to the layered architecture for communication networks
- To discuss specific functionality of the network layer.
- To enable the student to understand the basic principles of routing and implementation in conventional networks and the evolving routing algorithms based on Internetworking requirements, optical backbone and the wireless access part of the network.
- To enable the student to understand the different routing algorithms existing and their performance characteristics.

COURSE OUTCOMES:

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

- Understand layered architecture and its significance.
- Learn network layer and various routing techniques available.
- Apply knowledge for identifying a suitable routing algorithm ,implementing it and analyzing its performance for any given network and user requirements and the type of channel over which the network has to operate,
- Design a new algorithm or modify an existing algorithm to satisfy the evolving demands in the network and by the user applications.
- Compare Routing techniques and protocols.
- Acquire the knowledge of how data transfer happen in conventional networks.

UNIT I Introduction (7)

ISO OSI Layer Architecture, TCP/IP Layer Architecture, Functions of Network layer, General Classification of routing, Routing in telephone networks, Dynamic Non hierarchical Routing (DNHR), Trunk status map routing (TSMR), real-time network routing (RTNR), Distance vector routing, Link staterouting, Hierarchical routing.

UNIT II Internet Routing (10)

Interior protocol : Routing Information Protocol (RIP), Open Shortest Path First(OSPF), Bellman Ford Distance Vector Routing. Exterior Routing Protocols: Exterior Gateway Protocol (EGP) and Border Gateway Protocol (BGP). Multicast Routing: Pros and cons of Multicast and Multiple Unicast Routing, Distance Vector Multicast Routing Protocol (DVMRP), Multicast Open Shortest Path First (MOSPF), MBONE, Core Based Tree Routing.

UNIT III Routing In Optical Wdm Networks (10)

Classification of RWA algorithms, RWA algorithms, Fairness and Admission Control, Distributed Control Protocols, Permanent Routing and Wavelength Requirements,Wavelength Rerouting-Benefits and Issues, Lightpath Migration, Rerouting Schemes, Algorithms- AG, MWPG.

UNIT IV Mobile - IP Networks (9)

Macro-mobility Protocols, Micro-mobility protocol:Tunnel based : Hierarchical Mobile IP, Intra domain Mobility Management, Routing based: Cellular IP, Handoff Wireless Access Internet Infrastructure (HAWAII).

UNIT V Mobile Ad –Hoc Networks (9)

Internet-based mobile ad-hoc networking communication strategies, Routing algorithms – Proactive routing: destination sequenced Distance Vector Routing (DSDV), Reactive routing: Dynamic Source Routing (DSR), Ad hoc On-Demand Distance Vector Routing (AODV), Hybrid Routing: Zone Based Routing (ZRP).

Total Hours: 45

TEXT BOOKS:

1. William Stallings, „High speed networks and Internets Performance and Quality of Service", 2nd Edition, Pearson Education Asia. Reprint India 2002
2. M. Steen Strub, „Routing in Communication network, Prentice –Hall International, Newyork, 1995.

REFERENCES:

1. S. Keshav, „An engineering approach to computer networking" Addison Wesley 1999.
2. William Stallings, „High speed Networks TCP/IP and ATM Design Principles, Prentice-Hall, New York, 1995
3. C.E Perkins, „Ad Hoc Networking", Addison – Wesley, 2001
4. Ian F. Akyildiz, Jiang Xie and Shantidev Mohanty, "A Survey of mobility Management in Next generation-All IP- Based Wireless Systems", IEEE Wireless Communications Aug.2004, pp 16-27.
5. A.T Campbell et al., "Comparison of IP Micro mobility Protocols," IEEE Wireless Communications Feb.2002, pp 72-82.
6. C.Siva Rama Murthy and Mohan Gurusamy, " WDM Optical Networks – Concepts, Design and Algorithms", Prentice Hall of India Pvt. Ltd, New Delhi –2002.

18BECS6E03 **DISTRIBUTED COMPUTING** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the fundamentals and acquire knowledge of the architectures of distributed systems.
- To gain knowledge of various remote procedure call models.
- To understand concepts of distributed shared memory systems.
- To make students aware about synchronization and management mechanism for distributed environment.
- To learn features of distributed file systems.

COURSE OUTCOMES:

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

- Understand the principles and desired properties of distributed systems based on different application areas.
- Understand and apply the basic theoretical concepts and algorithms of distributed systems in problem solving.
- Learn the concepts of distributed shared memory systems.
- Analyze various synchronization and management techniques for distributed environment.
- Identify the features of distributed file systems.
- An ability to understand the security aspect of distributed systems.

UNIT I Fundamentals (9)

What is distributed computing systems – Evolution of distributed computing systems – Distributed computing system models – What is distributed operating system – Issues in designing distributed operating systems. Message passing – Features of a good message-passing system – Issues in IPC by message passing – Synchronization –Buffering – Multidatagram messages – Encoding and decoding of message data – Failure handling – Group communication.

UNIT II Remote Procedure Calls (9)

RPC Models –Transparency of RPC – Implementing RPC mechanism – Stub generation – RPC messages –Marshaling arguments & results – Server Management – Parameter-passing semantics – Call semantics – Communication protocols for RPCs – Complicated RPCs – Client server binding – Security – Special types of RPCs – Light weight RPC.

UNIT III Distributed Shared Memory (9)

General architecture of DSM systems – Design & implementation issues of DSM – Granularity – Structure of shared memory space – Consistency models – Replacement strategy – Thrasing – Hetrogenous DSM – Advantages of DSM.

UNIT IV Synchronization and Management (9)

Synchronization – Clock synchronization – Mutual exclusion – Election algorithms – Deadlocks.- Resource Management – Task assignment approach – Load balancing approach – Load sharing approach - Process Management – Process migration – Threads.

UNIT V Distributed File Systems (9)

Desirable features of a good distributed file system – File models – File accessing models – File sharing semantics – File caching schemes – File replications – Fault tolerance – Atomic transaction.

Total Hours: 45

TEXT BOOK:

1. Andrew S.Tanenbaum, and Steen, Maarten van, “Distributed Systems”, 2nd Edition, Prentice Hall of India, 2007

REFERENCES:

1. Pradeep K Sinha, ”Distributed Operating Systems, Concepts & Design”, Prentice Hall of India, 2009.
2. Andrew S.Tanenbaum, ”Distributed Operating Systems”, Prentice Hall of India, 2005.

B.E-CSE **2018-2019**

18BECS6E04 **VIDEO ANALYTICS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To learn various techniques for mining data streams.
- To understand the models used for recognition of objects in videos.
- To learn Event Modeling for different applications.
- To acquire the knowledge of extracting information from surveillance videos.

COURSE OUTCOMES:

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

- Work with big data platform and its analysis techniques.
- Understand the approaches for identifying and tracking objects and person with motion based algorithms.
- Understand the algorithms available for searching and matching in video content.
- Analyze approaches for action representation and recognition.
- Identify, Analyze and apply algorithms for developing solutions for real world problems.
- Design video analytic algorithms for business intelligence

UNIT I INTRODUCTION TO BIG DATA & DATA ANALYSIS (9)

Introduction to Big Data Platform – Challenges of Conventional systems – Web data- Evolution of Analytic scalability- analytic processes and tools- Analysis Vs Reporting- Modern data analytic tools- Data Analysis: Regression Modeling- Bayesian Modeling- Rule induction.

UNIT II MINING DATA STREAMS (9)

Introduction to Stream concepts- Stream data model and architecture – Stream Computing- Sampling data in a Stream- Filtering Streams- Counting distinct elements in a Stream- Estimating moments- Counting oneness in a window- Decaying window- Real time Analytics platform(RTAP) applications- case studies.

UNIT III VIDEO ANALYTICS (9)

Introduction- Video Basics - Fundamentals for Video Surveillance- Scene Artifacts - Object Detection and Tracking: Adaptive Background Modelling and Subtraction- Pedestrian Detection and Tracking- Vehicle Detection and Tracking- Articulated Human Motion Tracking in Low- Dimensional Latent Spaces

UNIT IV BEHAVIOURAL ANALYSIS & ACTIVITY RECOGNITION (9)

Event Modelling- Behavioural Analysis- Human Activity Recognition-Complex Activity Recognition- Activity modelling using 3D shape, Video summarization, shape based activity models- Suspicious Activity Detection

UNIT V HUMAN FACE RECOGNITION & GAIT ANALYSIS (9)

Introduction: Overview of Recognition algorithms – Human Recognition using Face: Face Recognition from still images, Face Recognition from video, Evaluation of Face Recognition Technologies- Human Recognition using gait: HMM Framework for Gait Recognition, View Invariant Gait Recognition, Role of Shape and Dynamics in Gait Recognition

Total Hours: 45

TEXT BOOK:

1. Michael Berthold, David J.Hand, Intelligent Data Analysis, Springer, 2007.

REFERENCES:

1. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.
2. Yunqian Ma, Gang Qian, “Intelligent Video Surveillance: Systems and Technology”, CRC Press (Taylor and Francis Group), 2009.
3. Rama Chellappa, Amit K.Roy-Chowdhury, Kevin Zhou.S, “Recognition of Humans and their Activities using Video”, Morgan&Claypool Publishers, 2005.

B.E-CSE **2018-2019**

18BECS6E05 **WIRELESS SENSOR NETWORKS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the concepts of wireless sensor networks.
- To learn how to program sensor nodes
- To understand the medium access protocol and address the physical layer issues.
- To learn network and transport layer protocols for sensor networks and design requirements.
- To understand the middleware and security issues of wireless sensor networks.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Apply knowledge of wireless sensor networks to various application areas.
- Design, implement and maintain wireless sensor networks.
- Define medium access layer issues.
- Address the transport protocol design issues.
- Design the efficient routing algorithm
- Analyze the security issues in wireless sensor networks

UNIT I Fundamentals of Sensor Networks (9)

Introduction and Overview - Overview of sensor network protocols, architecture, and applications, Challenges, Main features of WSNs; Research issues and trends, Platforms-Standards and specifications-IEEE802.15.4/Zigbee, Hardware: Telosb, Micaz motes ,Software: Overview of Embedded operating systems-Tiny OS, Introduction to Simulation tools- TOSSIM, OPNET, Ns-2.

UNIT II Communication Characteristics and Deployment Mechanisms (9)

Wireless Communication characteristics - Link quality, fading effects, Shadowing, Localization, Connectivity and Topology - Sensor deployment mechanisms, Coverage issues, Node discovery protocols.

UNIT III Mac Layer (9)

Fundamentals of Medium access protocol- Medium access layer protocols - Energy efficiency, Power allocation and Medium access control issues.

UNIT IV Network Layer and Transport Layer (9)

Network layer protocols-Data dissemination and processing, multichip and cluster based routing

protocols- Energy efficient routing- Geographic routing, Transport layer- Transport protocol Design issues- Performance of Transport Control Protocols.

UNIT V Middleware and Security Issues (9)

Middleware and Application layer -Data dissemination, Data storage, Query processing, Security - Privacy issues, Attacks and Countermeasures

Total Hours :45

TEXT BOOKS:

1. Waltenegus Dargie, Christian Poellabauer , "Fundamentals of Wireless Sensor Networks, Theory and Practice", Wiley Series on wireless Communication and Mobile Computing, 2010.
2. Kazem Sohraby, Daniel manoli , "Wireless Sensor networks- Technology, Protocols and Applications", Wiley InderScience Publications, 2010.

REFERENCES:

1. Bhaskar Krishnamachari , " Networking Wireless Sensors", Cambridge University Press, 2011.
2. C.S Raghavendra, Krishna M.Sivalingam, Taieb znati , "Wireless Sensor Networks", Springer Science, 2006.

B.E-CSE **2018-2019**

18BECS6E06 SERVICE ORIENTED ARCHITECTURE 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To gain knowledge of the basic concepts of SOA, comparison with older architectures and principles of service orientation.
- To learn about web services, messaging with SOAP and different layers of SOA.
- To learn about advanced concepts such as Orchestration and Choreography.
- To learn about various service-oriented analysis and design.
- To know about various WS- specification standards.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Obtain knowledge on basic concepts of SOA and how it differs with other architectures.
- Gain knowledge on advanced concepts of service composition, Orchestration and Choreography.
- Understand web service framework with respect to SOA.
- Acquire knowledge on various open standards available for developing SOA compliant web services.
- Design and implement Web based services using ASP.NET
- Appreciate the concept of Standards and Security on SOA.

UNIT I Introduction (9)

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation

UNIT II Services (9)

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer

UNIT III Analysis (9)

Service oriented analysis – Business-centric SOA – Deriving business services - service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task- centric business service design

UNIT IV SOA (9)

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

UNIT V WS (9)

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WS- Security

Total Hours: 45

TEXT BOOKS:

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2nd edition, 2016.
2. Judith Hurwitz, Robin Bloor, "Service Oriented Architecture for Dummies", Willey Publications, 2nd edition, 2009

REFERENCES:

1. Nicolai M. Josuttis, " SOA-The Art of Distributed System Design", O"Reily Publications, 2009.
2. Douglas K. Barry, " Web Services, Service Oriented Architecture and Cloud Computing", Elsevier Publicaions, 2nd Edition, 2013.

18BECS6E07 SOFTWARE PROJECT MANAGEMENT 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the concepts of software process and its models
- To understand software metrics and measurement.
- To learn quality assurance and various tools used in quality management.
- To learn in detail about various quality assurance models.
- To understand the audit and assessment procedures to achieve quality.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Understand in the context of software development projects, what approaches exist to manage the issues
- Identify the fundamental issues that a project manager has to consider, and describe, chiefly in the context of software development projects, what approaches exist to manage these issues
- Identify and analyze software project activities using contemporary work breakdown techniques
- Identify and apply selected techniques for estimating the effort and duration of project activities
- Construct a schedule of project activities using contemporary planning techniques
- Construct a quality model for a software development project, including identification of suitable quality attributes, suitable metrics for measuring these, and suitable threshold values for these metrics to indicate acceptable quality

UNIT I Software Process and People Management (9)

Process Maturity – Capability Maturity Model (CMM) – Variations in CMM - Productivity improvement process. Organization structure – Difficulties in people management - Effective team building – Role of Project manager - Team structures – Comparison of different team structures.

UNIT II Software Metrics (9)

Role of metrics in software development - Project metrics – Process metrics – Data gathering - Analysis of Data for measuring correctness, integrity, reliability and maintainability of Software products.

UNIT III Project Management (9)

Project initiation – Feasibility study - Planning - Estimation - Resource allocation - Root Cause Analysis.

UNIT IV Risk Management (9)

Risk analysis and management - Types of Risk involved - RMM plan.

UNIT V Project Scheduling and Tracking Software Configuration Management (9)

Scheduling - Critical path – Tracking - Timeline chart – Earned value chart. Baselines - Software

configuration items - The SCM process- Version control- Change control -Configuration audit - SCM standards.

Total Hours:45

TEXT BOOK:

1. Pankaj Jalote, "Software Project Management in practice", Pearson Education, New Delhi, 2002.

REFERENCES:

1. Roger S Pressman, "Software Engineering, A Practitioner‟s Approach" McGraw Hill Edition, New Delhi, 8th edition, 2014.
2. Watts Humphrey, "Managing the Software Process ", Pearson Education, New Delhi, 2000.

B.E-CSE **2018-2019**

18BECS6E08 TCP / IP DESIGN AND IMPLEMENTATION 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the IP addressing schemes.
- To learn the fundamentals of network design and implementation
- To understand the design and implementation of TCP/IP networks
- To learn the network management issues
- To understand the design and implement network applications.

COURSE OUTCOME:

Upon completion of this course, the students will be able to:

- Design and implement TCP/IP networks.
- Explain network management issues.
- Develop data structures for basic protocol functions of TCP/IP.
- Apply the members in the respective structures.
- Design and implement data structures for maintaining multiple local and global timers.
- Able to solve network management issues.

UNIT- I INTRODUCTION (9)

Internetworking concepts and architectural model- classful Internet address – CIDR-Subnetting and Supernetting –ARP- RARP- IP – IP Routing –ICMP – Ipv6

UNIT- II TCP (9)

Services – header – connection establishment and termination- interactive data flow- bulk data flow- timeout and retransmission – persist timer - keepalive timer- futures and performance

UNIT- III IP IMPLEMENTATION (9)

IP global software organization – routing table- routing algorithms-fragmentation and reassembly- error processing (ICMP) –Multicast Processing (IGMP)

UNIT- IV TCP IMPLEMENTATION I (9)

Data structure and input processing – transmission control blocks- segment format- comparison-finite state machine implementation-Output processing- mutual exclusion-computing the TCP data length

UNIT- V TCP IMPLEMENTATION II (9)

Timers-events and messages- timer process- deleting and inserting timer event- flow control and

adaptive retransmission-congestion avoidance and control – urgent data processing and push function.

Total Hours:45

TEXT BOOK:

1. Douglas E.Comer, Internetworking with TCP/IP Principles Protocols and Architecture (4th edition), Pearson Education Asia, 2006

REFERENCES:

1. Forouzan, TCP/IP protocol suite (2nd Edition), TMH, 2005
2. W.Richard Stevens, TCP/IP illustrated, Pearson Education, 2003

B.E-CSE **2018-2019**

18BECS7E01 **MANAGING BIG DATA** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To explore the fundamental concepts of big data analytics
- To learn and analyze big data like Hadoop, NoSql MapReduce.
- To understand the various search methods and visualization techniques.
- To learn the techniques and principles in achieving big data analytics with scalability and streaming capability
- To learn Hive and Pig scripts in the Hadoop environment.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Gain knowledge of Big Data and Hadoop ecosystem
- Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics.
- Interpret business models and scientific computing paradigms, and apply software tools for big data analytics.
- Design and implement MapReduce programs and implementing HBase
- Implement Hive and Pig scripts in the Hadoop Environment.
- Discuss the Challenges and Solutions in Big Data.

UNIT I **Introduction to Big Data** **(9)**

Introduction to BigData Platform –Challenges of Conventional Systems -Intelligent data analysis – Nature of Data -Analytic Processes and Tools -Analysis vs Reporting-Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions -Re-Sampling -Statistical Inference -Prediction Error.

UNIT II **Mining Data Streams** **(9)**

Introduction To Streams Concepts –Stream Data Model and Architecture -Stream Computing - Sampling Data in a Stream –Filtering Streams –Counting Distinct Elements in a Stream –Estimating Moments –Counting Oneness in a Window –Decaying Window -Real time Analytics Platform(RTAP)Applications -Case Studies -Real Time Sentiment Analysis, Stock Market Predictions.

UNIT III **Hadoop** **(9)**

History of Hadoop-The Hadoop Distributed File System –Components of Hadoop-Analyzing the Data with Hadoop-Scaling Out-Hadoop Streaming-Design of HDFS-Java interfaces to HDFSBasics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort –Task execution -Map Reduce Types andFormats-Map Reduce Features

UNIT IV **Hadoop Environment** **(9)**

Setting up a Hadoop Cluster -Cluster specification -Cluster Setup and Installation –Hadoop Configuration-Security in Hadoop -Administering Hadoop –HDFS -Monitoring-Maintenance-Hadoop bench marks-Hadoop in the cloud

UNIT V Frameworks (9)

Applications on Big Data Using Pig and Hive–Data processing operators in Pig –Hive services – HiveQL –Querying Data in Hive-fundamentals of HBase and ZooKeeper -IBM InfoSphere BigInsights and Streams. Visualizations-Visual data analysis techniques, interaction techniques;Systems and applications.

Total Hours: 45

TEXT BOOKS:

1. Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoopand Streaming Data, Tata McGraw Hill Publications, 2011
2. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing,2012

REFERENCES:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Tom White, " Hadoop: The Definitive Guide", Third Edition, O"reilly Media, 2012.
3. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", JohnWiley & sons, 2012.
4. Glenn J. Myatt, "Making Sense of Data", John Wiley & Sons, 2007
5. PeteWarden, "Big Data Glossary", O"Reilly, 2011.
6. Paul Zikopoulos ,Dirk deRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles David Corrigan , Harness the Power of Big Data -The IBM Big Data Platform, Tata McGraw HillPublications, 2012
7. Michael Minelli, Michele Chambers, Ambiga Dhiraj, Big Data, BigAnalytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses,WileyPublications,2013

B.E-CSE **2018-2019**

18BECS7E02 **AD-HOC NETWORK** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To learn Ad-Hoc Wireless Networks, Issues, and Classification of MAC Protocols.
- To understand the different types of AdHoc Routing Protocols and TCP over AdHoc Protocol.
- To understand about Sensor Network Architecture, its Applications and MAC Protocols for sensor networks.
- To learn the Different Issues in Wireless Sensor Routing and also Indoor and outdoor Localization and Quality of Service in WSN.
- To learn Mesh Networks , IEEE 802.11s Architecture and different types of Mesh Networks

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Gain the knowledge of Ad-Hoc Network and its issues.
- Identify the basic problems, limitations, strengths and current trends of mobile computing
- Analyze the current wireless networking mechanisms for mobile computing
- Analyze and critique the performance of different networks and algorithms for mobile Computing
- Develop an attitude to propose solutions with comparisons for problems related to mobile computing
- Investigation of different protocols and mobile/wireless networks

UNIT I Ad-Hoc MAC (9)

Issues in Ad-Hoc Wireless Networks. MAC Protocols – Issues, Classifications of MAC protocols, Multi channel MAC & Power control MAC protocol.

UNIT II Ad-Hoc Network Routing & TCP (9)

Issues – Classifications of routing protocols – Hierarchical and Power aware. Multicast routing – Classifications, Tree based, Mesh based. Ad Hoc Transport Layer Issues. TCP Over Ad Hoc – Feedback based, TCP with explicit link, TCP-Bus, Ad Hoc TCP, and Split TCP.

UNIT III WSN –MAC (9)

Introduction – Sensor Network Architecture, Data dissemination, Gathering. MAC Protocols – self-organizing, Hybrid TDMA/FDMA and CSMA based MAC.

UNIT IV WSN Routing, Localization & QOS (9)

Issues in WSN routing – OLSR, AODV. Localization – Indoor and Sensor Network Localization. QoS in WSN.

UNIT V Mesh Networks (9)

Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture – Opportunistic routing – Self configuration and Auto configuration – Capacity Models – Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks.

Total Hours: 45

TEXT BOOK:

1. C.Siva Ram Murthy and B.Smanoj, " Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2011.

REFERENCES:

1. Feng Zhao and Leonidas Guibas, "Wireless Sensor Networks", Morgan Kaufman Publishers, 2004.
2. C.K.Toh, "Ad Hoc Mobile Wireless Networks", Pearson Education, 2002.
3. Thomas Krag and Sebastin Buettrich, "Wireless Mesh Networking", O"Reilly Publishers, 2007

B.E-CSE **2018-2019**

18BECS7E03 **CLOUD COMPUTING** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To learn the basic concepts of cloud computing.
- To learn types of cloud services and its applications.
- To understand the key components of Amazon Web Services.
- To collaborate with real time cloud services.
- To understand the security risk and application of cloud computing.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Define basic concepts of cloud computing.
- Use and Examine different cloud computing services.
- Understand and appreciate the technological impact of service and cloud computing for future enterprises, and the technologies underpinning it.
- Describe importance of virtualization along with their technologies
- Analyze the key components of Amazon web Service
- Review and assess the risks, opportunities, costs and steps towards migrating existing systems to service and cloud computing.

UNIT- I Cloud Introduction (9)

Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , usage scenarios and Applications, Business models around Cloud – Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus – Open Nebula, CloudSim.

UNIT-II Cloud Services and File System (9)

Types of Cloud services **:** Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services. Service providers - Google App Engine, Amazon EC2, Microsoft Azure, Sales force. Introduction to MapReduce, GFS, HDFS, Hadoop Framework.

UNIT-III Collaborating with Cloud (9)

Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing ,Databases – Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis.

UNIT-IV Virtualization for Cloud (9)

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT-V Security, Standards, and Applications (9)

Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

Total Hours: 45

TEXT BOOK:

1. John Rittinghouse & James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press, 2010.

REFERENCES:

1. Bloor R., Kanfman M., Halper F. Judith Hurwitz "Cloud Computing for Dummies" (Wiley India Edition), 2010.
2. Antohy T Velte , Cloud Computing : "A Practical Approach", McGraw Hill,2009.
3. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.
4. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006

B.E-CSE **2018-2019**

18BECS7E04 INFORMATION SECURITY 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the basics of Information Security and its model.
- To learn the legal, ethical and professional issues in Information Security
- To understand the need of risk management and risk control.
- To study the critical need for ensuring Information Security in Organizations.
- To learn the security policy, standards and security analyzing tools.

COURSE OUTCOMES:
Upon completion of this course, the students will be able to:

- Analyze the appropriate techniques to tackle and solve problems in the discipline of information security management.
- Gain the knowledge of security and its management for any modern organization.
- Develop an understanding of security policies to implement, such policies in the form of message exchanges.
- Develop security management system should be planned, documented, implemented and improved, according to the security standard on information security management.
- Use and Examine the threats by security analysis tools
- Understand the CIA triad of Confidentiality, Integrity and Availability

UNIT I Introduction (9)

History, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC.

UNIT II Security Investigation (9)

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III Security Analysis (9)

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV Logical Design (9)

Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity

UNIT V Physical Design (9)

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel

Total Hours: 45

TEXT BOOK:

1. Michael E Whitman and Herbert J Mattord. “Principles of Information Security”, Second Edition, Vikas Publishing House, New Delhi, 2003.

REFERENCES:

1. Micki Krause, Harold F. Tipton,“ Handbook of Information Security Management”, Auerbach Publications, 4th edition,2012.

2. Stuart Mc Clure, Joel Scrambray, George Kurtz, “Hacking Exposed”, Tata McGraw-Hill, 7th edition, 2012.

B.E-CSE **2018-2019**

18BECS7E05	**DEVOPS**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To learn basics of DevOps and its components.
- To understand Configuration Management, Continuous Integration and Continuous Deployment, Continuous Delivery, Continuous Monitoring using DevOps tools-Git, Docker, Jenkins, Puppet and Nagios in practical, hands on and interactive approach.
- To understand automated testing and test-driven approach by various tool.
- To learn to create containers and dockers using different tools.
- To Understand continuous integration with Teamcity and jekins.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Analyze devOps and the modern devOps toolset
- Ability to automate all the aspects of a modern code delivery and deployment pipeline
- Use Source code management tools, build tools, Test automation tools using DevOps tools-Git, Docker, Jenkins, Puppet and Nagios for analysis
- Create containers and dockers using different tools.
- Configuring management tools.
- Integrate various module with Teamcity and Jekins.

Unit-1: Introduction to Devops

What is DevOps? What are its components? Agile and DevOps: How do they inter-relate?-An understanding of DevOps-An understanding of the technical challenges in DevOps- An understanding of security issues-An understanding of the difference between requirements and architecture-How to write user acceptance tests-Hands on Projects/Tools covered: 1. Setup of the cloud environment. Demo is done with Google cloud, but devOps is agnostic of cloud type (AWS, Azure and GCP will all function the same way) 2. Tools: GCP/AWS/Azure

Unit-2: Managing source code and automating builds

How to manage change by setting up and using a source control system-How to automate the process of assembling software components with build tools-How to automate the building of the whole system with continuous integration tools-The major differences between popular tools: CVS, SVN, and Git-How to use Eclipse editor, Advantages of the Eclipse editor-Hands on Projects/Tools covered: 1. Concepts: Ticketing, Subversion, Using GIT, Java Profiling 2. Jenkins and Git 3. Tools Covered: SCCS and CVS, Subversion, Git, Maven, Make, JaCoCo, Ant, jUnit for Unit test, SonarQube, Sqale, Structure 101 4. Hands on: Setup of Java sample program, Maven, path setup, Run Maven goals, Eclipse

Unit- 3: Automated testing and Test driven development

Principles of Test Driven Development-Benefits of Integrated Development Environments-How to perform Test Driven Development-Code quality-How to utilize code quality analysis tools-Hands on

Projects/Tools covered: 1. Concepts: TDD Origins, IDEs, TDD, Approach, Behavior Driven Development, Code Quality Principles, Code Analysis Tools 2. Tools Covered: Eclipse, Intellij, Visual Studio, Xcode, xUnit, SQALE, SonarQube, JaCoCo 3. Hands on: Complete setup of the automated test environment and running it.

Unit-4: Containerization using Docker

What are containers? Why are they used?-Introduction to Docker?-Image distribution and Docker containers?-Creating and managing remote docker instances?-Understanding Docker Networking, Volumes and Files-Hands on Projects/Tools covered: 1. Concepts: Docker containers,image creation and docker instance handling, Docker networking,volumes and files 2. Tools Covered: Docker 3. Hands on: Working on Docker containers, images, and registry

Unit-5: Continuous integration

Continuous integration with Team city-Integration of Eclipse with Teamcity-Continuous integration with Jenkins

TEXT BOOKS:

1. Joakim Verona , Practical DevOps, Packt Publishing Limited, 2016

REFERENCES:

1. John Allspaw , Gene Kim**,** The Devops Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations, IT Revolution Press, 2016.
2. Karl Matthias, Docker: Up and Running, Shroff, 2015

B.E-CSE **2018-2019**

18BECS8E01 **SEMANTIC WEB** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the basic concepts and layers of semantic web.
- To learn RDF data models and querying the semantic web using SPARQL
- To learn Ontology Engineering, construction and reusing.
- To understand the description logics and monotonic rules.
- To learn Social Network Analysis and semantic web

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Describe the rationale behind Semantic Web.
- Model ontologies using Resource Description Framework (RDF).
- Design RDF Schemas for ontologies.
- Model and design ontologies using Web Ontology Language (OWL).
- Query ontologies using SPARQL.
- Apply Semantic web technologies to real world applications.

UNIT I Introduction (9)

History – Semantic web layers –Semantic web technologies – Semantics in semantic web – XML: Structuring – Namespaces – Addressing – Querying-Processing XML.

UNIT II Rdf and Querying the Semantic Web (9)

RDF data model-syntaxes-Adding semantics -RDF schema-RDF and RDF schema in RDF schema-An axiomatic semantics for RDF and RDF schema-Querying the semantic web-SPARQL-Basics-Filters-Constructs-Organizing result sets-Querying schemas.

UNIT III Ontology (9)

Introduction – Ontology movement – OWL – OWL specification - OWL elements – OWL constructs: Simple and complex – Ontology engineering: Introduction – Constructing ontologies – Reusing ontologies – On-To-Knowledge semantic web architecture

UNIT IV Logic and Inference (9)

Logic – Description logics - Rules – Monotonic rules: syntax, semantics and examples – Non-monotonic rules – Motivation, syntax, and examples – Rule markup in XML: Monotonic rules - Non-Monotonic rules

UNIT V Applications of Semantic Web Technologies (9)

Good relations-BBC artists-BBC world cup 2010 website-Government data, Newyork times-Sigma and sindiceopen Calais-schema.org-Future of semantic web

Total Hours - 45

TEXT BOOKS:

1. Grigorous Antoniou and Van Hermelen, A Semantic Web Primer. New Delhi: The MIT Press, 2012.
2. James Hendler, Henry Lieberman and Wolfgang Wahlster, Spinning the Semantic Web: Bringing the World Wide Web to its full potential. New Delhi: The MIT Press, 2005.

REFERENCES:

1. Shelley Powers, Practical RDF. Mumbai: O‟reilly publishers, 2009
2. Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, Foundations of Semantic Web Technologies, Chapman & Hall/CRC, 2009

B.E-CSE **2018-2019**

18BECS8E02 **E- COMMERCE** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the basic concepts of E-commerce and its values.
- To learn key features of Internet, Intranets and Extranets and explain how they relate to each other
- To understand web servers, protocol and EC software.
- To obtain the knowledge of online security issues to assess existing websites.
- To understand the web-based marketing and its advantages

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Demonstrate an understanding of the foundations and importance of E-commerce.
- Describe the infrastructure required for E-commerce.
- Describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.
- Analyze the online threats and strategies for marketing.
- Discuss legal issues and privacy in E-Commerce.
- Demonstrate the use of a social media technology in a business or government application

UNIT I INTRODUCTION (9)

Traditional commerce and E commerce – Internet and WWW – role of WWW – value chains – strategic business and Industry value chains – role of E commerce.

UNIT II INFRASTRUCTURE FOR E COMMERCE (9)

Packet switched networks – TCP/IP protocol script – Internet utility programmes – SGML, HTML and XML – web client and servers – Web client/server architecture – intranet and extranets.

UNIT III WEB BASED TOOLS FOR E COMMERCE (9)

Web server – performance evaluation - web server software feature sets – web server software and tools – web protocol – search engines – intelligent agents –EC software – web hosting – cost analysis

UNIT IV SECURITY (9)

Computer security classification – copy right and Intellectual property – electronic commerce threats – protecting client computers – electronic payment systems – electronic cash – strategies for marketing – sales and promotion – cryptography – authentication.

UNIT V INTELLIGENT AGENTS (9)

Definition and capabilities – limitation of agents – security – web based marketing – search engines and Directory registration – online advertisements – Portables and info mechanics – website design issues.

Total Hours - 45

TEXT BOOKS:

1. Ravi Kalakota, " Electronic Commerce", Pearson Education,
2. Gary P Schneider "Electronic commerce", Thomson learning & James T Peny Cambridge USA, 2001.
3. Manlyn Greenstein and Miklos "Electronic commerce" McGraw-Hill, 2002.

REFERENCES:

1. Efraim Turvan J.Lee, David kug and chung, "Electronic commerce" Pearson Education Asia 2001.
2. Brenda Kienew E commerce Business Prentice Hall, 2001.

B.E-CSE **2018-2019**

18BECS8E03 HUMAN COMPUTER INTERACTION 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OUTCOMES:

- To understand the concepts relating to the design of human-computer interfaces in ways making computer-based systems comprehensive, friendly and usable.
- To understand the theoretical dimensions of human factors involved in the acceptance of computer interfaces.
- To understand the important aspects of implementation of human-computer interfaces.
- To identify the various tools and techniques for interface analysis, design, and evaluation.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Analyze the key aspects of human psychology which can determine user actions at and satisfaction of the interface.
- Describe the key design principles for user interfaces.
- Set up and carry out a process to gather requirements for, engage in iterative design of, and evaluate the usability of a user interface.
- Describe how user interface development can be integrated into an overall software development process.
- Understanding of the ethical issues involved in testing user interfaces.
- Apply Human Computer Interface in real time applications

UNIT I Design Process **(9)**

Humans – Information Process – Computer – Information Process – Differences and Similarities – Need for Interaction – Models – Ergonomics – Style – Context – Paradigms – Designing of Interactive Systems – Usability – Paradigm shift – Interaction Design Basics – Design Process – Scenarios – Users Need –Complexity of Design

UNIT II Design and Evaluation of Interactive Systems **(9)**

Software Process – Usability Engineering – Issue based Information Systems – Iterative Design Practices – Design Rules – Maximum Usability – Principles – Standards and Guidelines – Design Patterns – Programming Tools – Windowing Systems – Interaction Tool Kit – User Interface Management System – Evaluation Techniques – Evaluation Design – Evaluating Implementations – Observational Methods.

UNIT III Models **(9)**

Universal Design Principles – Multimodal Systems – User Support – Presentation and Implementation Issues – Types – Requirements – Approaches – Cognitive Model – Hierarchical Model – Linguistic Model – Physical and Device Models – Socio technical Models – Communication and Collaboration Models – Task Models – Task Analysis And Design.

UNIT IV Experimental Design and Statistical Analysis of HCI (9)

Basic Design Structure – Single Independent Variable – Multiple Independent Variable – Factorial Design – Split-Plot Design – Random Errors – Experimental Procedure – Statistical Analysis – T Tests – Analysis of Variance Test – Regression – Chi-Square Test – Survey – Probabilistic Sampling – Non-Probabilistic Sampling – Developing Survey Questions.

UNIT V Theories (9)

Dialogue Notations and Design – Dialogue Need – Dialogue Design Notations – Graphical – Textual - Representing Dialogue – Formal Descriptions – Dialogue Analysis – System Models – Interaction Models – Relationship with Dialogue – Formalisms – Formal Notations – Interstitial Behavior – Virtual Reality – Modeling Rich Interaction – Status Event Analysis – Properties – Rich Contexts – Sensor-based Systems – Groupware – Applications – Ubiquitous Computing – Virtual Reality

Total Hours:45

TEXT BOOKS:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, “Human Computer Interaction”, Third Edition, Prentice Hall, 2004.

REFERENCES:

1. Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, “Research Methods in Human Computer Interaction”, Wiley, 2010.
2. Ben Shneiderman and Catherine Plaisant, “Designing the User Interface: Strategies for Effective Human-Computer Interaction”, Fifth Edition, Addison-Wesley Publishing Co,2010.

18BECS8E04 NATURAL LANGUAGE PROCESSING 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the various levels of analysis involved in NLP.
- To learn language modeling.
- To gain knowledge in automated natural language generation and machine translation.
- To understand the concepts of information Retrieval and Lexical resource.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to:

- Compose key NLP elements to develop higher level processing chains
- Assess / Evaluate NLP based systems
- Choose appropriate solutions for solving typical NLP sub problems (tokenizing, tagging, parsing)
- Describe the Machine translation approaches.
- Gain knowledge in design features in information retrieval and lexical analysis techniques.
- Analyze Natural Language Processing in real time application

UNIT I Overview and Language Modeling (9)

OVERVIEW**:** Origins and challenges of NLP- Language and Grammar- Processing Indian Languages-NLP Applications-Information Retrieval.

LANGUAGE MODELING: Introduction-Various Grammar-based Language Models-Statistical Language Model.

UNIT II Word Level and Syntactic Analysis (9)

WORD LEVEL ANALYSIS: Introduction- Regular Expressions-Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction-Words and Word classes-Part-of Speech Tagging. SYNTACTIC ANALYSIS: Introduction-Context-free Grammar-Constituency-Parsing-Probabilistic Parsing.

UNIT III Semantic Analysis and Discourse Processing (9)

SEMANTIC ANALYSIS: Introduction- Meaning Representation-Lexical Semantics- Ambiguity-Word Sense Disambiguation. DISCOURSE PROCESSING: Introduction- cohesion-Reference Resolution- Discourse Coherence and Structure.

UNIT IV Natural Language Generation and Machine Translation (9)

NATURAL LANGUAGE GENERATION**:** Introduction-Architecture of NLG Systems-Generation Tasks and Representations-Application of NLG.MACHINE TRANSLATION: Introduction-Problems in Machine Translation- Characteristics of Indian Languages- Machine Translation Approaches-Translation involving Indian Languages.

UNIT V Information Retrieval and Lexical Resources (9)

INFORMATION RETRIEVAL**:** Introduction -Design features of Information Retrieval Systems-Classical, Non-classical, Alternative Models of Information Retrieval – Evaluation. LEXICAL

RESOURCES**:** Introduction-WordNet-FrameNet-Stemmers-POS Tagger- Research Corpora.

Total Hours: 45

TEXT BOOKS:

1. Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retrieval", Oxford University Press, 2008.

REFERENCES:

1. Daniel Jurafsky and James H Martin, "Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", Prentice Hall, 2nd Edition, 2008.
2. James Allen, Bejamin/cummings, "Natural Language Understanding", 2nd edition, 1995.

B.E-CSE **2018-2019**

18BECS8E05 **DIGITAL MARKETING** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To learn strategic understanding of Digital Marketing
- To understand how to use optimize the search engine
- To learn marketing and tracking metrics
- To learn how digital marketing use social media and strategies for digital marketing.
- Manage Reporting & Tracking Metrics
- Understand the future of Digital Marketing and prepare for it

Upon completion of this course, the students will be able to

- Define and outline key concept related to digital marketing
- Categorize digital marketing concepts including e-business models, e-consumer behaviour, online marketing communications, website design and social media marketing.
- Critically assess the role that digital marketing can play in business strategy
- Develop tactical decisions concerning effective product, pricing, distribution and promotion decisions in digital marketing
- Reflect on the practical implementation of a digital marketing strategy from a critical and evaluative perspective
- Develop applications like email marketing, display advertising, mobile marketing, strategy & planning

Unit-1: Introduction to Digital Marketing

Strategies in Digital Marketing-Aligning Internet with Business Objectives-Examples of Great Case Studies-User Behaviour & Navigation-Branding & User Experience

Unit-2: Search Engine Optimisation

Stakeholders in Search-C ustomer Insights-O n & off-page Optimisation-Meta Tags, Layout, Content Ppdates-Inbound Links & Link Building

Unit-3: Search Marketing and Web Site Analytics

Campaign Management-Conversion Tracking-Targeting & Analytics-Keyword Selection-Conversion Metrics: CPA, CTR, Goal Configuration &Funnels-Intelligence Reporting-Conversions, Bounce Rate, Traffic Sources, Scheduling etc

Unit-4: Social Media

What is Social Media Marketing?-Overview of Facebook, Twitter,LinkedIn, Blogging, Youtube and Flickr Building Brand Awareness Using Social Media, Social Media Management-Insights and Analytics-Best Practice Examples & case Studies

Unit-5: Email Marketing, Display advertising, Mobile Marketing, Strategy & Planning

User Behaviour-Segmentation, Key Metrics-Best Practice Case Studies-Split Testing-Campaign Process Optimisation, SMS Strategy-Mobile Advertising - Mobile Optimized Websites-7 Step Process for Mobile Apps • Proximity Marketing -Strategic Steps -Review & Testing, Tracking your

Campaign -Optimizing the Campaign- Campaign Planning -Running Effective Ads, Situation Analysis, Planning, Budget, Measurement - Information Gathering & Research - Key Strategy & Planning Concepts & Methodologies - Best Practice Case Studies.

TEXT BOOKS:

1. Ian Dodson , The Art of Digital Marketing Hardcover, 2016.
2. Sudhir Sreedharan, Digital Marketing Paperback – Import, 2015

REFERENCES:

- Akins Homlon, Quickwin Digital Marketing - Answers To Your, 2012.
- Philip Kotler , Marketing 4.0: Moving from Traditional to Digital Hardcover, 2017.

OPEN ELECTIVES OFFERED BY
SCIENCE AND HUMMANITIES

B.E-CSE **2018-2019**

18BESHOE01 **SOLID WASTE MANAGEMENT** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To make the students conversant with basics of Solid wastesand its classification.
- To make the student acquire sound knowledge of different treatments of solid wastes.
- To acquaint the student with concepts of waste disposals.
- To develop an understanding of the basic concepts of Hazardous waste managements.
- To acquaint the students with the basics of energy generation from waste materials.
- To make the students conversant with the types, sources, generation, storage, collection, transport, processing solid waste.

COURSE OUTCOMES:

- Outline the basic principles of Solid waste and separation of wastes (K)
- Identify the concepts of treatment of solid wastes(S)
- Identify the methods of wastes disposals.(S)
- Examine the level of Hazardousness and its management. (S)
- Examine the possible of the energy production using waste materials. (S)
- Integrate the chemical principles in the projects undertaken in field of engineering and technology (A)

UNIT I SOLID WASTE

Definitions – Sources, Types, Compositions, Properties of Solid Waste – Municipal Solid Waste – Physical, Chemical and Biological Property – Collection – Transfer Stations – Waste Minimization and Recycling of Municipal Waste

UNIT II WASTE TREATMENT

Size Reduction – Aerobic Composting – Incineration – batch type and continuous flow type, Medical/ Pharmaceutical Waste Incineration – Environmental Impacts – Measures of Mitigate Environmental Effects due to Incineration

UNIT III WASTE DISPOSAL

Sanitary Land Fill Method of Solid Waste Disposal – Land Fill Classficaition, Types, Methods &Siting Consideration – Layout & Preliminary Design of Land Fills – Composition, Characteristics generation, Movement and Control of Landfill Leachate & Gases – Environmental Monitoring System for Land Fill Gases, Waste landfill Remediation

UNIT IV HAZARDOUS WASTE MANAGEMENT

Definition & Identification of Hazardous Waste – Sources and Nature of Hazardous Waste – Impact on Environment – Hazardous Waste Control – Minimization and Recycling -Assessment of Hazardous Waste Sites – Disposal of Hazardous Waste, Underground Storage Tanks Construction, Installation & Closure, Remediaiton, risk assessment.

UNIT V ENERGY GENERATION FROM WASTE

Thermal conversion Technologies – Pyrolysis systems, Combustion systems, Gasification systems, Environment control systems, Energy recovery systems. Biological & Chemical conversion technologies – Aerobic composting, low solids.Anaerobic digestion, high solids anaerobic digestion, Energy production from biological conversion products, other biological transformation processes. Chemical transformation processes.

Total: 4

TEXT BOOKS:

1. Dara.S.S,Mishra.D.D, A Text book of Environmental Chemistry and Pollution Control, S.Chand and Company Ltd., New Delhi.2011.
2. Naomi B. Klinghoffer and Marco J. Castaldi,Waste to Energy Conversion Technology (Woodhead Publishing Series in Energy),Woodhead Publishing Ltd., Cambridge, UK,2013.

REFERENCES:

1. Frank Kreith, George Tchobanoglous,Hand Book of Solid Waste Management- 2nd edition, McGraw Hill Publishing Ltd., Newyork,2002.
2. Shah, L Kanti, Basics of Solid & Hazardous Waste Management Technology, Prentice Hall (P) Ltd.,New Delhi.1999.

WEBSITES:

1. www.iitk.ac.in/3inetwork/html/reports/IIR2006/Solid_Waste.
2. http://www.unep.or.jp/ietc/ESTdir/Pub/MSW/
3. www.alternative-energy-news.info/technology/garbage-energy/
   nzic.org.nz/ChemProcesses/environment/

B.E-CSE **2018-2019**

18BESHOE02 **GREEN CHEMISTRY** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To make the students conversant about the green chemistry
- To make the student acquire sound knowledge of the atom efficient process and synthesis elaborately.
- To acquaint the student with concepts of green technology.
- To develop an understanding of the basic concepts of renewable energy resources.
- To acquaint the students with the basics information on catalysis.
- To make the students to knowing various techniques in green chemistry based on Current needs.

COURSE OUTCOMES:

- Outline the basic principles of green chemistry (K)
- Examine the different atom efficient process and synthesis elaborately (S)
- Apply the concepts combustion of green technology (S)
- Identify and apply the concepts of renewable energy(S)
- Apply the concepts of green catalysts in the synthesis (S)
- Integrate the chemical principles in the projects undertaken in field of engineering and technology (A)

UNIT I INTRODUCTION TO GREEN CHEMICAL PRINCIPLES

Definition, tools, and twelve principles of green chemistry, solvent-less reactions and reactions in water, microwaves and fluorous solvents, green resolution of racemic mixtures, materials for a sustainable economy, chemistry of longer wear, agrochemicals: problems and green alternate solutions.

UNIT II ATOM EFFICIENT PROCESSES

Atom efficient processes, evaluating chemical reagents according to their yield and atom efficiency, examples of efficient stoichiometric and catalytic processes, atom economy and homogeneous catalysis, halide-free synthesis and alternatives to Strecker synthesis.

UNIT III BIOTECHNOLOGY AND GREEN CHEMISTRY

Bio technology and its applications in environmental protection-Bio informatics-Bio remediation, biological purification of contaminated air.Green chemistry for clean technology-Significance of green chemistry-Basic components of green chemistry, Industrial applications of green chemistry, green fuels-e-green propellants and bio catalysts.

UNIT IV RENEWABLE RESOURCES

Use of renewable materials, evaluating feedstock and starting materials and their origins, toxicity, sustainability and the downstream implications of the choice of feedstock, commodity chemicals from glucose and biomass conversion.

UNIT V CATALYSIS IN GREEN CHEMISTRY

Catalysis, energy requirements and usage, optimization of the reaction by minimizing the energy requirements, examples of efficient catalytic reactions including the use of heterogeneous catalysis, zeolites, oxidation using molecular oxygen.

Total: 45

TEXT BOOKS:

1. Sanjay K. Sharma, AckmezMudhoo,Green Chemistry for Environmental Sustainability,CRC Press , London,2010
2. Ahluwalia V. K. and M.Kidwai,New Trends in Green Chemistry 2nd edition,Anamaya publishers., New Delhi,2007.

REFERENCES:

1. Dr. SunitaRatan,A Textbook of Engineering Chemistry,S.K. Kataria and Sons., New Delhi.,2012.
2. MukeshDoble. Ken Rollins, Anil Kumar,Green Chemistry and Engineering, 1st edition, Academic Press, Elesevier., New Delhi.2007.
3. Desai K. R.,GreenChemistry, Himalaya Publishing House, Mumbai.,2005.
4. Matlack A. S.,Introduction to Green Chemistry.,Marcel Dekker: New York,2001.

WEBSITES:

1. http://www.organic-chemistry.org/topics/green-chemistry.shtm
2. http://www.essentialchemicalindustry.org/processes/green-chemistry.html
3. http://www.chm.bris.ac.uk/webprojects2004/vickery/green_solvents.htm
4. http://www.epa.gov/research/greenchemistry/
5. http://www.amazon.in/Green-Chemistry-Catalysis

B.E-CSE **2018-2019**

18BESHOE03 APPLIED ELECTROCHEMISTRY 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To make the students conversant with the information on electrochemical material.
- To make the student acquire sound knowledge of conducting polymers.
- To acquaint the student with concepts of Energy storage devices.
- To develop energy storage devices.
- To impart knowledge on basic principles of solar cells and its applications.
- To make the students with the dimension a leaching, solution purification and recovery process based on selected aims, such as yield, selectivity or residence time.

COURSE OUTCOMES:

- Outline the basic principles of chemistry in **electrochemical material (K)**
- Examine the properties of conducting polymers(S)
- Apply the concepts of electrochemistry in storage devices.(S)
- Identify the concepts of storage devices and its applications. (S)
- Apply the suitable materials for the manufacturing of storage devices. (S)
- Integrate the chemical principles in the projects undertaken in field of engineering and technology (A)

UNIT I METAL FINISHING

Fundamental principles, surface preparation-Electroplating of copper, nickel, chromium, zinc and precious metals (gold & silver)- Electroplating for electronic industry- Alloy plating, brass plating- Electro less plating of nickel- anodizing – Electroforming – Electro winning.

UNIT II CONDUCTING POLYMERS AND ELECTROCHEMICALS

lectropolymerisation- anodic and cathodic polymerization-effect of reaction parameters on the course of the reaction- Electrochemical preparation of conducting polymers- poly acetylene- Electrolytic production of perchlorates and manganese dioxide- Electro organic chemicals- constant current electrolysis.

UNIT III BATTERIES AND POWER SOURCES-I

Principles of energy conservation- electrochemical energy conservation- thermodynamic reversibility, Gibbs equation. EMF- battery terminology, energy and power density- Properties of anodes, cathodes, electrolytes and separators- Types of electrolytes.

UNIT IV BATTERIES AND POWER SOURCES-II

Primary batteries- Dry Leclanche cells, alkaline primary batteries, Lithium batteries- construction, characteristics, problems associated with system- Secondary batteries- Lead acid, nickel cadmium- Fuel cells- Introduction, types of fuel cells, advantages.

UNIT V ELECTROCHEMICAL MATERIAL SCIENCE

Solar cells- Preparation of CdS/Cu_2S solar cells by screen printing techniques and their characteristics - Amorphous silicon solar cells - Photo electrochemical cells(PEC) for conversion of light energy to electrical energy - PEC cells based on Cd/Se and Ga/As characteristics

TOTAL :45

TEXT BOOKS:

1. Cynthia G. Zoski,Hand Book of Electrochemistry,Academic Press, Elesevier., UK,2007.
2. D.Pletcher and F.C.Walsh,Industrial Electrochemistry,Chapman and Hall, London,1990.
3. M. Barak,Electrochemical Power Sources,I.EEE series, Peter Peregrinius Ltd, Steverage, U.K.1997.

REFERENCES:

1. Bruno Scrosati,Applications of Electroactive Polymers,Chapman & Hall, London,1993.
2. K.L. Chopra and I. Kaur,Thin Film Devices and their Application,Plenum Press, New York.1983.
3. M.M.Baizer,Organic Electrochemistry,Dekker Inc. New York,1983.

WEBSITES:

1. http://www.anoplate.com/finishes/
2. http://hyperphysics.phy-astr.gsu.edu/hbase/electric/battery.html
3. http://inventors.about.com/od/sstartinventions/a/solar_cell.htm

B.E-CSE **2018-2019**

18BESHOE04 INDUSTRIAL CHEMISTRY 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To make the students conversant with **cement and lime** and its uses.
- To make the student acquire sound knowledge of abrasives and refractories.
- To acquaint the student with concepts of inorganic chemicals.
- To develop an understanding of the basic concepts **explosives**.
- To acquaint the students with the basics of **agriculture chemicals**.

COURSE OUTCOMES:

- Outline the basic chemistry of **cement and lime (K)**
- Examine the uses of abrasives and refractories (S)
- Identify the usage of the inorganic chemicals. (S)
- Identify the concepts of explosives and smoke screens(S)
- Identify the usage of the **agriculture** chemicals(S)
- Integrate the chemical principles in the projects undertaken in field of engineering and technology (A)

UNIT I CEMENT AND LIME

Manufacture of Portland cement – settling of hardening of portland cement – regauging cement – effect of fineness on setting and hardening – freezing – high early strength cement – high alumina cement Lime – raw materials- manufacture – slaking – lime mortar – types of lime – high – calcium or fat lime – calcium lime or lean lime – magnesian lime – dolomitic lime – hydraulic lime.

UNIT II ABRASIVES AND REFRACTORIES

Abrasives – hard abrasives – siliceous abrasives – soft abrasives – artificial abrasives – uses. Refractories – definition – classification – acid refractories – basic refractories – neutral refractories – properties – uses.

UNIT IIIINORGANIC CHEMICALS

Common salt and soda ash – manufacture – different grades – products – alkalis – Na_2CO_3, caustic soda and chlor-alkali industry – manufacture principles of electrolytic process – chlorine – storage. Hydrochloric acid – manufacture – absorption – uses, sulphur and sulphuric acid – extraction of sulphur – manufacture of H_2SO_4 – chamber – contact processes – industrial uses.

UNIT IV EXPLOSIVES

Explosives – uses – properties and tests – explosives for war – nitrocellulose – picric acid and T.N.T. – industrial explosives – nitroglycerin and dynamites – black powder – smoke screens – incendiaries – gas mask.

UNIT V AGRICULTURE CHEMICALS

Fertilizers – organic and inorganic – ammoniated superphosphates, sodium nitrate, solid pellets – potassium salts – pesticides – fungicides – herbicides – their preparations and characteristics – environmental impacts.

Total: 45

TEXT BOOKS:

1. Harikrishan, ndustrial Chemistry, Goel Publishing House, Meerut.,2014.
2. B.K. Sharma, Industrial Chemistry, Goel Publishing House, Meerut.,2000.
3. B.N.Chakrabarty, Industrial Chemistry, Oxford and IBH Publishing CO. New Delhi.1998.

REFERENCES:

1. James A. Kent, Hand Book of Industrial Chemistry, 9th edition, Van Nostrand Reinhold, New York.1992.
2. R.N. Sherve, Chemical Process Industries, McGraw-Hill, Kugakuisha Ltd., Tokyo.1984.
3. S.D. Shukla and G.N. Pandy, A Text book of Chemical Technology, Vikas Publishing
4. House (P) Ltd, New Delhi.1979.

WEBSITES:

1. http://en.wikipedia.org/wiki/Cement
2. http://www.hon.ch/HONselect/Selection/D01.html
3. http://fas.org/man/dod-101/navy/docs/fun/part12.htm
4. http://toxics.usgs.gov/topics/agchemicals.html

B.E-CSE **2018-2019**

18BESHOE05 **TECHNICAL WRITING** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Develop abilities to write technically and expressively,
- Recognize writing as a constructive, meaningful process,
- Practice using reading strategies for effective writing.
- Design effective technical documents for both print and digital media
- Identify the qualities of good technical writing

COURSE OUTCOMES:

Students undergoing this course are able to

- Construct simple sentences, correct common grammatical errors in written English.
- Build confidence in English language by imbibing lexical and syntax rules.
- Enrich their reading ability for effective writing.
- Minimize word, sentence, and paragraph length without sacrificing clarity or substance
- Familiarize with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and presentation.
- Understand the basic components of definitions, descriptions, process explanations, and other common forms of technical writing.

UNIT – I BASICS OF WRITING

Introduction to Technical Writing – Importance of Writing – Characteristics of Writing– Audience Recognition/ Analysis – Appropriateness of language — Conciseness and Flow– Bias free and plain writing – Impersonal and Formal Language -Techniques of Technical Writing– Overcoming writer's block – Prioritizing for effective writing– Avoiding plagiarism.

UNIT – 2 PARAGRAPHS AND ESSAYS

Expressing Ideas – Paragraph construction – Cohesion and Coherence – Adequate development – Kinds of paragraphs – Writing drafts – Paragraph length and pattern – Types of Essays – Characteristics of Essays – Salient point of sentence constructions.

UNIT – 3 LETTERS, MEMOS AND EMAIL

Formal written correspondence – Types of messages – Business letters – Structure of letters – Language in letters – Tense in letters – Cover letters – Resumes – Curriculum vitae – Memos – Emails – Email Etiquette – Effectiveness and purpose.

UNIT – 4 THE ART OF CONDENSATION AND TECHNICAL PROPOSALS

Steps to Effective précis writing – Guidelines – Technical Proposals – Types of Proposals – Characteristics – Body of the Proposals – Style and appearance – Evaluation of proposals – Proof Reading – Book /Film Review – Travelogue – Dialogue Writing.

UNIT – 5 REPORTS AND RESEARCH ARTICLES

Discussion of newspaper articles -Objectives of Reports – Characteristics of Reports – Structure of Reports – Types of Reports – Writing an article – Writing research articles – Essential features of Dissertation – Organizing the structure of thesis and articles – Writing technical description.

TEXT BOOKS:

1. **V.N. Arora & Lakshmi Chandra, Improve Your Writing: Revised First Edition,** OUP, New Delhi. 2014.
2. David Morley, The Cambridge Intro. to Creative Writing, CUP, New Delhi.2010.

REFERENCES:

1. Graham King, Collins Improve Your Writing Collins; First edition, UK 2009
2. Crème, P. and M. Lea.Writing at University: A guide for students.OUP, New Delhi.2003

WEBSITES:

1. http://www.stevepavlina.com/blog/2006/08/10-ways-to-improve-your-technical-skills/http://www.nyu.edu/classes/keefer/brain/net2.html
2. https://www.udemy.com/technical-writing-and-editing/
3. http://techwhirl.com/what-is-technical-writing/

B.E-CSE **2018-2019**

18BESHOE06 **GEOPHYSICS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To inculcate the basics of brief history of Earth sciences (K)
- To divulge knowledge on the basics of structure of earth and earth's gravitational field.(S)
- To disseminate the fundamentals of magnetic field and thermal distribution of earth(K)
- To introduce the concepts of seismology and seismic waves (S) .
- To impart the basic knowledge of oceans (K)

COURSE OUTCOMES:

- Gain knowledge on the basics of history of Earth sciences.
- Acquire knowledge on concepts of structure of earth and earth's gravitational field.
- Have adequate knowledge on the concepts of magnetic field and thermal distribution of earth
- Obtain knowledge on the basics of seismic waves.
- Understand the basics of oceans and properties of sea water.
- Apply the knowledge gained from this course to solve the relevant propblems in engineering stream.

UNIT I ORIGIN OF EARTH

A brief history of the development of Earth Sciences . An overview of Geophysical methods and their essential features, Problems of inversion and non-uniqueness in Geophysics, Origin & evolution of Solar system, Earth and Moon structure,.Kepler's law of planetary motion, A review of the Earth's structure and composition

UNIT II STRUCTURE OF EARTH

Chemical composition of Earth, Rheological behavior of crust and upper mantle, viscoelasticity and rock failure criteria, Geochronology: Radiometric dating and their advantages, meaning of radiometric ages, Major features of the Earth's gravitational field and relationship with tectonic processes in the crust and upper mantle, concept of isostasy, mathematical concept of Airy and Pratt hypotheses of isostasy

UNIT III MAGNETIC FIELD AND THERMAL DISTRUBUTION OF EARTH

Origin of geomagnetic field, polar wandering, secular variations and westward drift, reversals of geomagnetic field, sun spot, solar flares, geomagnetic storms, sea-floor spreading, Paleomagnetism and its uses, Thermal history of the Earth, sources of heat generation and temperature distribution inside the earth, convection in the mantle

UNIT IV SEISMOLOGY

Earthquake seismology, Earthquakes and its classifications, Global seismicity and tectonics, Earth's internal structure derived from seismology, Earthquake mechanism and Anderson's theory of faulting, Continental drift and plate tectonics: its essential features, present day plate motions, Triple junctions, oceanic ridges, Benioff zones, arcs, hot spots, Mantle Plume, Mountain building, origin of Himalaya, Geodynamics of Indian subcontinent.

UNIT V OCEANS

Physical properties of seawater and methods of determination, distribution of salinity in the oceans, factors affecting salinity, water masses and water type, TS Diagram, Circulation of currents in major ocean waves. Tides: Dynamical and equilibrium theory of tides. Marine pollution, steps to control marine pollution, Laws of seas, Coastal zone management

Total: 45

TEXT BOOK:

1. B.F. Howell,Introduction to Geophysics, McGraw-Hill,2007.

REFERENCES:

1. W. Lowrie,Fundamentals of Geophysics, Cambridge University Press,2007.
2. J.A. Jacobs, R.D. Russel,Physics and Geology, McGraw-Hill.2002.

WEBSITES:

1. www. ocw.mit.edu
2. www.physicsclassroom.com
3. www.nptel.ac.in
4. www.physics.org

B.E-CSE **2018-2019**

18BESHOE07 **ENGINEERING ACOUSTICS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To disseminate the fundamentals of acoustic waves. (K)
- To inculcate the characteristics of radiation and reception of acoustic waves. (K)
- To divulge knowledge on the basics of pipe resonators and filters.(S)
- To introduce the features of architectural acoustics.**(S)**
- To impart the basic knowledge of transducers and receivers.(K)

COURSE OUTCOME:

- Develop the idea of the fundamentals of acoustic waves.
- Apply the concepts of radiation and reception of acoustic waves.
- Explain the basic ideas of pipe resonators and filters.
- Illustrate the basics of architectural acoustics..
- Illustrate the transducers and receivers and its applications in various electronic devices.
- Apply the knowledge inputs of the course for engineering applications.

UNIT I INTRODUCTION

Acoustics waves – Linear wave equation – sound in fluids – Harmonic plane waves - Acoustics intensity – Specific acoustic impedance – spherical waves – Describer scales.Reflection and Transmission:Transmission from one fluid to another normal and oblique incidence –method ofimages.

UNIT II RADIATION AND RECEPTION OF ACOUSTIC WAVES

Radiation from a pulsating sphere – Acoustic reciprocity – continuous line sourceradiation impedance - Fundamental properties of transducers.Absorption and attenuation of sound. Absorption from viscosity – complex sound speed and absorption – classical absorption coefficient

UNIT III PIPES RESONATORS AND FILTERS

Resonance in pipes - standing wave pattern absorption of sound in pipes – long wavelength limit – Helmoltz resonator - acoustic impedance - reflection and transmission of waves in pipe - acoustic filters – low pass, high pass and band pass. Noise, Signal detection, Hearing and speech. Noise, spectrum level and band level – combing band levels and tones – detecting signals in noise – fundamental properties of hearing – loudness level and loudness – pitch and frequency – voice.

UNIT IV ARCHITECTURAL ACOUSTICS

Sound in endosure – A simple model for the growth of sound in a room – reverberation time - Sabine, sound absorption materials – measurement of the acoustic output of sound sources in live rooms – acoustics factor in architectural design. Environmental Acoustics: Highway noise – noise induced hearing loss – noise and architectural design specification and measurement of some isolation design of portions.

UNIT V TRANSDUCTION

Transducer as an electives network – canonical equation for the two simple transducers transmitters – moving coil loud speaker– horn loud speaker, receivers – condenser – microphone – moving coil electrodynamics microphone piezoelectric microphone – calibration of receivers

Total: 45

TEXT BOOKS:

1. LawerenceE.Kinsler, Austin R.Frey, Fundamentals of Acoustics, John Wiley & Sons, 4th edition 2000.
2. F. AltonEverest & Ken Pohlmann, Master Handbook of Acoustics, McGraw Hill Professional, 6th edition 2014.

WEBSITES:

1. www.acousticalsociety.org
2. www.acoustics-engineering.com
3. www.nptel.ac.in
4. www. ocw.mit.edu

18BESHOE08 INDUSTRIAL MATHEMATICS – I 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To develop analytical skills for solving engineering problems
- To teach the students the basic concepts of LPP,
- To learn the techniques to solve transportation and Assignment problems
- To make the students to study about the Integer Programming and Network Analysis
- Analyze the results and propose recommendations to the decision-making processes in Management Engineering

COURSE OUTCOMES:

- To define and formulate linear programming problems and appreciate their limitations.
- To solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained and translate solutions into directives for action.
- To be able to build and solve Transportation Models, Assignment Models,
- To construct linear integer programming models and discuss the solution techniques.
- To formulate and solve problems as networks and graphs.
- To be able to solve problems in different environments and develop critical thinking

UNIT I LINEAR PROGRAMMING PROBLEM

Formulation of LPP - Graphical Method - Simplex Method - Artificial variable technique and two phase simplex method. Duality - Dual and simplex method - Dual Simplex Method .

UNIT II TRANSPORTATION PROBLEM

Transportation Model, finding initial basic feasible solutions, moving towards optimality, Degeneracy.

UNIT III ASSIGNMENT PROBLEM

Solution of an Assignment problem, Multiple Solution, Hungarian Algorithm, Maximization in Assignment Model, Impossible Assignment.

UNIT IV INTEGER PROGRAMMING

Integer Programming Problem – Gromory's fractional cut Method – Branch Bound Method

UNIT V NETWORK ANALYSIS

PERT & CPM- network diagram-probability of achieving completion date- crash time- cost analysis.

Total : 45

TEXT BOOKS:

1. HamdyTaha. A., Operations Research, Prentice – Hall of India Private Limited, New Delhi.2013.
2. KantiSwarup, Manmohan, Gupta, Operations Research, Sultan Chand & Sons, New Delhi.2010.
3. Natarajan A.M., Balasubramani P., Thamilarasi A, Operations Research, Pearson Education, New Delhi.2005.

REFERENCES:

1. Srinivasan G, Operations Research: Principles and Applications, PHI Private Limited, New Delhi.2007.
2. Winston, Operations Research, Applications and Algorithms, Cengage Learning India Pvt. Ltd, New Delhi,2004.

WEBSITES:

1. www.mathworld.
2. Wolfram.com
3. www.mit.edu
4. **www.nptel.com**

B.E-CSE **2018-2019**

18BESHOE09 **INDUSTRIAL MATHEMATICS – II** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To kindle analytical skills for solving engineering problems
- To impact the knowledge about inventory models
- To learn replacement models and simulation models
- To provide techniques for effective methods to solve nonlinear programming and decision making.
- To analyse the results and propose recommendations to the decision-making processes in Management Engineering

COURSE OUTCOMES:

The students will

- To be able to solve simple models in Inventory problems and Replacement problems.
- To understand different queuing situations and find the optimal solutions using models for different situations.
- Simulate different real life probabilistic situations using Monte Carlo simulation technique.
- To be able to understand the characteristics of different types of decision-making environments and the appropriate decision making approaches and tools to be used in each type.
- **Convert** and **solve** the practical situations into replacement models.
- To understand how to model and solve problems using non integer programming.

UNIT – I INVENTORY MODELS

Economic order quantity models-techniques in inventory management-ABC analysis.

UNIT – II NON LINEAR PROGRAMMING

Khun-tucker conditions with non-negative constraints- Quadratic programming- Wolf's modified simplex method.

UNIT – III SIMULATION MODELS

Elements of simulation model -Monte Carlo technique – applications. Queuing model: problems involving (M\M\1): (∞\FIFO) , (M\M\c): (∞\FIFO) Models.

UNIT -IV DECISION MODELS

Decision Analysis – Decision Making environment – Decisions under uncertainty – Decision under risk – Decision – Tree Analysis.

UNIT -V REPLACEMENT MODELS

Models based on models that gradually detoriate with time-whose maintenance cost increase with time-Replacement of items that fail suddenly and completely.

Total : 45

TEXT BOOKS:

1. HamdyTaha. A., Operations Research, Prentice – Hall of India Private Limited, New Delhi.2013.
2. KantiSwarup, Manmohan, Gupta, Operations Research, Sultan Chand & Sons, New Delhi.2010.
3. Natarajan A.M., Balasubramani P., Thamilarasi A, Operations Research, Pearson Education, New Delhi.2005.

REFERENCES

1. Srinivasan G, Operations Research: Principles and Applications, PHI Private Limited, New Delhi.2007.

2. Winston, Operations Research, Applications and Algorithms, Cengage Learning India Pvt. Ltd, New Delhi,2004.

WEBSITES:

1. www.mathworld.
2. Wolfram.com
3. www.mit.edu
4. **www.nptel.com**

18BESHOE10 **FUZZY MATHEMATICS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Be able to understand basic knowledge of fuzzy sets and fuzzy logic
- Be able to apply basic knowledge of fuzzy operations.
- To know the basic definitions of fuzzy relations
- Be able to apply basic fuzzy inference and approximate reasoning
- To know the applications of fuzzy Technology.

COURSE OUTCOMES:

- To gain the main subject of fuzzy sets.
- To understand the concept of fuzziness involved in various systems and fuzzy set theory.
- To gain the methods of fuzzy logic.
- To comprehend the concepts of fuzzy relations.
- To analyze the application of fuzzy logic control to real time systems.
- The Engineers will have an exposure on various topics such as fuzzy algebra, fuzzy theory and fuzzy technology.

UNIT I FUZZY SETS

Fuzzy Sets : Basics Classical sets vs Fuzzy Sets – Need for fuzzy sets – Definition and Mathematical representations – Level Sets – Fuzzy functions - Zadeh's Extension Principle

UNIT II OPERATIONS ON FUZZY SETS

Operations on Fuzzy Sets Operations on [0,1] – Fuzzy negation, triangular norms, tconorms, fuzzy implications, Aggregation Operations, Fuzzy Functional Equations

UNIT III FUZZY RELATIONS

Fuzzy Relations Fuzzy Binary and n-ary relations – composition of fuzzy relations – Fuzzy Equivalence Relations – Fuzzy Compatibility Relations – Fuzzy Relational Equations

UNIT IV FUZZY MEASURES

Possibility Theory Fuzzy Measures – Evidence Theory – Necessity and Belief Measures – Probability Measures vs Possibility Measures

UNIT V FUZZY INFERENCE

Approximate Reasoning Fuzzy Decision Making - Fuzzy Relational Inference – Compositional rule of Inference - Efficiency of Inference - Hierarchical

Total : 45

TEXT BOOKS:

1. George J Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic : Theory and Applications, Prentice Hall of India, New Delhi,2003.
2. Zimmermann H.J. Fuzzy Set Theory and its Applications, Kluwer Academic publishers, USA.2001.

REFERENCES:

1. Michal Baczynski and BalasubramaniamJayaram, Fuzzy Implications, Springer-Verlag publishers, Heidelberg,2008
2. Kevin M Passino and Stephen Yurkovich, Fuzzy Control, Addison Wesley Longman publishers, USA,1998.

B.E-CSE **2018-2019**

18BESHOE11 MATHEMATICAL PHYSICS 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To know the fundamentals of Tensors.
- To know the series solutions to differential equations.
- To introduce the concepts of special functions.
- To study about Calculus of variations and integral equations
- Be familiar with the main mathematical methods used in physics.

COURSE OUTCOMES:

- Students will demonstrate proficiency in mathematics and the mathematical concepts needed for a proper understanding of physics.
- Learn about special type of matrices that are relevant in physics and then learn about tensors.
- Get introduced to Special functions like Bessel, Legendre , Hermite and Laguerre functions and their recurrence relations
- Learn different ways of solving second order differential equations and familiarized with singular points and Frobenius method.
- Students will master in calculus of variations and linear integral equations.
- The students will have the knowledge on Mathematical Physics and that knowledge will be used by them in different engineering and technology applications.

UNIT I TENSORS

Definition of tensor - rank, symmetric tensors, contraction, quotient rule - tensors with zero components, tensor equations, metric tensors and their determinants - pseudo tensors

UNIT II DIFFERENTIAL EQUATIONS-SERIES SOLUTIONS Series Solution : Classification of singularities of an ordinary differential equation - Series solution-Method of Frobenius - indicial equation - examples

UNIT III SPECIAL FUNCTIONS

Basic properties (Recurrence and Orthogonality relations, series expansion) of Bessel, Legendre ,Hermite and Laguerre functions – Generating Function

UNIT IV CALCULUS OF VARIATIONS

Concept of variation and its properties – Euler's equation – Functional dependant on first and higher order derivatives – Functional dependant on functions of several independent variables – Variational problems with moving boundaries – Isoperimetric Problems – Direct methods – Ritz and Kantorovich methods.

UNIT V LINEAR INTEGRAL EQUATIONS

Introduction – conversion of a linear differential equation to an integral equations and vice versa – conversion of boundary value problem to integral equations using Green's function – solution of aintegral equation – integral equations of the convolution type – Abel's integral equations –integro– differential equations – integral equations with separable kernels – solution of Fredholm equations with separable kernels.

Total : 45

TEXT BOOKS:

1. Dr. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi.2013.
2. Murray R Spiegel, Seymour Lipschutz, Dennis Spellman, Vector Analysis, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2010

REFERENCES:

1. Stephenson, G, Radmore, P.M, Advanced Mathematical Methods for Engineering and Science students, Cambridge University Press India Pvt. Ltd., New Delhi,1990.
2. Andrews, Larry C. Special Functions of Mathematics for Engineers, Oxford Science publishers, New Delhi,1997.

WEBSITES:

1. www.mathcentre.ac.uk
2. www.mathworld.
3. wolfram.com
4. www.nptel.ac.in

B.E-CSE **2018-2019**

18BESHOE12 **LINEAR ALGEBRA** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To introduce the basic concepts of vector space
- To know the fundamentals of linear Algebra
- To solve system of linear equations

- To study about the linear transformations
- To introduce the concepts of inner product spaces

COURSE OUTCOMES:

The student will be able to

- To explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
- To describe the fundamental concepts of Eigen values and Eigen vectors by using Power method.
- To apply the fundamental concepts in their respective engineering fields
- To visualize linear transformations as matrix form
- To recognize the underlying theory of vector spaces over a field and inner product spaces over real or complex numbers
- To articulate the importance of Linear Algebra and its applications in branches of Mathematics

UNIT I VECTOR SPACES

General vector spaces, real vector spaces, Euclidean n-space, subspaces, linear independence, basis and dimension, row space, column space and null space,

UNIT II EIGEN VALUES AND EIGEN VECTORS

Eigen values and Eigen vectors - Diagonalization - Power method - QR decomposition

UNIT III SYSTEM OF LINEAR EQUATIONS

Direct methods, Gauss elimination method, Gauss Jordan method, Crout's method, iterative methods, Gauss-Jacobi method, Gauss–Seidel method, convergence criteria.

UNIT IV LINEAR TRANSFORMATIONS

Linear Transformations - The Null Space and Range - Isomorphisms - Matrix Representation of Linear Transformations – Similarity - Eigenvalues and Eigenvectors Eigen values and Eigen vectors - Diagonalization

UNIT V INNER PRODUCT SPACES

The Dot Product on R^n and Inner Product Spaces - Orthonormal Bases - Orthogonal Complements - Application : Least Squares Approximation - Diagonalization of Symmetric M - Application: Quadratic Forms

Total : 45

TEXT BOOK:

1. Kreyszig,E, Advanced Engineering Mathematics, John Wiley & Sons, New Delhi.,2014.

REFERENCES:

1. Anton and Rorres, Elementary Linear Algebra, Applications version, Wiley India Edition, New Delhi,2012.
2. Jim Defranza, Daniel Gagliardi, Introduction to Linear Algebra with Application, Tata McGraw-Hill, New Delhi.2008.

WEBSITES:

1. wolfram.com
2. www.sosmath.com
3. www.nptel.ac.in
4. www.mathworld.

OPEN ELECTIVES OFFERED BY
BIO MEDICAL ENGINEERING

B.E-CSE **2018-2019**

18BEBMEOE01 **ROBOTICS IN MEDICINE** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

The goal of this course is for students

- To understand the basics of Robotics, Kinematics.
- To understand the basics of Inverse Kinematics.
- To explore various kinematic motion planning solutions for various Robotic configurations.
- To study the trajectory planning for robot.
- To understand the task level programming
- To explore various applications of Robots in Medicine

COURSE OUTCOMES:

Upon completion of this course, students will be able to:

- Explain various kinds robotics techniques, vision, planning and applications.
- Outline the basic concept of robotics
- Identify and discuss the Robot Vision
- Describe about manipulators and kinematics.
- Demonstrate Task level programming
- Discuss the applications of robotic systems in medical field.

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UNIT I INTRODUCTION **9**

Introduction Automation and Robots, Classification, Application, Specification, Notations, Direct Kinematics Dot and cross products, Coordinate frames, Rotations, Homogeneous coordinates Link coordination arm equation – Five-axis robot, Four-axis robot, Six-axis robot

UNIT II KINEMATICS **9**

Inverse Kinematics – General properties of solutions tool configuration, Five axis robots, Three-Four axis, Six axis Robot, Workspace analysis and trajectory planning work envelope and examples, workspace fixtures, Pick and place operations, Continuous path motion, Interpolated motion, Straight-line motion.

UNIT III ROBOT VISION **9**

Robot Vision Image representation, Template matching, Polyhedral objects, Shane analysis, Segmentation – Thresholding, region labeling, Shrink operators, Swell operators, Euler numbers, Perspective transformation, Structured illumination, Camera calibration.

UNIT IV PLANNING **9**

Task Planning Task level programming, Uncertainty, Configuration, Space, Gross motion, Planning, Grasp Planning, Fine-motion planning, Simulation of planar motion, Source and Goal scenes, Task Planner simulation.

UNIT V APPLICATIONS **9**

Applications in Biomedical Engineering – Bio Engineering Biologically Inspired Robots, Neural Engineering, Application in Rehabilitation – Interactive Therapy, Bionic Arm, Clinical and Surgical – Gynecology, Orthopaedics, Neurosurgery

Total: 45

TEXT BOOKS:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of publication
1	Robert Schilling	Fundamentals of Robotics-Analysis and control‖	Prentice Hall	2003
2	J.J.Craig	Introduction to Robotics‖,	Pearson Education	2005

REFERENCES:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of publication
1	Staugaard, Andrew C	Robotics and Artificial Intelligence: An Introduction to Applied Machine Learning‖	Prentice Hall Of India	1987
2	Grover, Wiess, Nagel, Oderey	Industrial Robotics: Technology, Programming and Applications‖	McGraw Hill	1986.
3	Wolfram Stadler	Analytical Robotics and Mechatronics‖	McGraw Hill,	1995
4	Saeed B. Niku,	Introduction to Robotics: Analysis, Systems, Applications‖	Prentice Hall	2001
5	K. S. Fu, R. C. Gonzales and C. S. G. Lee	Robotics‖	McGraw Hill	2008

B.E-CSE **2018-2019**

18BEBMEOE02 VIRTUAL REALITY AND AUGMENTED REALITY 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To introduce the relevance of this course to the existing technology through demonstrations, case studies and applications with a futuristic vision along with socio-economic impact and issues
- To understand virtual reality, augmented reality and using them to build Biomedical engineering applications
- To know the intricacies of these platform to develop PDA applications with better optimality.
- Understand the elements, architecture, input and output devices of virtual and augmented reality systems.
- Be able to develop and evaluate 3D interactive applications involving stereoscopic output, virtual reality hardware and 3D user interfaces.

COURSE OUTCOMES

Upon completion of this course, the student will be able to,

- Demonstrate understanding and perspective on the VR/AR landscape; past, present and future
- Demonstrate understanding of fundamental computer vision, computer graphics and human-computer interaction techniques related to VR/AR
- Analyse and Design a system or process to meet given specifications with realistic engineering constraints.
- Identify problem statements and function as a member of an engineering design team.
- Utilize technical resources
- Propose technical documents and give technical oral presentations related to design mini project results.

UNIT I INTRODUCTION (9)

The three I‘s of virtual reality-commercial VR technology and the five classic components of a VR system - Input Devices: (Trackers, Navigation, and Gesture Interfaces): Three-dimensional position trackers, navigation and manipulation-interfaces and gesture interfaces-Output Devices: Graphics displays-sound displays & haptic feedback..

UNIT II VR DEVELOPMENT PROCESS (9)

Geometric modeling - kinematics modeling- physical modeling - behaviour modeling - model Management.

UNIT III CONTENT CREATION CONSIDERATIONS FOR VR (9)

Methodology and terminology-user performance studies-VR health and safety issues-Usability of virtual reality system- cyber sickness -side effects of exposures to virtual reality environment

UNIT IV VR ON THE WEB & VR ON THE MOBILE (9)

JS-pros and cons-building blocks (WebVR, WebGL, Three.js, device orientation events)-frameworks (A-frame, React VR)-Google VR for Android-Scripts, mobile device configuration, building to android-cameras and interaction-teleporting-spatial audio-Assessing human parameters-device development and drivers-Design Haptics

UNIT V APPLICATIONS (9)

Medical applications-military applications-robotics applications- Advanced Real time Tracking other applications- games, movies, simulations, therapy.

Total : 45

TEXT BOOKS:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of publication
1	C. Burdea & Philippe Coiffet	Virtual Reality Technology‖	Second Edition, Gregory,	2008
2	Jason Jerald	. The VR Book: Human-Centred Design for Virtual Reality. Association for Computing Machinery and Morgan & Claypool	New York, NY, US	-

REFERENCES:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of publication
1	Dieter Schmalstieg & Tobias Hollerer	Augmented Reality: Principles and Practice (Usability)	Pearson Education (US), Addison-Wesley Educational Publishers Inc, New Jersey, United States	2016
2	Steve Aukstakalnis,	Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR (Usability)	Addison-Wesley Professional 1 edition,	2016

3	Robert Scoble & Shel Israel	The Fourth Transformation: How Augmented Reality & Artificial Intelligence Will Change Everything	, Patrick Brewster Press	2016
4	Tony Parisi,	Learning Virtual Reality: Developing Immersive Experiences and Applications for Desktop, Web, and Mobile	O‘Reilly Media; 1 edition	2015
5	Tony Parisi	Programming 3D Applications with HTML5 and WebGL: 3D Animation and Visualization for	O‘Reilly Media; 1 edition	2014
6	Jos Dirksen	Learning Three.js: The JavaScript 3D Library for WebGL	Packt Publishing - ebooks Account; 2nd Revised ed. Edition	2015

B.E-CSE **2018-2019**

18BEBMEOE03 ARTIFICIAL ORGANS AND IMPLANTS 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

The goal of this course is for students:

- To discuss the overview of artificial organs & transplants
- To extend the principles of implant design with a case study
- To explain the implant design parameters and solution in use
- To simplify about various blood interfacing implants
- To know the biocompatibility of artificial organs
- To learn about the implantable medical devices.

COURSE OUTCOMES:

Upon completion of this course, students will be able to:

- Explain the implant design parameters and solution in use
- Analyze about various blood interfacing implants
- Evaluate response of biomaterials in living system
- Perceive knowledge about artificial organs & transplants
- Demonstrate different types of soft tissue replacement and hard tissue replacement
- Assess biocompatibility of artificial organs

UNIT I ARTIFICIAL ORGANS & TRANSPLANTS (9)

ARTIFICIAL ORGANS:-Introduction, outlook for organ replacements, design consideration, evaluation process.

TRANSPLANTS:-Overview, Immunological considerations, Blood transfusions, individual organs – kidney, liver, heart and lung, bone marrow, cornea.

UNIT II PRINCIPLES OF IMPLANT DESIGN (9)

Principles of implant design, Clinical problems requiring implants for solution, Permanent versus absorbable devices, the missing organ and its replacement, Tissue engineering, scaffolds, cells and regulators criteria for materials selection, Case study of organ regeneration.

UNIT III IMPLANT DESIGN PARAMETERS AND ITS SOLUTION (9)

Biocompatibility, local and systemic effects of implants, Design specifications for tissue bonding and modulus matching, Degradation of devices, natural and synthetic polymers, corrosion, wear

and tear, Implants for Bone, Devices for nerve regeneration.

UNIT IV BLOOD INTERFACING IMPLANTS (9)

Neural and neuromuscular implants, heart valve implants, heart and lung assist devices, artificial heart, cardiac pacemakers, artificial kidney- dialysis membrane and artificial blood.

UNIT V IMPLANTABLE MEDICAL DEVICES AND ORGANS (9)

Gastrointestinal system, Dentistry, Maxillofacial and craniofacial replacement, Soft tissue repair, replacement and augmentation, recent advancement and future directions.

TOTAL: 45

TEXT BOOKS:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of publication
1	Kopff W.J	Artificial Organs	John Wiley and sons, New York, 1st edition	1976
2	Park J.B.,	Biomaterials Science and Engineering‖	Plenum Press	1984

REFERENCES:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of publication
1	J D Bronzino	Biomedical Engineering handbook Volume II	CRC Press / IEEE Press	2000
2	R S Khandpur	Handbook of Biomedical Instrumentation	Tata McGraw Hill	2003
3	Joon B Park	Biomaterials – An Introduction	Plenum press, New York	1992
4	Yannas, I. V	Tissue and Organ Regeneration in Adults‖	New York, NY: Springer	2001
5	Yadin David, Wolf W. von Maltzahn, Michael R. Neuman, Joseph.D, Bronzino	Clinical Engineering‖	CRC Press, 1st edition	2010
6	Myer Kutz	Standard Handbook of Biomedical Engineering & Design	McGraw- Hill	2003

LIST OF OPEN ELECTIVES OFFERED BY

CHEMICAL ENGINEERING

B.E-CSE **2018-2019**

18BTCEOE01 ENERGY MANAGEMENT IN CHEMICAL INDUSTRIES 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVE:

- To provide students with a general awareness on the importance of energy
- To provide awareness about conservation, its impact on society, various energy sources, energy conversion processes, energy management, energy audit and energy conservation measures.
- To introduce the energy and water management principles related to process Chemical plants.
- To introduce various forms of energy and its forms.
- To introduce the growth, need and necessity of the consumption energy.

COURSE OUTCOMES:

After completion of the course, students are able to

- Plan to optimize energy using systems and procedures to meet energy demand
- Describe the movement of substances in the entire globe
- Examine the relationship between energy systems and society
- Use optimization techniques for conservation of energy in chemical industries
- Evaluate the production rate and analyze the cost from economic balance for energy consumption.
- Understand the concepts of conservation of the resources available.

UNIT I: PLANNING FOR ENERGY NEEDS

Forecasting techniques; energy demand; magnitude and pattern; input and output analysis; energy modelling and optimal mix of energy sources. (9)

UNIT II : ENERGY AND ENVIRONMENT

Energy; various forms; energy storage; structural properties of environment; bio-geo-chemical cycles; society, environment population and technology. (9)

UNIT III : ENERGY AND SOCIETY

Energy and evolution; growth and change; patterns of consumption in developing and advanced countries; commercial generation of power requirements and benefit. (9)

UNIT IV : MANAGEMENT OF ENERGY CONSERVATION IN CHEMICAL INDUSTRIES

Chemical industries; classification; conservation in unit operations such as separation; cooling tower; drying; conservation appliedto refineries, petrochemical, fertilisers, cement, pulp and paper, food and chlor-alkali industries; conservation using optimization techniques. (9)

UNIT V : ECONOMIC BALANCE IN ENERGY CONSUMPTION

Cost analysis; capacity; production rate; system rate; system cost analysis; corporate models; production analysis and production using fuel inventories; input-output analysis; economics; tariffs (9)

TOTAL : 45

TEXT BOOKS:

1. Jerrold H Kertz, Energy Conservation and Utilization, Allyn and BacurInc, 1976.
2. Gemand M Gramlay, Energy, Macmillion publishing Co, Newyork, 1975
3. Krentz J. H., Energy Conservation and Utilization, Allyn and Bacur Inc., 1976.

REFERENCES:

1. Gramlay G. M., Energy, Macmillan Publishing Co., New York, 1975.
2. Rused C. K., Elements of Energy Conservation, McGraw-Hill Book Co., 1985

B.E-CSE **2018-2019**

18BTCEOE02 **FERTILIZER TECHNOLOGY** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To introduce the concepts of fertilizers and manures.
- Justify the need for synthetic fertilizer.
- To understand the process and flow in manufacture of fertilizers.
- To analyze how the nitrogenous fertilizers are useful for the agriculture purpose.
- To categories the storage and handling of the fertilizers.
-

COURSE OUTCOMES:

- After completion of the course, students are able to Illustrate chemical, organic fertilizers and nutrients
- Develop the flow chart for manufacture of nitrogenous fertilizers
- Analyze the various processes and develop the flow chart for the manufacture of phosphatic fertilizers.
- Develop the flow chart for the manufacture of potassic fertilizer and analyze the unit operations involved in the process.
- Illustrate the quality and pollution standards permissible in fertilizer industry.

UNIT I : INTRODUCTION

Chemical Fertilizers and Organic Manures - Types of chemical Fertilizers.Secondary nutrients, micro nutrients. (9)

UNIT II : NITROGEN FERTILIZERS

Nitrogenous Fertilizers - Methods of production of Ammonia and Urea. Nitric acid, Ammonium sulphate, Ammonium Nitrate, Calcium Ammonium Nitrate, Ammonium Chloride - Their methods of production, characteristics, storage and handling specifications. (9)

UNIT III : PHOSPHATIC FERTILIZERS

Raw materials, phosphate rock, Sulphur pyrites -Process for the production of Sulphuric and Phosphoric acids. Ground phosphate rock, bone meal. Single Super Phosphate, Triple Super phosphate -Methods of production, characteristics and specifications. (9)

UNIT IV : POTASSIC FERTILIZERS

Potassium chloride, Potassium sulphate, Potassium schoenite - Methods of production, specification, characteristics. Complex Fertilizers, NPK Fertilizers, Mono ammonium phosphate, Diammonium phosphate, Nitro phosphate Methods of production. (9)

UNIT V : FERTILIZERS IMPACTS AND STANDARDS

Fluid fertilizers.Controlled Release of fertilizers. Solid, Liquid and Gaseous pollution from ammonia urea and NPK fertilizer industries and standards laid down for them. Fertilizer production in India. (9)

TOTAL : 45

TEXT BOOKS:

1. GopalaRao M., Marshall Sittig, Dryden's Outlines of Chemical Technology, Third Edition, WEP East-West Press, New Delhi, 2010.
2. George T. Austin., Shreve's Chemical Process Industries, Fifth Edition, McGraw Hill Professional, 2012
3. Vincent Sauchelli., The Chemistry and Technology of Fertilizers, Reinhold Pub. Corp., 1960

REFERENCES:

1. Editorial Committee - FAI Seminar on Fertilizer in India in the Seventies (Proceedings), The Fertilizer Association of India,New Delhi, 1973.
2. Editorial Committee - Seminar on Recent Advances in Fertilizer Technology, The Fertilizer Association of India, New Delhi,1972.
3. Sauchelli V., Manual on Fertilizer Manufacture, Industry Publication Inc, New Jersy, 1963.
4. CHEMTECH - II - (Chapter on Fertilizers by Chari, K.S.), Chemical Engineering Education Development Centre, I.I.T.,Madras, 1977.
5. Menon M.G., Fertilizer Industry - Introductory Survey, Higginbothams, Madras, 1973

B.E-CSE **2018-2019**

18BTCEOE03 INDUSTRIAL WASTEWATER TREATMENT 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To impart knowledge on composition treatment and effective disposal of industrial effluents.
- To understand the basic characteristics of wastewater.
- Understanding the kinetics of biological system.
- Understand the design and working principle of various treatment methods.
- Understand magnitude and influence of hazardous content

COURSE OUTCOMES:

After completion of the course, students are able to

- Examine the constituents of waste water and its effects.
- Separate the contaminants from the effluent for treatability.
- Determine the biomass yield and substrate utilization rate for biological treatment process and design of activated
- sludge process.
- Develop a flow sheet for the waste water treatment from dairy, sugar, pulp and paper, textile and pharmaceutical
- industries.
- Develop process flow diagram for water reuse and sludge disposal.

UNIT I :INTRODUCTION TO WASTE WATER ENGINEERING

Waste Water Engineering - Overview, inorganic non-metallic constituents and metallic constituents, physical and biological Characteristics. (7)

UNIT II : UNIT OPERATIONS AND UNIT PROCESS

Screening, Flow Equalization, Mixing, Flocculation, Grit removal, Sedimentation, Coagulation, Precipitation, Oxidation and Neutralization (11)

UNIT III : FUNDAMENTALS OF BIOLOGICAL TREATMENT

Introduction, Microbial growth kinetics, types of biological process for wastewater treatment -aerobic and anaerobic oxidation,Biological Nitrification and De-nitrification, biological phosphorous removal, activated sludge process (with design Considerations), trickling filters and lagoons. (9)

UNIT IV : WASTE WATER TREATMENT IN SPECIFIC INDUSTRIES

Dairy, Sugar, Pulp and Paper, Textile and Pharmaceutical Industries. (9)

UNIT V :WATER REUSE

Wastewater reclamation technologies and reuse, Solid processing flow diagrams, sludge and scum pumping, grinding, screening,degritting, blending, anaerobic digestion, composting, conditioning, dewatering and incineration. (9)

TOTAL : 45

TEXT BOOK:

1. Metcalf Eddy, Wastewater Engineering -Treatment and Reuse, Fourth Edition, Tata McGraw Hill, New Delhi, 2002.

REFERENCES:

1. Mark J. Hammer, Water and Wastewater Technology, Seventh Edition, Prentice Hall of India Pvt Limited, New Delhi, 2012.
2. James M. Montgomery, Water Treatment Principles and Design, First Edition, A Wiley Interscience publication, New York,1985

B.E-CSE **2018-2019**

18BTCEOE04 SOLID AND HAZARDOUS WASTE MANAGEMENT 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Provides an overview of municipal solid waste (MSW), industrial waste and hazardous waste management, including design and economic analysis
- In planning and engineering principles needed to address the growing and increasingly intricate problem of controlling and processing the refuse (solid waste) created by urban societies.
- To understand the landfilling, composting and incineration from engineering, social, and regulatory perspectives
- To understand about the physical, chemical, and biological treatment of hazardous waste.
- To analyze and understand the situations dealing with real world settings are covered through worked examples and field trips to solid waste management facilities.

COURSE OUTCOMES:

- After successful completion of the course, student will be able to
- Outline the salient features of solid waste management and handling.
- Deduce the source reduction, recycling and reuse techniques of solid waste.
- Analyze the collection systems and method of transfer of solid waste.
- Describe the processing techniques for solid and hazardous waste.
- Select the suitable methods for disposal of solid and hazardous waste.
- Interpret the legislation for management, handling and disposal of solid and hazardous waste.

UNIT I : CHARACTERISTICS AND SOURCE REDUCTION OF SOLID WASTE

Definition, sources, and types of solid waste - Composition, physical, chemical and biological properties of solid wastes - Percapita generation rates - Sampling and characterization of solid waste - Source reduction of wastes -Waste exchange - Recyclingand reuses - Salient features of Indian legislations on management and handling of municipal solid wastes. (9)

UNIT II : COLLECTION AND TRANSPORT OF SOLID WASTE

Estimation of solid waste and factors affecting generation rates - On-site handling, storage, and processing- Collection services:municipal and commercial - Industrial services - Collection systems: Hauled-container system (HCS) and stationary containersystem (SCS) - Vehicle and labour assessment - Assessment of collection route - Transfer and transport - Transfer stationlocation- Means and methods of transfer. (9)

UNIT III : PROCESSING AND DISPOSAL OF SOLID WASTE

Objective of processing - material separation and processing technologies- biological, chemical and thermal conversiontechnologies- disposal in Landfills: site selection methods and operations, leachate and gas generations and movement andcontrol of gas and leachate techniques - Composting: aerobic and anaerobic - Resource and energy recovery schemes. (9)

UNIT IV : HAZARDOUS WASTE CHARACTERIZATION AND MANAGEMENT

Definitions and Identifications of hazardous waste - Origin and characterization of hazardous solid waste- Typical hazardouswastes in MSW - Hazardous waste management: minimization, collection, storage, handling, transport, and disposal - design ofhazardous waste landfills - TCLP tests - National and International legislation for hazardous waste management – AtomicEnergy Regulatory Board - International Atomic Energy Agency - Department of Atomic Energy - Nuclear Power Corporation - Nuclear power plants in India. (9)

UNIT V : NUCLEAR WASTE AND e-WASTE

Sources - classification - effects of nuclear waste- initial treatment of nuclear wastevitrification, ion exchange, synroc – long term management - above ground disposal, geological disposal, ocean dumping, transmutation, space disposal - reuse ofwaste - nuclear safety and waste regulation - case study on nuclear disaster - source of e-waste - material composition ofe-waste - recycling and recovery - integrated approaches to e-waste recycling - socio economic factors - treatment option - disposal option - e-waste legislation. (9)

TOTAL : 45

TEXT BOOKS:

1. Tchobanoglous, G. et al., "Integrated Solid Waste Management", McGraw-Hill Publication., New York, 1993.
2. Ronald E. Hester, Roy M. Harrison "Electronic Waste Management", Royal Society of Chemistry, 2009.

REFERENCES:

1. Peavy, SH, Rowe, RD and Tchobanoglous, G, "Environmental Engineering", McGraw-Hill Inter Edition, 1985.
2. Charles, A.W., "Hazardous Waste Management", McGraw-Hill Publication, 2002

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B.E-CSE **2018-2019**

18BEEEOE01 ELECTRIC HYBRID VEHICLE 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the basic concepts of electric hybrid vehicle.
- To gain the knowledge about electric propulsion unit.
- To gain the concept of Hybrid Electric Drive-Trains.
- To gain the different Energy Management Strategies.
- To study about the efficiency manipulation in drives
- To understand and gain the knowledge about various energy storage devices

COURSE OUTCOME:

Upon completion of the Course the student will be able to,

- Summarize the basic concepts in bioprocess Engineering.
- Explain the concept of Hybrid Electric Vehicles.
- Understand the concept of Hybrid Electric Drive-Trains.
- Identify the different Energy Management Strategies.
- Understand the concept of different Energy Storage devices.
- Analyze the different motor drives used in Hybrid Electric Vehicles.

UNIT I INTRODUCTION (9)

History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies.

UNIT II HYBRID ELECTRIC DRIVE-TRAINS (9)

Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis.

UNIT III ELECTRIC PROPULSION UNIT (9)

Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

UNIT IV ENERGY STORAGE (9)

Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices.

UNIT V ENERGY MANAGEMENT STRATEGIES (9)

Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies, implementation issues of energy management strategies.

Total Hours: 45

TEXT BOOK:

1. Iqbal Hussein Electric and Hybrid Vehicles: Design Fundamentals CRC Press – 2nd edition 2010

REFERENCES:

1. Mehrdad Ehsani, Yimi Gao, Sebastian E. Gay, Ali Emadi Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design Standardsmedia – 2nd edition 2009
2. James Larminie, John Lowry Electric Vehicle Technology Explained Wiley – 2nd edition 2012

B.E-CSE **2018-2019**

18BEEEOE02 ENERGY MANAGEMENT AND ENERGY AUDITING 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To gain the knowledge about energy management.
- To understand the basic concepts in economic analysis in energy management.
- To understand the basic principles of energy audit.
- To gain the knowledge about the basic concept of types of Energy Audit
- To gain and Evaluate the different energy efficient motors
- Understand the concept of Energy conservation.
- To study about the behaviour changes of PF requirement in motor currents

COURSE OUTCOME:

At the end of this course, students will demonstrate the ability to

- Understand the concept of Energy Management.
- Analyze the different methods for economic analysis
- Knowledge about the basic concept of Energy Audit and types.
- Evaluate the different energy efficient motors
- Understand the concept of Energy conservation.
- Investigate the different methods to improve power factor.

UNIT I ENERGY MANAGEMENT (9)

Principles of energy management, organizing energy management program, initiating, planning, controlling, promoting, monitoring, reporting –Energy Auditor and Energy Manager – Eligibility, Qualification and functions - Questionnaire and check list for top management.

UNIT II ECONOMIC ASPECTS AND ANALYSIS (9)

Economics analysis – Depreciation Methods, time value of money, rate of return, present worth method, replacement analysis, life cycle costing analysis - Calculation of simple payback method, net present worth method.

UNIT III BASIC PRINCIPLES OF ENERGY AUDIT (9)

Energy audit – definition, concept, type of audit, energy index, cost index, pie charts, Sankey diagrams, load profiles, Energy conservation schemes – Energy audit of industries – energy saving potential, energy audit of process industry, thermal power station, building energy audit.

UNIT IV ENERGY EFFICIENT MOTORS (9)

Electric Motors: Factors affecting efficiency - Energy efficient motors - constructional details, characteristics - voltage variation –over motoring – motor energy audit-

Energy conservation: Importance-energy saving measures in DG set-fans and blowers pumps- air conditioning system- energy efficient transformers.

UNIT VPOWER FACTOR IMPROVEMENT, LIGHTING AND ENERGY INSTRUMENT (9)

Power factor - methods of improvement, location of capacitors, p.f with non linear loads, effect of harmonics on p.f,- p.f motor controllers –Energy efficient lighting system design and practice- lighting control– Measuring Instruments – wattmeter, data loggers, thermocouples, pyrometers, lux meters, tong testers, application of PLCs.

Total Hours: 45

TEXT BOOK:

1. Murphy W.R. and G.Mckay Butter worth Energy Management Heinemann Publications 2007

REFERENCES:

1. John.C.Andreas Energy Efficient Electric Motors Marcel Dekker Inc Ltd – 3rd edition 2005
2. W.C.Turner Steve Doty Energy Management Handbook Lulu Enterprises, Inc. - 8th Edition Volume II 2013.

B.E-CSE **2018-2019**

18BEEEOE03 PROGRAMMABLE LOGIC CONTROLLER 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the basic principles of PLC systems.
- To gain the knowledge about data handling functions.
- To gain the knowledge of storage techniques in PLC
- To acquire the knowledge about how to handle the data and functions
- To study about flow charts of ladder and spray process system
- To understand the principles of PID.

COURSE OUTCOME:

- At the end of the course the student will be able to understand the registers and functions in PLC and they are able to do the program.
- To acquire the knowledge of storage techniques in PLC
- Students know how to handle the data and functions
- Students known about advanced controller in PLC applications
- Students gather real time industrial application of PLC
- Students gathered and evaluate the flow charts of ladder and spray process system

UNIT I INTRODUCTION (9)

PLC Basics PLC system, I/O modules and interfacing CPU processor programming equipment Programming formats, construction of PLC ladder diagrams, devices connected to I/O modules.

UNIT II PLC PROGRAMMING (9)

PLC Programming input instructions, outputs, operational procedures, programming examples using contacts and coils. Drill-press operation. Digital logic gates programming in the Boolean algebra system, conversion examples Ladder diagrams for process control Ladder diagrams and sequence listings, ladder diagram construction and flow chart for spray process system.

UNIT III REGISTERS AND PLC FUNCTIONS (9)

PLC Registers: Characteristics of Registers module addressing holding registers input registers, output registers. PLC Functions Timer functions and industrial applications counters counter function industrial applications, Architecture functions, Number comparison functions, number conversion functions.

UNIT IV DATA HANDLING FUNCTIONS (9)

Data handling functions: SKIP, Master control Relay Jump Move FIFO, FAL, ONS, CLR and Sweep functions and their applications. Bit Pattern and changing a bit shift register, sequence functions and applications, controlling of two axes and three axis Robots with PLC, Matrix functions.

UNIT V PID PRINCIPLES (9)

Analog PLC operation: Analog modules and systems Analog signal processing multi bit data processing , analog output application examples, PID principles position indicator with PID control, PID modules, PID tuning, PID functions

Total Hours: 45

TEXT BOOK:

1. JR Hackworth and F.D Hackworth – Jr Programmable Logic Controllers – Programming Method and Applications Pearson 2006

REFERENCES:

1. John Webb and Ronald A Reiss Programmable Logic Controllers – Principle and Applications Fifth edition, PHI 2004
2. W.Bolton Programmable Logic controller Elsevier Newnes Publications, 5th Edition 2009

WEBSITE:

1. http://www.mikroe.com/old/books/plcbook/chapter1/chapter1.htm,-Introduction to programmable Logic controller

B.E-CSE **2018-2019**

18BEEEOE04 RENEWABLE ENERGY RESOURCES 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To gain the knowledge about environmental aspects of energy utilization.
- To understand the basic principles of wind energy conversion, solar cells, photovoltaic conversion.
- To study about solar energy collectors and its storages
- To study about the inter connected system in wind power
- To understand the basic principles fuel cell, Geo thermal power plants.
- To gain the knowledge about hydro energy.

COURSE OUTCOME:

- Analyze the Energy Scenario in india
- Understand the concept of Solar Energy
- Understand the concept of Wind Energy
- Understand the concept of Hydro Energy
- Analyze the different energy sources
- Students gathered the real time inter connected system modelling in wind power

UNIT I INTRODUCTION (9)

Energy scenario - Different types of Renewable Energy Sources - Environmental aspects of energy utilization - Energy Conservation and Energy Efficiency - Needs and Advantages, Energy Conservation Act 2003.

UNIT II SOLAR ENERGY

(9)

Introduction to solar energy: solar radiation, availability, measurement and estimation– Solar thermal conversion devices and storage – solar cells and photovoltaic conversion – PV systems – MPPT. Applications of PV Systems – solar energy collectors and storage.

UNIT III WIND ENERGY

(9)

Introduction – Basic principles of wind energy conversion- components of wind energy conversion system - site selection consideration – basic–Types of wind machines. Schemes for electric generation – generator control, load control, energy storage – applications of wind energy – Inter connected systems.

UNIT IV HYDRO ENERGY (9)

Hydropower, classification of hydro power, Turbine selection, Ocean energy resources, ocean energy routes. Principles of ocean thermal energy conversion systems, ocean thermal power plants. Principles of ocean wave energy conversion and tidal energy conversion.

UNIT V OTHER SOURCES (9)

Bio energy and types –Fuel cell, Geo-thermal power plants; Magneto-hydro-dynamic (MHD) energy conversion.

Total Hours: 45

TEXT BOOKS:

1. Khan.B.H Non-Conventional Energy Resources The McGraw Hills, Second edition 2009
2. Rai.G.D Non-conventional sources of energy Khanna publishers 201

REFERENCES:

1. John W Twidell and Anthony D Weir Renewable Energy Resources Taylor and Francis – 3rd Rao.S. & Parulekar Energy Technology Khanna publishers, Eleventh Reprint 2013
2. Godfrey Boyl Renewable Energy: Power sustainable future Oxford University Press, Third edition 2012
3. John W Twidell and Anthony D Weir Renewable Energy Resources Taylor and Francis – 3rd edition 2015

WEBSITES :

1. www.energycentral.com
2. www.catelelectricpowerinfo.com

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B.E-CSE **2018-2019**

18BEECOE01 REAL TIME EMBEDDED SYSTEMS 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To introduce students to the embedded systems, its hardware and software.
- To introduce devices and buses used for embedded networking.
- To study about task management
- To learn about semaphore management and message passing
- To study about memory management
- To imparts knowledge on

COURSE OUTCOMES:

At the end of the course the students will be able to

- Understand overview of embedded systems architecture
- Acquire knowledge on embedded system, its hardware and software.
- Gain knowledge on overview of Operating system
- Discuss about task Management
- Gain knowledge about semaphore management and message passing.
- Gain knowledge about memory management.

UNIT-I INTRODUCTION TO EMBEDDED SYSTEM

Introduction- Embedded systems description, definition, design considerations & requirements- Overview of Embedded System Architecture (CISC and RISC)-Categories of Embedded Systems- embedded processor selection & tradeoffs- Embedded design life cycle -Product specifications- hardware / software partitioning- iterations and implementation- hardware software integration – product testing techniques–ARM7.

UNIT-II OPERATING SYSTEM OVERVIEW

Introduction–Advantage and Disadvantage of Using RTOS–Multitasking–Tasks-Real Time Kernels – Scheduler- Non-Preemptive Kernels – Preemptive Kernels – Reentrancy- Reentrant Functions– Round Robin Scheduling- Task Priorities- Static Priorities– Mutual Exclusion– Deadlock– Inter task Communication–Message Mailboxes–Message Queues- Interrupts- Task Management–Memory Management-Time Management–Clock Ticks.

UNIT-III TASK MANAGEMENT

Introduction-µ C/OS-II Features-Goals ofµ C/OS-II-Hardware and Software Architecture–Kernel Structures: Tasks–Task States–Task Scheduling–Idle Task–Statistics Task–Interrupts Under µC/OS-II – Clock Tick-µ C/OS- II Initialization. Task Management: Creating Tasks–Task Stacks–StackChecking–Task'sPriority–SuspendingTask– esumingTask.TimeManagement: Delaying a Task–Resuming a Delayed Task–System Time. Event Control Blocks-Placing a Task in the ECB Wait List–Removing a Task from an ECB wait List.

UNIT-IV SEMAPHORE MANAGEMENT AND MESSAGE PASSING

Semaphore Management: Semaphore Management Overview– Signaling a Semaphore. Message Mailbox Management: Creating a Mailbox –Deleting Mailbox–Waiting for a Message box–Sending Message to a Mailbox- Status of Mailbox. Message Queue Management: Creating Message Queue–Deleting a Message Queue–Waiting for a Message Queue–Sending Message to a Queue– Flushing a Queue.

UNIT-V MEMORY MANAGEMENT

Memory Management: Memory Control Blocks–Creating Partition-Obtaining a Memory Block–Returning a Memory Block. Getting Started withµ C/OS-II–Installingµ C/OS-II–Portingµ C/OS-II: Development Tools–Directories and Files– Testing a Port -IAR Workbench withµ C/OS-II-µ C/OS-II Porting on a 8051CPU– Implementation of Multitasking- Implementation of Scheduling and Rescheduling –Analyze the Multichannel ADC with help ofµ C/OS-II.

TEXT BOOKS:

1. Floyd JeanJ. Labrosse Micro C/OS–II The Real Time Kernel CMPBOOKS 2009
2. David Seal ARM Architecture Reference Manual.Addison-Wesley 2008
3. Steve Furbe, ARM System-on-Chip Architecture, Addison-Wesley Professional, California 2000.

REFERENCES:

1. K.V.K.K.Prasad Embedded Real-Time Systems: Concepts, Design & Programming Dream Tech Press 2005.
2. Sriram V Iyer, Pankaj Gupta Embedded Real Time Systems Programming Tata Mc Graw Hill 2004

B.E-CSE **2018-2019**

18BEECOE02 **CONSUMER ELECTRONICS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

Course Objectives

- To study about various speakers and microphone
- To learn the fundamental of television systems and standards
- To learn the process of audio recording and reproduction
- To study various telephone networks
- To discuss about the working of home appliances
- To familiarize with TV services like ISDN.

COURSE OUTCOMES

At the end of the course the students will be able to

- Understand working of various type of loud speakers
- Acquire knowledge on various types of picture tubes
- Demonstrate the working of various optical recording systems
- Distinguish various standards for color TV system
- Acquire knowledge on various telecommunication networks
- Demonstrate the working of various home appliances

UNIT-I LOUDSPEAKERS AND MICROPHONES

Dynamic Loudspeaker, Electrostatic loudspeaker, Permanent Magnet Loudspeaker, Woofers and Tweeters – Microphone Characteristics, Carbon Microphones, Dynamic Microphones and Wireless Microphones.

UNIT-II TELEVISION STANDARDS AND SYSTEMS

Components of a TV system–interlacing–composite video signal. Colour TV– Luminance and Chrominance signal; Monochrome and Colour Picture Tubes- Color TV systems– NTSC, PAL, SECAM-Components of a Remote Control.

UNIT-III OPTICAL RECORDING AND REPRODUCTION

Audio Disc– Processing of the Audio signal–readout from the Disc –Reconstruction of the audio signal– Video Disc–Video disc formats- recording systems–Playback Systems.

UNIT-IV TELECOMMUNICATION SYSTEMS

Telephone services-telephone networks–switching system principles–PAPX switching–Circuit, packet and message switching, LAN, MAN and WAN, Integrated Services Digital Network. Wireless Local Loop. VHF/UHF radio systems, Limited range Cordless Phones; cellular modems.

UNIT-V HOME APPLIANCES

Basic principle and block diagram of microwave oven; washing machine hardware and software; Components of air conditioning and refrigeration systems.

TEXT BOOK:

1. S.P. Bali Consumer Electronics Pearson Education 2007

REFERENCES:

1. J.S.Chitode Consumer Electronics Technical Publications 2007
2. Philip Hoff, Philip Herbert Hoff Consumer Electronics for Engineers Cambridge University Press 1998.

B.E-CSE **2018-2019**

18BEECOE03 NEURAL NETWORKS AND ITS APPLICATIONS 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To introduce the basic concepts of neural networks and its applications in various domain
- To educate how to use Soft Computing to solve real-world problems
- To have a solid understanding of Basic Neural Network.
- To provide students with a sound and comprehensive understanding of artificial neural networks and machine learning.
- To gain exposure in the field of neural networks and relate the human neural system into the digital world
- To provide knowledge of computation and dynamical systems using neural networks

COURSE OUTCOMES:

At the end of the course the students will be able to

- Understand the basic concepts of neural networks and its applications in various domains
- Gain knowledge about learning process in Neural Networks
- Apply perception concept in design
- Design using ART phenomena
- Gain knowledge on SOM concepts
- Ability to develop the use of Soft Computing to solve real-world problems

UNIT-I INTRODUCTION TO NEURAL NETWORKS

Introduction-biological neurons and their artificial models-learning, adaptation and neural network's learning rules-types of neural networks-single layer, multiple layer-feed forward, feedback networks

UNIT-II LEARNING PROCESS

Error– correction learning– memory based learning- hebbian learning-competitive learning-Boltzmann learning-supervised and unsupervised learning-adaptation-statistical learning theory.

UNIT-III PERCEPTION

Single layer Perception-Adaptive filtering-unconstrained Optimization-Least-mean square algorithm- Leaning Curve-Annealing Technique-perception convergence Theorem-Relationship between perception and Baye's Classifier-Back propagation algorithm

UNIT-IV ATTRACT OR NEURAL NETWORK AND ART

Hopfield model-BAM model -BAM Stability-Adaptive BAM -Lyapunov function-effect of gain-Hopfield Design-Application to TSP problem-ART-layer 1-layer 2-orienting subsystem- ART algorithm-ARTMAP.

UNIT-V SELF ORGANIZATION

Self-organizing map-SOM Algorithm-properties of the feature map-LVQ-Hierarchical Vector Quantization. Applications of self-organizing maps: The Neural Phonetic Type Writer Learning Ballistic Arm Movements.

TEXT BOOKS:

1. SimonHaykin Neural Networks and Learning Machines 3rd Edition Pearson/Prentice Hall 2009
2. SatishKumar Neural Networks: A Classroom Approach TMH 2008

REFERENCES:

1. Rajasekaran.S, Vijayalakshmi Pai.G.A Neural Networks, Fuzzy Logic and Genetic Algorithms, Synthesis and Applications PHI, New Delhi 2003.
2. LaureneFausett Fundamentals of Neural Networks: Architectures, Algorithms, and ApplicationsPearson/Prentice Hall 1994
3. Wasserman P.D Neural Computing Theory & Practice Van Nortrand Reinhold 1989.

B.E-CSE **2018-2019**

18BEECOE04 FUZZY LOGIC AND ITS APPLICATIONS 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To introduce the basic concepts of Fuzzy logic and its applications in various domain
- To educate how to use Fuzzy computation to solve real-world problems
- To have a solid understanding of Basic fuzzy models.
- Provide an understanding of the basic mathematical elements of the theory of fuzzy sets.
- To learn about applications on Fuzzy based systems
- To familiarize with fuzzy fiction and de fuzzy fiction procedures

COURSE OUTCOMES:

At the end of the course the students will be able to

- Understand the basic concepts of Fuzzy logic and its applications in various domain
- Gain knowledge on theory of Reasoning
- Develop fuzzy controllers
- Understand concepts of adaptive fuzzy control
- Ability to develop how to use Fuzzy computation to solve real- world problems
- Design fuzzy based model for any application

UNIT-I BASICS OF FUZZY LOGIC

Fuzzy sets, Properties of fuzzy sets, operation in fuzzy sets, fuzzy relations, the extension principle

UNIT-II THEORY OF APPROXIMATE REASONING

Linguistic variables, Fuzzy proportions, Fuzzy if-then statements, inference rules, compositional rule of inference-fuzzy models

UNIT-III FUZZY KNOWLEDGE BASED CONTROLLERS

Basic concept structure of FKBC, choice of membership functions, scaling factors, rules, fuzzy fiction and de fuzzy fiction procedures–Design of Fuzzy Logic Controller

UNIT-IV ADAPTIVE FUZZY CONTROL

Process performance monitoring, adaption mechanisms, membership functions, tuning using gradient descent and performance criteria. Set organizing controller model based controller.

UNIT-V FUZZY BASED SYSTEMS

Simple applications of FKBC-washing machines-traffic regulations-lift control-fuzzy in medical Applications-Introduction to ANFIS.

SUGGESTED READINGS

1. D .Diankar ,H. Hellendoom and M .Rein frank An Introduction to Fuzzy Control Narosa Publishers India 1996
2. G.J. KlirandT.A. Folger Fuzzy Sets Uncertainty and Information PHI IEEE 1995
3. Timothy J. Ross Fuzzy Logic with Engineering Applications McGraw Hill1997
4. George. J Klir and Bo Yuan Fuzzy Sets and Fuzzy Logic Prentice Hall, USA 1995

B.E-CSE **2018-2019**

18BEECOE05 PRINCIPLES OF MODERN COMMUNICATION SYSTEM 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To provide students with an overview of communication systems
- To provide an overview on mobile communication
- To make students to have a better understanding on satellite and radar communication
- To understand the basic communication techniques which in turn are used as the building blocks of the larger and more complex communication systems.
- To acquire the basic engineering understanding to the modern communication systems and; the relevant theory and technique.
- Design simple systems for landing and navigation.

COURSE OUTCOMES:

At the end of the course the students will be able to

- Understand past, present and future trends in mobile communication.
- Gain knowledge about mobile cellular communication
- Understand various standards in use for wireless communication and its application.
- Demonstrate some basic application of GPS.
- Gain knowledge about RADAR working and its applications
- Demonstrate how a simple radar system works and its applications.

UNIT I THE EVOLUTION OF ELECTRONIC COMMUNICATION

From smoke signals to smart phones - History of communications: Theoretical Foundations, Development & Applications - Frequencies for communication - Frequency regulations - Overview of communication transmitter and receiver.

UNIT II MOBILE CELLULAR COMMUNICATIONS

Evolution to cellular networks – Cellular systems generations and standards: 1G, 2G, 3G, 4G - Cellular network components - Components of a mobile phone - setting up a call process - Making a call process - Receiving a call process - Spectrum allocation: Policies and strategies, Role of TRAI.

UNIT III WIRELESS COMMUNICATION

Introduction - Bluetooth - Infrared communication - IEEE Wireless LANs (Wi-Fi) - IEEE 802.16 (WiMaX) - Future mobile and wireless networks: Introduction to 5G- device to device communication- IoT.

UNIT IV SATELLITE COMMUNICATION

History of Satellite communication, Basics of Satellites, Types of Satellites, Capacity Allocation - Launch Vehicles and Orbits: Introduction to launching vehicles, Important Orbits, working of rocket, Three Pioneers of Rocketry - Basics of Global Positioning System (GPS) - Applications of

GPS.

UNIT V RADAR & NAVIGATION

Introduction, Radar Block diagram and Operation, Radar Frequencies, Applications of Radar. Navigation Systems: Introduction & methods of navigation, Instrument Landing System, Microwave landing system- Modern Navigation systems.

TEXT BOOKS:

1. S.Haykin, ―Communication Systems, 4/e, John Wiley 2007
2. B.P.Lathi, ―Modern Digital and Analog Communication Systems, 3/e, Oxford University Press,2007
3. Rappaport Theodore S - Wireless Communications: Principles and Practice, 2/E, Pearson Education India, 2010

REFERENCES:

1. Vijay. K. Garg, ―Wireless Communication and Networking, Morgan Kaufmann Publishers, 2007.
2. T.Pratt, C. Bostian and J.Allnutt; ―Satellite Communications, John Wiley and Sons, Second Edition., 2003
3. M. I .Skolnik ―Introduction to Radar Systems, Tata McGraw Hill 2006.
4. Myron Kyton and W.R.Fried ―Avionics Navigation Systems, John Wiley & Sons 1997.

OPEN ELECTIVES OFFERED BY
FOOD TECHNOLOGY

B.E-CSE **2018-2019**

18BTFTOE01 PROCESSING OF FOOD MATERIALS 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Explain the milling, extraction and manufacture of tremendous products from cereals, pulses and oil seeds
- Summarize the production and processing methods of fruits and vegetables
- Discuss the chemical composition, processing, production, spoilage and quality of milk and milk products
- Outline the overall processes involved in the production of meat, poultry and fish products
- Review the production and processing methods of plantation and spice products
- Discuss the opportunities in which entrepreneurial activity is related to food products.

COURSE OUTCOMES:

- Discuss the basics of food processing.
- Demonstrate the various processing technologies involved in fruits and vegetables, dairy, cereals, meat, fish, egg and plantation products.
- Infer the basics on microbiology of food products.
- Describe the process of manufacture of various food products.
- Recognize various methods of preservation of food.
- Express the possible arena of entrepreneurial activity related to food products.

Unit I - CEREAL, PULSES AND OIL SEEDS TECHNOLOGY

Rice milling, Pulse milling, Wheat milling - Oil extraction - Methods of manufacture of Bread - different processes of manufacture - types of breads - buns, biscuits, cakes and cookies -Pasta products -Tortilla - Method of manufacture.

Unit II - FRUITS AND VEGETABLE PROCESSING

Production of Fruits and vegetables in India, Cause for heavy losses, preservation treatments - Basics of Canning, Minimal processing and Hurdle technology as applied to Vegetable and Fruit processing, Processing of fruit juices, Dehydration, Aseptic processing.

Unit III - DAIRY PROCESSING

Basic dairy terminology, composition, General tests at reception, Dairy Processing - Method of manufacture of Standardized, toned and double toned milk, milk powder - Equipments - Pasteurizers, homogenizers and pumps - Method of manufacture of dairy products - Icecream, Cheese, Paneer, Yoghurt - Pasteurization and microorganisms involved in spoilage of milk.

Unit IV - MEAT, POULTRY AND FISH PROCESSING

Meat composition from different sources, Definitions and measurements, Carcass Processing, Meat Products, Processing of Poultry Products, Fish and other Marine Products Processing .

Unit V - PLANTATION PRODUCT TECHNOLOGY

Processing of Tea, Coffee and Cocoa - Outline of the methods of manufacture of - green tea, black tea, instant tea, Instant coffee, Cocoa and Chocolate. Outline of the methods of processing of Pepper, cardamom, ginger, vanilla and turmeric

TEXT BOOK:

1. Srivastava R.P. and Kumar S. Fruit and Vegetable Preservation: Principles and Practices. International Book Distributing Co. Lucknow. 3rd Edition. 2010.

REFERENCES:

1. Chakraverty A., Mujumdar A.S., Raghavan G.S.V and Ramaswamy H.S. Handbook of Post-harvest Technology: Marcel Dekker Press. USA. 1st Edition. 2003.
2. Sukumar De. Outlines of Dairy Technology. Oxford University Press. New Delhi. 23rd impression. 2016.

B.E-CSE **2018-2019**

18BTFTOE02 **NUTRITION AND DIETETICS** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

Course objectives

- Explain the basic concepts of food and nutrition
- Define the overall classification, function, and source of carbohydrates, lipids and proteins
- Discuss the overall aspects of vitamins
- Outline the role of health and nutritional importance of micro and macro minerals
- Summarize the recent trends in nutrition
- Discuss the comparison of various types of nutrition research with respect to type and reliability of information produced.

COURSE OUTCOMES

- Discuss the basics in the area of nutritional assessment in health and disease
- Evaluate the biological functions of foods for health in addition to nutritional values
- Judge the potential for adverse events related to dietary supplements
- Identify which nutrients are sources of energy for the body and how an excess or a deficiency of energy can affect the body.
- Formulate nutrition therapy for chronic disease.
- Compare the various types of nutrition research with respect to type and reliability of information produced.

UNIT I - HUMAN NUTRITION

Historical perspective of nutrient requirements – Assessment of nutritional status - recommended dietary allowances of macronutrients for all age groups - Assessment of protein quality – Malnutrition and related disorders – Balanced Diet. Factors influencing dietary intake: Food habits, food fads and fallacies, their influence on health and wellbeing.

UNIT II - BIOMOLECULES

Carbohydrates- Definition, classification, Functions, Sources of Carbohydrates, Deficiency. Lipids – Definition, classification, function, sources, Refined & Hydrogenated fats process. Proteins – Definitions, Classification, Function, Amino Acids, Sources of Proteins.

UNIT III - VITAMINS

Physiological role, bio-availability, requirements, sources and deficiency of Fat Soluble Vitamins: Vitamin A, Vitamin D, E & K. *ƒ* Water soluble vitamins: Vitamin C, Thiamine, Riboflavin, Niacin, Pantothenic acid, Biotin, Folic acid, Vitamin B12, VitaminB6.

UNIT IV - MINERALS

Physiological role, bio-availability, requirements, sources and deficiency of Macro minerals: Calcium, Phosphorus Magnesium, Sodium, Potassium chloride. Micro minerals: Iron, Zinc, copper, selenium, chromium, iodine, manganese, Molybdenum and fluoride.

UNIT V - RECENT TRENDS IN NUTRITION

Principles of dietary management in gout, rheumatism, AIDS/HIV - Cancer-risk factors, symptoms, dietary management, role of food in prevention of Cancer. Role of functional foods, health foods and novel foods, organically grown foods, recent concepts in human nutrition like nutrigenomics, nutraceuticals etc.

TEXT BOOKS:

1. Gordon M. Wardlaw. Perspectives in Nutrition. WCB McGraw-Hill Publishers, Boston, 9th Edition. 2013.
2. Shubhangini A. Joshi. Nutrition and Dietetics. Tata Mc Grow- Hill publishing Company Ltd, New Delhi. 4th Edition. 2016.
3. Srilakshmi. B. Nutrition Science. New Age International Pvt. Ltd, Publishers. 6th Edition. 2017.

REFERENCES:

1. Ronald Ross Watson. Functional foods and Nutraceuticals in Cancer Prevention. Ed. Wiley – Blackwell. 2003.
2. Sunetra Roday. Food Science and Nutrition. Oxford Higher Education/Oxford University Press. 3rd edition 2018.

B.E-CSE **2018-2019**

18BTFTOE03 **READY TO EAT** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Outline the current status of snack food Industry
- Describe the production, processing and marketing trends of potato-based snacks
- Explain the processing and equipments involved in the production of tortilla chips
- Outline the overall processing of popcorn
- Summarize the sensory analysis methods and packaging techniques of snack foods
- Discuss about flavorings in the popcorn industries

COURSE OUTCOMES :

- List the various manufacturing process in snack food industries
- Acquire knowledge about current production and marketing status of Snack foods
- Elucidate the advantages of Sensory Evaluation
- Packaging technologies in Snack Food Industries
- Demonstrate the equipments involved in the snack production processes
- Use flavorings in the popcorn industries

UNIT I SNACK FOOD INDUSTRY

Introduction-History-Past innovations- Outline of snack food industry- Nutrition-Total Quality Management of Technology-Domestic Snack Food Market-Global Market-Snack Food Association Future Considerations

UNIT II POTATO CHIPS PROCESSING

Potato Production- Market value of Potato- History of Fabricated potato snacks- Potato snack Ingredients-Potato Analysis and Composition-Potato chip manufacturing process-Unit Operations-
Future of Fabricated Potato snacks- Other value added products from Potato.

UNIT III TORTILLA CHIP PROCESSING

Introduction- Raw Materials- Processing steps-Corn cooking and soaking-Washing and Draining Grinding Equipment-Reconstitution of Dry Maize Flour- Maize feeding Pumping Preheating Sheeting/Cutting-Baking-Conditioning/Equilibration-Frying.

UNIT IV POPCORN PROCESSING

Introduction- Raw popcorn selection and preparation-Popping Methods-Home preparation of Popcorn-Equipments-Industrial manufacturing process- Flavorings and Applicators-Popcorn
Packaging- Relative Nutrition- Marketing.

UNIT V SENSORY EVALUATION AND PACKAGING

Introduction- Analytical methods-Sensory methods- Sensory Aspect of Processing- Quality properties of Snack Foods and Packaging Materials-Automated Bag- Pouch Packaging- Cartoning Case Packing-Current Issues in Snack Foods Packaging

TEXT BOOk:

1. Lusas, E. W and Rooney, L. W. Snack Foods Processing. CRC Press,1st Edition 2001.

REFERENCES:

1. Panda, H. The Complete Technology Book on Snack Foods, National Institute of Industrial Research, Delhi. 2nd Edition 2013.
2. Sergio O Serna-Saldivar, Industrial Manufacture of Snack Foods, Kennedys Books Ltd. 2008.

B.E-CSE **2018-2019**

18BTFTOE04 AGRICULTURAL WASTE AND BYPRODUCTS UTILIZATION 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Categorize the types of agricultural wastes
- Outline the production and utilization of biomass
- Explain the various parameters considered to be important in the designing of biogas units
- Review the various methods employed in the production of alcohol from the byproducts of agricultural wastes
- Summarize the overall aspects involved in the production of paperboards and particleboards from agricultural wastes
- Discuss Applications of agricultural waste and byproducts utilization

COURSE OUTCOMES:

- List and group the types of agricultural wastes
- Develop number of value-added products from agriculture wastes
- Discuss the techniques and production involved in the utilization of biomass
- Assess the various parameters considered to be important in the designing of biogas units
- Illustrate the various methods employed in the production of alcohol from the byproducts of agricultural wastes
- Choose the appropriate materials to produce paperboards and particleboards from agricultural wastes

UNIT 1-TYPES OF AGRICULTURAL WASTES

Introduction and Background Agricultural Waste, Crop Waste, Agricultural Residues (annual crops), Technical terms, rice by-products utilization-rice bran and germ, rice bran oil, economic products from agriculture waste/by-products.

UNIT 2-BIOMASS PRODUCTION AND UTILIZATION

Biomass Gasifier, Technology used for the utilization of agricultural wastes: Biomass Gasifier, Nimbkar Agricultural Research Institute (NARI) Gasifier, Rice-Husk Based Gasifier, Heat and Steam from Sugarcane Leaf and Bagasse.

UNIT 3-BIOGAS DESIGN AND PRODUCTION

Biogas: Definition, composition, history of biogas, Production of biogas; types of biogas plant (floating drum type and fixed dome type) and their components (inlet, outlet, stirrer, slanting pipe, digester, gas holder and gas outer pipe), Selection and Design of biogas plant.

UNIT 4-PRODUCTION OF ALCOHOL FROM WASTE MATERIALS

Production of Alcohol from waste materials: Introduction, Production methods, Cellulolysis (biological approach): Pretreatment, Cellulolytic processes (Chemical and Enzymatic hydrolysis), Microbial fermentation, Gasification process (thermochemical approach).

UNIT 5-PRODUCTION OF PAPERBOARDS AND PARTICLEBOARDS FROM AGRICULTURAL WASTE

Production and testing of Paperboards and Particleboards from Agricultural Waste: Introduction, History, Terminology and classification, Raw materials, Production steps- Pulping, Classifications of pulp, Bleaching, Plies, Coating, Grades.

TEXT BOOKS:

1. K M Sahay and K K Singh. Unit Operations of Agricultural Processing. Vikas Publishing House Pvt Ltd, Noida, Uttar Pradesh. 2nd Edition 2013.
2. Beggs C. Energy Management and Conservation. Elsevier Pulication. 2nd Edition 2009.

REFERENCES:

1. Chaturvedi P. 2009. Energy Management: Challenges for the Next Millennium. Concept Publishing Co. 1st Edition 2000.
2. Fardo SW, Patrick DR, Richardson RE and Fardo BW. Energy Conservation Guidebook. The Fairmont Press. 3rd Edition 2014.
3. Wulfinghoff DR. Energy Efficiency Manual. Energy Institute Press. 2000.

OPEN ELECTIVES OFFERED BY
BIOTECHNOLOGY

B.E-CSE **2018-2019**

18BTBTOE01	**BIOREACTOR DESIGN**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To impart basic knowledge in bioprocess Engineering
- To design the bioreactors for various operations.
- To understand the principle and working of heat transfer equipments.
- To extend the knowledge in principle of heat transfer inside a bioreactor
- To construct the equipments used in mass transfer operations.
- To learn the equipments used in separation process.

COURSE OUTCOMES:

- Summarize the basic concepts in bioprocess Engineering.
- Design the bioreactors for various operations.
- Develop the heat transfer equipments for Bioprocess Engineering.
- Construct the equipments used in mass transfer operations.
- Categorize the equipments used in separation process.
- To understand about the principles behind the heat transfer.

UNIT I –INRODUCTION TO BIOPROCESS ENGINEERING

Introduction – Biotechnology and Bioprocess Engineering- Biologists and Engineers Differ in their approach to research-How Biologists and Engineers work Together- Bioprocesses: Regulatory constraints.

UNIT II - REACTOR DESIGN

Design of Airlift fermentor, Bubble column reactor and Continuous stirred tank reactor.

UNIT III - HEAT TRANSFER EQUIPMENTS

Design of Shell and tube Heat exchanger, Double pipe heat exchanger, long tube vertical evaporator and forced circulation evaporator.

UNIT IV - MASS TRANSFER EQUIPMENTS

Design of Bollmann extractor, fractionating column, packed tower and spray tray absorber

UNIT V - SEPARATION EQUIPMENTS

Design of plate and frame filter press, leaf filter, rotary drum filter, disc bowl centrifuge, rotary drum drier and Swenson –walker crystallizer.

SUGGESTED READINGS:

1. James Edwin Bailey, David F. Ollis (2015) Biochemical Engineering Fundamentals, Second Edition. McGraw-Hill Education (India) private limited.
2. Don W. Green, Robert H.Perry (2008). Chemical Engineer Hand book. The McGraw-Hill Companies, Inc.
3. Pauline. M. Doran (2015). Bioprocess Engineering Principles Second Edition . Academic Press.

B.E-CSE **2018-2019**

18BTBTOE02	**FOOD PROCESSING AND PRESERVATION**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES

- To learn the scope and importance of food processing.
- To impart basic knowledge in different food processing methods carried out in the food tech companies.
- To extend the brief knowledge in food conservation operations.
- To study the methods of food preservation by cooling.
- To familiarize the students on the concepts of preservation methods for fruits.
- To create deeper understanding on preservation methods for vegetables.

COURSE OUTCOMES

- Describe the scope and importance of food processing.
- Outline the various processing methods for foods.
- Extend the knowledge in food conservation operations.
- Describe the methods of food preservation by cooling.
- Summarize the preservation methods for fruits.
- Demonstrate the preservation methods for vegetables.

UNIT I - SCOPE AND IMPORTANCE OF FOOD PROCESSING

Properties of food - Physical, thermal, mechanical, sensory. Raw material Preparation - Cleaning, sorting, grading, peeling.

UNIT II - PROCESSING METHODS

Heating- Blanching and Pasteurization. Freezing- Dehydration- canning-additives- fermentation- extrusion cooking- hydrostatic pressure cooking- dielectric heating- micro wave processing and aseptic processing – Infra red radiation processing-Concepts and equipment used.

UNIT III - FOOD CONVERSION OPERATIONS

Size reduction – Fibrous foods, dry foods and liquid theory and foods – equipments - membrane separation- filtration- equipment and application.

UNIT IV - FOOD PRESERVATION BY COOLING

Refrigeration, Freezing-Theory, freezing time calculation, methods freezing of freezing equipments, freeze drying, freeze concentration, thawing, effect of low temperature on food. Water activity, methods to control water activity.

UNIT V - PRESERVATION METHODS FOR FRUITS AND VEGETABLES

Pre processing operations - preservation by reduction of water content: drying / dehydration and concentration – chemical preservation – preservation of vegetables by acidification, preservation with sugar - Heat preservation– Food irradiation- Combined preservation techniques.

SUGGESTED READINGS:

1. R. Paul Singh, Dennis R.Heldman (2014).Introduction to food engineering. Academic press.
2. P.Fellows.(2017). Food processing technology principles and practice, Fourth Edition. Wood head publishing Ltd.
3. Mircea Enachescu Dauthy. (1995). Food and vegetable processing.FAO agricultural services bulletin.
4. M.A. Rao, Syed S.H.Rizvi, Ashim K. Datta. (2014). Engineering properties of foods. CRC press.
5. B. Sivasankar. (2002). Food processing and preservation.PHI learning Pvt.Ltd.

B.E-CSE **2018-2019**

18BTBTOE03	**BASIC BIOINFORMATICS**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

Course Objectives

- To understand the available tools and databases for performing research in bioinformatics.
- To expose students to sequence alignment tool in bioinformatics.
- To construct the phylogenetic trees for evolution.
- To get familiar with the 3D structure of protein and classification.
- To acquire basic knowledge in protein secondary structure prediction.
- To extend the brief knowledge in Micro array data analysis.

COURSE OUTCOMES

- Summarize the basic concepts and importance of Bioinformatics in various sectors.
- Demonstrate the sequence alignment tool in bioinformatics.
- Construct the phylogenetic trees for evolution.
- Analyze the three dimensional protein structure and classification using various tools.
- Illustrate the protein secondary structure prediction by comparative modeling.
- Extend the knowledge in micro array technology and applications of bioinformatics in various sectors.

UNIT I - OVERVIEW OF BIOINFORMATICS

The scope of bioinformatics; bioinformatics & the internet; useful bioinformatics sites. Data acquisition: sequencing DNA, RNA & proteins; determination of protein structure; gene & protein expression data; protein interaction data. Databases – contents, structure & annotation: file formats; annotated sequence databases; miscellaneous databases.

UNIT II - RETRIEVAL OF BIOLOGICAL DATA

Data retrieval with Entrez & DBGET/ LinkDB; data retrieval with SRS (sequence retrieval system).Searching sequence databases by sequence similarity criteria: sequence similarity searches; amino acid substitution matrices; database searches, FASTA & BLAST; sequence filters; iterative database searches & PSI-BLAST. Multiple-sequence alignment, gene & protein families: multiple-sequence alignment & family relationships; protein families & pattern databases; protein domain families.

UNIT III - PHYLOGENETICS

Phylogenetics, cladistics & ontology; building phylogenetic trees; evolution of macromolecular sequences. Sequence annotation: principles of genome annotation; annotation tools & resources.

UNIT IV - STRUCTURAL BIOINFORMATICS

Conceptual models of protein structure; the relationship of protein three-dimensional structure to protein function; the evolution of protein structure & function; obtaining, viewing & analyzing structural data; structural alignment; classification of proteins of known three-dimensional structure: CATH & SCOP; introduction to protein structure prediction; structure prediction by comparative modeling; secondary structure prediction; advanced protein structure prediction & prediction strategies.

UNIT V - MICROARRAY DATA ANALYSIS

Microarray data, analysis methods; microarray data, tools & resources; sequence sampling & SAGE. Bioinformatics in pharmaceutical industry: informatics & drug discovery; pharma informatics resources. Basic principles of computing in bioinformatics: running computer software; computer operating systems; software downloading & installation; database management.

SUGGESTED READINGS:

1. Dan E krane Michael L Rayme. (2004). Fundamental concepts of Bioinformatics. Pearson Education.
2. Andreas D Baxevanis B.F. Franchis Ouellette. (2004). Bioinformatics: A practical guide to the analysis of genes and proteins. Wiley-Interscience.
3. David W. Mount. (2004). Sequence and Genome Analysis. Cold Spring Harbor Laboratory.
4. Jonathan Pevsner.(2015). Bioinformatics and functional genomics. wiley-Liss.
5. Michael J Koernberg. (2016).Microarray Data Analysis: Methods and applications. Humana Press

B.E-CSE **2018-2019**

18BTBTOE04	**FUNDAMENTALS OF NANO BIOTECHNOLOGY**	**3H-3C**
Instruction Hours/week: L:3 T:0 P:0	**Marks:** Internal**:40** External**:60** Total**:100**	

End Semester Exam:3 Hours

COURSE OBJECTIVES

- To impart the skills in the field of nano biotechnology and its applications.
- To acquire knowledge in the nano particles and its significance in various fields.
- To extend the knowledge in types and application of nano particles in sensors.
- To define the concepts of biomaterials through molecular self assembly.
- To equip students with clinical applications of nano devices.
- To describe deeper understanding of the socio-economic issues in nanobiotechnology.

COURSE OUTCOMES

- Develop skills in the field of nano biotechnology and its applications.
- Summarize the nanoparticles and its significance in various fields.
- Extend the knowledge in types and application of nano particles in sensors.
- Define the concepts of biomaterials through molecular self assembly.
- Outline the clinical applications of nano devices.
- Describe the socio-economic issues in nanobiotechnology.

UNIT I - INTRODUCTION

Introduction, Scope and Overview, Length scales , Importance of Nanoscale and Technology, History of Nanotechnology, Future of Nanotechnology: Nano Technology Revolution, Silicon based Technology, Benefits and challenges in Molecular manufacturing: The Molecular assembler concept, Controversies and confusions, Understanding advanced capabilities, Nanotechnology in Different, Fields: Nanobiotechnology, Materials, Medicine, Dental care.

UNIT II - NANO PARTICLES

Introduction, Types of Nanoparticles, Techniques to Synthesize Nanoparticles, Characterization of Nanoparticles, Applications, Toxic effects of Nanomaterials, Significance of Nanoparticles Nanofabrications- MEMS/NEMS, Atomic Force Microscopy, Self assembled monolayers/ Dip- pen Nanolithography, Soft Lithography, PDMS Molding, Nano Particles, Nano wires and Nanotubes.

UNIT III – MEDICAL NANOTECHNOLOGY

Nanomedicine, Nanobiosensor and Nanofludics. Nanocrystals in biological detection, Electrochemical DNA sensors and Integrated Nanoliter systems. Nano-Biodevices and Systems. Fabrication of Novel Biomaterials through molecular self assembly- Small scale systems for in vivo drug delivery- Future nanomachine.

UNIT IV - NANOBIOTECHNOLOGY

Clinical applications of nanodevices. Artificial neurons. Real-time nanosensors- Applications in cancer biology. Nanomedicine.Synthetic retinyl chips based on bacteriorhodopsins. High throughput DNA sequencing with nano carbontubules.Nanosurgical devices.

UNIT V - ETHICAL ISSUES IN NANOTECHNOLOGY

Introduction, Socioeconomic Challenges, Ethical Issues in Nanotechnology: With Especial Reference to Nanomedicine, Nanomedicine Applied in Nonmedical Contexts, Social Issues Relating to Nanomedicine. Social and Ethical Issues, Economic Impacts, Other Issues, Nanotechnology and Future Socio-economic challenges.

SUGGESTED READINGS:

1. Niemeyer, C.M. and Mirkin, C.A (2005). Nanobiotechnology: Concepts, Applications and Perspectives. Wiley-VCH.
2. Goodsell, D.S. (2004). Bionanotechnology. John Wiley and Sons, Inc.
3. Shoseyov, O.and Levy, I (2008).Nanobiotechnology: Bioinspired Devices and Materials of the Future. Humana Press.
4. Bhushan, B.(2017). Springer Handbook of Nanotechnology. Springer-Verlag Berlin Heidelberg.
5. FreitasJr R.A (2006) Nanomedicine. Landes Biosciences.
6. Kohler, M. and Fritzsche, W. (2008). Nanotechnology – An Introduction to Nanostructuring Techniques. Wiley-VCH.

OPEN ELECTIVES OFFERED BY MECHANICAL ENGINEERING

B.E-CSE **2018-2019**

18BEMEOE01	**COMPUTER AIDED DESIGN**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To provide an overview of how computers are being used in mechanical component design
- To study about the various computer graphics concepts
- To get basic knowledge on geometric modeling
- to study about the basics of parametric design and object representation
- To get basic knowledge in product design and development.
- To become familiar with Solid Modelling concepts and techniques.

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

- Give the overview of the cad systems and its importance
- Explain the ideas and principles behind the computer graphics
- Explain the process involved in graphic transformations
- Understand the operations involved in the geometric modeling.
- Describe the concepts of parametric design
- Understand the basics of the product design and development.

UNIT I OVERVIEW OF CAD SYSTEMS

Conventional and computer aided design processes-advantages and disadvantages. Subsystems of CAD-CAD hardware and software, analytical and graphics packages, CAD workstations. Networking of CAD systems.

UNIT II INTERACTIVE COMPUTER GRAPHICS AND GRAPHICS TRANSFORMATIONS

Generative, cognitive and image processing graphics. Static and dynamic data graphics. Transport of graphics data. Graphic standards. Generation of graphic primitives - display transformation in Two- and Three – Dimensional graphics concepts, Graphical input technique, Geometric transformations, Visual Realism, Computer animation, customizing graphics software.

UNIT III GEOMETRIC MODELING

Wireframe, surface, NURBS and solid modeling-applications and advantages. Creating primitive solids, sweeping solids, Boolean operations. Extracting entities from a solid. Filleting of edges of solids. Boundary representation (B-rep) Constructive Solid Geometry(CSG) and Analytical Solid Modeling(ASM)

UNIT IV PARAMETRIC DESIGN AND OBJECT REPRESENTATION

Types of co-ordinate systems. Parametric design - definition and advantages. Parametric representation of analytic and synthetic curves. Parametric representation of surfaces and solids - manipulations.

UNIT V PRODUCT DESIGN AND DEVELOPMENT

Automated 2D drafting - basics, mechanical assembly - bill of materials generation. Mass property calculations.

SUGGESTED READINGS

1. Vera B Anand, Computer Graphics and Geometric Modeling for Engineers,1st edition, John Wiley & Sons, New York, 2000
2. Radhakrishnan P and Subramanyan S, CAD/CAM/CIM, 2nd edition, New Age International Pvt. Ltd, 2008
3. Ibrahim Zeid, CAD/CAM Theory and Practice,2nd edition, McGraw Hill Inc., New York, 2009
4. Barry Hawhes, The CAD/CAM Process,1st edition, Pitman Publishing, London, 2007(digital)
5. William M Newman and Robert Sproul, Principles of Interactive Computer Graphics,1st edition, McGraw Hill Inc., New York, 2001
6. Sadhu Singh, Computer-Aided Design and Manufacturing,1st edition, Khanna Publishers, New Delhi, 1998

B.E-CSE **2018-2019**

18BEMEOE02	**INDUSTRIAL SAFETY AND ENVIRONMENT**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To get the basic introduction on logistics
- To study the basics of supply chain and its concepts.
- to know the various phases involved in supply chain
- to study about different supply chain models
- to know the various activities involved in supply chain management.
- To prevent or mitigate harm or damage to people, property, orthe environment.

COURSE OUTCOMES:

Upon completion of this course, the students can be able to

- Understand the role of logistics
- Understand the phases of supply chain
- Get the knowledge on various supply chain models
- Link the supply chain concepts with customer
- Perform various activities involved in supply chain
- Understand the management system of supply chain and the information system followed for managing the same.

UNIT I INTRODUCTION TO LOGISTICS

Logistics - concepts, definitions and approaches, factors influencing logistics - Supply chain: basic tasks, definitions and approaches, influencing supply chain - a new corporate model.

UNIT II PHASES OF SUPPLY CHAIN

The new paradigm shift - The modular company - The network relations - Supply processes - Procurement processes - Distribution management.

UNIT III EVOLUTION OF SUPPLY CHAIN MODELS

Strategy and structure - Factors of supply chain - Manufacturing strategy stages - Supply chain progress - Model for competing through supply chain management - PLC grid, supply chain redesign - Linking supply chain with customer.

UNIT IV SUPPLY CHAIN ACTIVITIES

Structuring the SC, SC and new products, functional roles in SC - SC design frame- work - Collaborative product commerce (CPC).

UNIT V SCM ORGANISATION AND INFORMATION SYSTEM

The management task - Logistics organization - The logistics information systems - Topology of SC application - Product Data Management - Warehouse management system MRP- I, MRP - II, ERP,. - Case study, ERP Software's

SUGGESTED READINGS

1. Shari.P.B and Lassen.T.S, Managing the global supply chain, 1st edition, Viva books, New Delhi, 2000
2. Ayers.J.B, Hand book of supply chain management,1st edition, The St. Lencie press, 2001
3. Nicolas.J.N, Competitive manufacturing management - continuous improvement, Lean production, customer focused quality,1st edition, McGrawHill, New York, 2008
4. Steudel.H.J and Desruelle.P, Manufacturing in the nineties - How to become a mean, lean and world class competitor,1st edition, Van No strand Reinhold, New York, 2007(digital)

B.E-CSE **2018-2019**

18BEMEOE03	**TRANSPORT PHENOMENA**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To provide the basics of transport phenomena and its applications.
- To provide the knowledge over the properties of the systems and unit systems used.
- To understand the basics and mathematics involved in momentum transport.
- To provide the basics and applications of energy transport.
- To give basics and principles involved in the mass transport phenomena.
- To Solve the given set of equations either analytically or numerically.

COURSE OUTCOMES:

Upon completion of this course, the students can be able to,

- Understand the basic concepts of transport phenomena
- Understand the essentiality of properties of a system and unit systems used.
- Understand the basic concepts involved in momentum transport.
- Apply the mathematics involved in fluid flow problems.
- Explain the various energy transport phenomena.
- Understand the basics of mass transport phenomena.

UNIT I INTRODUCTION AND BASIC CONCEPTS

General overview of transport phenomena including various applications, Transport of momentum, heat and mass , Transport mechanism, Level of transport, Driving forces, Molecular transport (diffusion), convective transport (microscopic)

UNIT II PROPERTIES, UNITS AND OTHER PHYSICAL PARAMETERS

Unit systems, temperature, mole, concentration, pressure, Gas laws, laws of conservation, energy and heat units

UNIT III MOMENTUM TRANSPORT

Basic concepts in fluid mechanics, Force, unit and dimensions, pressure in fluid, head of fluid, Molecular transport for momentum, heat and mass transfer, Viscosity of fluids, Newton's law, Momentum transfer, Newtonian and non- Newtonian fluids, Fluid flow and Reynolds number, Overall mass balance, Control volume and Continuity equation, Overall energy balance, Bernoulli's equation, Overall momentum balance, Drag coefficient, Stokes law, Flow in packed beds, Flow in fluidized bed

UNIT IV ENERGY TRANSPORT

Basic concepts in heat transfer, Heat transfer mechanisms, Fourier's law of heat conduction, thermal conductivity, convective heat transfer coefficient, Conduction heat transfer - through flat slab/wall

and through hollow cylinder, Conduction through solids in series, Forced convection heat transfer inside pipes, Heat transfer outside various geometrics in forced convection, General discussion on natural convection heat transfer, Heat exchangers, General discussion on radiation heat transfer

UNIT V MASS TRANSPORT

Basic concepts in mass transport, Some application examples, Modes of mass transfer, Molecular diffusion- Fick's law, Analogy between mass, heat and momentum transfer, Dispersion, Hydraulic or Darcy's flow in porous media, Chemical kinetics and activation energy, Film theory, Convective mass transfer, Liquid-solid mass transfer, Liquid-liquid mass transport, Gas-liquid mass transfer, Aeration and oxygen transport, Air stripping

SUGGESTED READINGS

1. Geankoplis, C. J, Transport Processes and Separation Processes Principles, 4th edition, Prentice Hall, 2013
2. R. Byron Bird, Warren E. Stewart, Edwin N. Lightfoot, Transport Phenomena, 1st edition, John Wiley & Sons, 2007.
3. Edwin N. Lightfoot, Transport phenomena and living systems: biomedical aspects of momentum and mass transport, 1st edition, Wiley, 1973, 2007 (digital)

B.E-CSE **2018-2019**

18BEMEOE04	**INTRODUCTION TO BIOMECHANICS**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVE:

- To describe the principles of the study of human movement.
- To describe the range of factors that influence the initiation, production and control of human movement.
- To identify the body's lever systems and their relationship to basic joint movement and classification.
- To distinguish between biomechanical principles of kinetics and kinematics when applied to the analysis of human movement.
- To explain joint and muscle function and the forces acting upon the human body during various sporting activities.
- To relate the different body systems necessary for human movement to occur.

COURSE OUTCOMES:

Upon completion of this course, the students will be able to,

- Understand the basics and importance of biomechanics.
- Present the nine fundamentals of biomechanics and its need.
- Explain the nine principles used for application of biomechanics.
- Describe the human anatomy
- Explain the need for biomechanics in muscle actions
- Understand the basics of the mechanics involved in musculoskeletal system.

UNIT I INTRODUCTION

Biomechanics - Improving Performance – Applications - Preventing And Treating Injury - Qualitative And Quantitative Analysis - Scholarly Societies - Computer Searches – Biomechanical Knowledge versus Information - Kinds of Sources - Evaluating Sources

UNIT II KEY MECHANICAL CONCEPTS

Mechanics - Basic Units - Nine Fundamentals of Biomechanics - Principles and Laws - Nine Principles for Application of Biomechanics

UNIT III HUMAN ANATOMY AND SOME BASIC TERMINOLOGY

Gross (Whole-Body) Modeling - Position and Direction Terminology - Terminology for Common Movements - Skeletal Anatomy - Major Joints - Major Muscle Groups - Anthropometric Data

UNIT IV ANATOMICAL DESCRIPTION

Key Anatomical Concepts - Directional Terms - Joint Motions - Muscle Actions - Active and Passive Tension of Muscle - Limitations of Functional Anatomical Analysis - Mechanical Method of Muscle Action Analysis - The Need for Biomechanics to Understand Muscle Actions - Sports Medicine and Rehabilitation Applications

UNIT V MECHANICS OF THE MUSCULOSKELETAL SYSTEM

Tissue Loads - Response of Tissues To Forces - Biomechanics of The Passive Muscle–Tendon Unit - Biomechanics of Bone - Biomechanics of Ligaments - Three Mechanical Characteristics of Muscle - Stretch-Shortening Cycle (SSC) - Force–Time Principle - Neuromuscular Control

SUGGESTED READINGS

1. Duane Knudson, Fundamentals of Biomechanics, 1st edition,Springer Science+ Business Media, LLC, 2013
2. C. Ross Ethier Craig A. Simmons, Introductory Biomechanics,1st edition, Cambridge University Press, 2008

OPEN ELECTIVES OFFERED BY
AUTOMOBILE ENGINEERING

B.E-CSE **2018-2019**

18BEAEOE01 **AUTOMOBILE ENGINEERING** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To impart the knowledge on constructional details and principle of operation of various automobile components.
- To learn the function and working of various components in transmission and drive lines.
- To study the concept and working of steering and suspension systems in an automobile.
- To give the knowledge on wheels, tyres and brakes of automobiles.
- To provide the information on current and future trends in automobiles.
- To study the ignition of engine system

COURSE OUTCOMES:

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

- Demonstrate the operating principles and constructional details of various automobile components.
- Explain the function and working of components in transmission and drive lines.
- Identify and explain the types of steering system and suspension system.
- Classify and describe the types of wheels, tyres and brakes of automobiles.
- Discuss the current and future trends in the automobiles.
- Gather the knowledge of the ignition of engine system

UNIT I ENGINE AND FUEL FEED SYSTEMS

Classification of Engine, construction and working of four stroke petrol and diesel engine, firing order and its significance. Carburettor working principle, requirements of an automotive carburettor, Petrol injection Systems (MPFI, TBI), Diesel fuel injection systems (CRDI)

UNIT II TRANSMISSION SYSTEMS

Requirements of transmission system.Flywheel. Different types of clutches, principle, Construction, torque capacity and design aspects. Objective of the gearbox - Determination of gear ratios for vehicles.Performance characteristics at different speeds. Different types of gearboxes - operation. Function of Propeller Shaft Construction details of multi drive axle vehicles. Different types of final drive. Differential principles. Constructional details of differential unit. Non-slip differential. Differential lock

UNITIII SUSPENSION SYSTEM

Need of suspension system - Types of suspension - Suspension springs - Constructional details and characteristics of leaf, coil and torsion bar springs - Independent suspension - Rubber suspension – Pneumatic suspension – Hydro Elastic suspension - Shock absorbers. Vibration and driving comfort.

UNITIV BRAKES

Necessity of brake, stopping distance and time, brake efficiency, weight transfer, shoe brake and disc brake theory, Brake actuating systems - Mechanical, Hydraulic and Pneumatic. Parking and engine exhaust brakes. Power and power assisted brakes. Antilock Braking System (ABS).

UNITV ELECTRICAL SYSTEM

Principle and construction of lead acid battery. Lighting system: details of head light and side light, LED lighting system, head light dazzling and preventive methods – Horn, wiper system and trafficator.Starting System and charging system.

TEXT BOOKS:

SL.NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Young U.P and Griffiths L	Automotive Electrical Equipment	ELBS & New Press	1999
2.	Ganesan.V	Internal Combustion Engines	Tata McGraw-Hill Publishing Co., New Delhi	2003
3.	Dr.Kirpal Singh	Automobile Engineering	Standard Publisher	2011

REFERENCES:

SL.NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Heldt .P.M	The Automotive Chassis	Literary Licensing,LLC	2012
2.	Crouse.W.H	Automobile Electrical Equipment, 3rd Edition	McGraw-Hill Book Co., Inc., New York.	1986
3.	N.Newton, W. Steeds and T.K.Garrett	The Motor vehicle, 13th edition	SAEInc	2001

B.E-CSE **2018-2019**

18BEAEOE02 BASICS OF TWO AND THREE WHEELERS 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To impart the technical knowledge on construction and working of power train and drive train of two and three wheeler vehicles.
- To familiarize with the maintenance procedures of engine and subsystems of two and three wheelers.
- To study the types of transmission, steering and suspension systems.
- To study the types of wheels, tyres and brakes for two and three wheelers.
- To study the cranking system in IC engines
- To study anti braking system of engines

COURSE OUTCOMES:

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

- Construct the frames of two and three wheelers of different layouts.
- Demonstrate the constructional details and principle of operation of various engine components.
- Identify and explain the types of transmission, steering and suspension systems.
- Classify and describe the types of wheels, tyres and brakes for two and three wheelers.
- Explain the servicing of two and three wheelers.
- Get knowledge of practical things in cranking system

UNIT I INTRODUCTION

Classifications- design considerations –weight and dimension limitations – requirements stability problems, gyroscopic effect- pendulum effect of two and three wheelers.

UNIT II POWER UNITS, IGNITION SYSTEMS AND OTHER ELECTRICAL SYSTEMS

2 stoke and 4 stoke SI engines and CI engines design criteria– design of cylinders, cylinder head, cooling fins, crank case, connecting rod and crank shaft. Carburettor types and design. Battery coil ignition, magneto ignition and electronic ignition. Lighting and other electrical system.

UNIT III CLUTCHES AND TRANSMISSION

Types of clutches for 2 and 3 wheelers.Design of clutch system.Gears for two and three wheelers.Design of gear box and gear change mechanism. Belt, chain and shaft drive. Freewheeling devices, starting systems.

UNIT IV FRAMES, SUSPENSION, WHEELS AND TYRES

Types of frames used for two wheelers and three wheelers. Wheel frames- construction design of frames for fatigue strength torsional stiffness and lateral stability. Front and rear forks. Springs for suspension, Dampers, constructional details of wheel and tyres.

UNIT V THREE WHEELERS

Auto rickshaws, different types, Pick-Ups and delivery type vehicle, frames and transmission for 3 wheelers wheel types, wheel attachment tyre types. Brakes and their operating mechanism.

TEXT BOOKS:

SL.NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Irving P.E.	Motor Cycle Engineering.	Temple Press Book, London.	1992
2.	Srinivasan.S.	Motor cycle, Scooter, Mobeds.	New century book house.	1988

REFERENCES:

SL. NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	Griffin.M.M	Motor cycles from inside and outside.	Prentice Hall Inc, New Jersey.	1978
2.	Bruce A. Johns, David D. Edmundson and Robert Scharff	Motorcycles: Fundamentals, Service, Repair	Goodheart-Willcox	1999

B.E-CSE **2018-2019**

18BEAEOE03 **AUTOMOBILE MAINTENANCE** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand the need for vehicle maintenance and its importance.
- To familiarize the maintenance procedure for various components of an automobile.
- To study the servicing of transmission and driveline components.
- To study the procedure for steering, suspension, wheel and brake maintenance.
- To study the fault diagnosis in the electrical and air conditioner systems.
- To study the various services of brakings.

COURSE OUTCOMES:

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

- Describe and differentiate the types of maintenance.
- List the procedure for dismantling, servicing and assembling of engine components.
- Demonstrate the servicing of transmission and driveline components.
- Discuss the procedure for steering, suspension, wheel and brake maintenance.
- Explain the fault diagnosis in the electrical and air conditioner systems.
- To acquire the knowledge of tuneup of vehicle system

UNIT I MAINTENANCE OF RECORDS AND SCHEDULES

Importance of maintenance, preventive (scheduled) and breakdown (unscheduled) maintenance, requirements of maintenance, preparation of check lists, Inspection schedule, maintenance of records, log sheets and other forms, safety precautions in maintenance.

UNIT II ENGINE MAINTENANCE

Dismantling of engine components and cleaning, cleaning methods, visual and dimensional inspections, minor and major reconditioning of various components, reconditioning methods, engine assembly, special tools used for maintenance overhauling, engine tune up.

UNIT III CHASSIS MAINTENANCE

Mechanical and automobile clutch and gear box, servicing and maintenance, maintenance servicing of propeller shaft and differential system, Maintenance servicing of suspension systems. Brake systems, types and servicing techniques, Steering systems, overhauling and maintenance. Wheel alignment, computerized alignment and wheel balancing.

UNIT IV ELECTRICAL SYSTEM MAINTENANCE

Testing methods for checking electrical components, checking battery, starter motor, charging systems, DC generator and alternator, ignitions system, lighting systems, Fault diagnosis and maintenance of modern electronic controls, checking and servicing of dash board instruments.

UNIT V MAINTENANCE OF FUEL SYSTEM, COOLING SYSTEMS, LUBRICATION SYSTEM AND VEHICLE BODY

Servicing and maintenance of fuel system of different types of vehicles, calibration and tuning of engine for optimum fuel supply, Cooling systems, water pump, radiator, thermostat, anticorrosion and antifreeze additives, Lubrication maintenance, lubricating oil changing, greasing of parts, Vehicle body maintenance, minor and major repairs. Door locks and window glass actuating system maintenance.

TEXT BOOKS

SL.NO.	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	John Doke	Fleet Management	McGraw Hill Co	1984
2.	James D Halderman	Advanced Engine Performance Diagnosis	Prentice Hall Publications	2011
3.	Service Manuals from Different Vehicle Manufacturers			

B.E-CSE **2018-2019**

18BEAEOE04 INTRODUCTION TO MODERN VEHICLE TECHNOLOGY 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURTSE OBJECTIVES:

- To impart the knowledge on trends in vehicle power plants.
- To learn about the various advanced driver assistance systems.
- To study the working of advanced suspension and braking systems in an automobile.
- To give the information about motor vehicle emission and noise pollution control.
- To provide the knowledge of vehicle telematics.
- To study about pedestrian detections

COURSE OUTCOMES:

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

- Distinguish and describe the various modern vehicle power plant systems.
- List and explain the various driver assistant mechanisms.
- Identify and explain the working of advanced suspension and braking systems.
- Apply the knowledge of motor vehicle emission and noise pollution control.
- Describe the vehicle telematics and its applications.
- Getting knowledge of safety of vehicles securities

UNIT I TRENDS IN POWER PLANTS

Hybrid vehicles - Stratified charged / learn burn engines - Hydrogen engines - battery vehicles – Electric propulsion with cables - Magnetic track vehicles.

UNIT II DRIVER ASSISTANCE SYSTEMS

Collision Avoidance Systems, Adaptive cruise control, adaptive noise control, anti spin regulation, traction control systems, cylinder cut- off technology, ABS, Driver Drowsiness Detection system

UNIT III SUSPENSION BRAKES AND SAFETY

Air suspension - Closed loop suspension - antiskid braking system, Retarders, Regenerative braking safety cage - air bags - crash resistance - passenger comfort.

UNIT IV NOISE & POLLUTION

Reduction of noise - Internal & external pollution control through alternate fuels/power plants – Catalytic converters and filters for particulate emission.

UNIT V TELEMATICS

Global positioning systems, geographical information systems, navigation systems, automotive vision system, road recognition

TEXT BOOKS:

SL. NO	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	LjuboVlacic, Michael Saren and Fumio Harashima	Intelligent Vehicle Technologies	Butterworth-Heinemann publications, Oxford	2001
2.	Ronald K.Jurgen	Navigation and Intelligent Transportation Systems –Progress in Technology	Automotive Electronics Series,SAE, USA.	1998

REFERENCES:

SL. NO	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	William B Riddens	Understanding Automotive Electronics, 5th Edition	Butterworth Heinemann Woburn.	1998
2.	Bechhold,	Understanding Automotive Electronics	SAE	1998
3.	Robert Bosch	Automotive HandBook, 5th Edition	SAE	2000

18BEAEOE05 COMMERICAL FLEET OPEARTION 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To impart the knowledge on personnel management, selection process, training methods and motor vehicle act.
- To plan the vehicle routes, scheduling of vehicles and fare structure.
- To study the motor vehicle act in terms of registration and describe the various vehicles and conduct the test of competence to drive.
- To study the buildup of fare structure and analyze the methods of fare collection.
- Analyze the vehicle parts, supply management and data processing.
- To design the vehicle maintenance systems.

COURSE OUTCOMES:

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

- Apply the knowledge of personnel management and analyze the selection process and training methods.
- Apply the motor vehicle act in terms of registration and describe the various vehicles and conduct the test of competence to drive.
- Construct a fare structure and analyze the methods of fare collection.
- Analyze the vehicle parts, supply management and data processing.
- Demonstrate an electronically controlled vehicle maintenance system and analyze the work scheduling.
- Gaining knowledge in test of competence

UNIT I ORGANISATION AND MANAGEMENT

Forms of Ownership – principle of Transport Management – Staff administration – Recruitment and Training – welfare – health and safety. Basic principles of supervising. Organizing time and people. Driver and mechanic hiring - Driver checklist - Lists for driver and mechanic - Trip leasing - Vehicle operation and types of operations.

UNIT II VEHICLE MAINTENACE

Scheduled and unscheduled maintenance - Planning and scope - Evaluation of PMI programme – Work scheduling - Overtime - Breakdown analysis - Control of repair backlogs - Cost of options.

UNIT III VEHICLE PARTS, SUPPLY MANAGEMENT AND BUDGET

Cost of inventory - Balancing inventory cost against downtime - Parts control - Bin tag systems – Time management - Time record keeping - Budget activity - Capital expenditures - Classification of vehicle expenses - Fleet management and data processing - Data processing systems - Software. Model - Computer controlling of
fleet activity - Energy management.

UNIT IV SCHEDULING AND FARE STRUCTURE

Route planning - Scheduling of transport vehicles - Preparation of timetable – preparation of vehicle and crew schedule - Costs, fare structure – Fare concessions - Methods of fare collection - Preparation of fare table.

UNIT V MOTOR VEHICLE ACT

Schedules and sections - Registration of motor vehicles - Licensing of drivers and conductors - Control of permits - Limits of speed - traffic signs - Constructional regulations - Description of goods carrier, delivery van, tanker, tipper, municipal, fire fighting and break down service vehicle.

REFERENCES:

SL. NO	AUTHOR(S)	TITLE OF THE BOOK	PUBLISHER	YEAR OF PUBLICATION
1.	John Dolu	Fleet Management	McGraw-Hill Co.	1984
2.	Rex W. Faulks	Bus and Coach Operation	Butterworth.	1987
3.	Kitchin L.T.D	Bus operation, 3rd Edition	iliffe and Sons Ltd., London.	1992

OPEN ELECTIVES OFFERED BY
CIVIL ENGINEERING

18BECEOE01 HOUSING, PLAN AND MANAGEMENT 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVE:

- To examine the role and tasks of basic housing policies and building bye laws
- Understand the process of integrated service delivery in the context of economic, social, environmental and institutional factors
- Analyze the Innovative construction methods and Materials
- Analyze city management strategies and strengthen the urban governance through a problem solving approach
- To know the Importance of basic housing policies and building bye laws
- To use Housing Programmes and Schemes

COURSE OUTCOMES:

The students will be able to

- Know the Importance of basic housing policies and building bye laws
- Use Housing Programmes and Schemes
- Plan and Design of Housing projects
- Examine Innovative construction methods and Materials
- Know Housing finance and loan approval procedures
- Understand Construction as well as managing techniques

UNIT I INTRODUCTION TO HOUSING 9

Definition of Basic Terms – House, Home, Household, Apartments, Multi storeyed Buildings, Special Buildings, Objectives and Strategies of National Housing Policies, Principle of Sustainable Housing, Housing Laws at State level, Bye-laws at Urban and Rural Local Bodies – levels - Development Control Regulations, Institutions for Housing at National, State and Local levels

UNIT II HOUSING PROGRAMMES 9

Basic Concepts, Contents and Standards for Housing Programmes - Sites and Services, Neighborhoods, Open Development Plots, Apartments, Rental Housing, Co-operative Housing, Slum Housing Programmes, Role of Public, Private and Non-Government Organizations.

UNIT III PLANNING AND DESIGN OF HOUSING PROJECTS 9

Formulation of Housing Projects – Site Analysis, Layout Design, Design of Housing Units (Design Problems)

UNIT IV CONSTRUCTION TECHNIQUES AND COST-EFFECTIVE MATERIALS 9

New Constructions Techniques – Cost Effective Modern Construction Materials, Building Centers – Concept, Functions and Performance Evaluation

UNIT V HOUSING FINANCE AND PROJECT APPRAISAL 9

Appraisal of Housing Projects – Housing Finance, Cost Recovery – Cash Flow Analysis, Subsidy and Cross Subsidy, Pricing o f Housing Units, Rents, Recovery Pattern (Problems).

TOTAL HRS: 45

TEXT BOOKS:

1. Meera Mehta and Dinesh Mehta, Metropolitan Housing Markets, Sage Publications Pvt. Ltd., New Delhi, 2002.
2. Francis Cherunilam and Odeyar D Heggade, Housing in India, Himalaya Publishing House, Bombay, 2001.

REFERENCES:

1. Development Control Rules for Chennai Metropolitan Area, CMA, Chennai, 2002.
2. UNCHS, National Experiences with Shelter Delivery for the Poorest Groups, UNCHS (Habitat), Nairobi, 2000.

B.E-CSE **2018-2019**

18BECEOE02	**BUILDING SERVICES**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVE:

- Defining and identifying of eng. services systems in buildings.
- The role of eng. services systems in providing comfort and facilitating life of users of the building.
- The basic principles of asset management in a building & facilities maintenance environment
- Importance of Fire safety and its installation techniques
- To Know the principle of Refrigeration and application
- To Understand Electrical system and its selection criteria

COURSE OUTCOMES:

The students will be able to

- Machineries involved in building construction
- Understand Electrical system and its selection criteria
- Use the Principles of illumination & design
- Know the principle of Refrigeration and application
- Importance of Fire safety and its installation techniques
- Know the principle behind the installation of building services and to ensure safety in buildings

UNIT I MACHINERIES **9**

Hot Water Boilers – Lifts and Escalators – Special features required for physically handicapped and elderly – Conveyors – Vibrators – Concrete mixers – DC/AC motors – Generators – Laboratory services – Gas, water, air and electricity

UNIT II ELECTRICAL SYSTEMS IN BUILDINGS 9

Basics of electricity – Single / Three phase supply – Protective devices in electrical installations – Earthing for safety – Types of earthing – ISI specifications – Types of wires, wiring systems and their choice – Planning electrical wiring for building – Main and distribution boards – Transformers and switch gears – Layout of substations

UNIT III PRINCIPLES OF ILLUMINATION & DESIGN **9**

Visual tasks – Factors affecting visual tasks – Modern theory of light and colour – Synthesis of light – Additive and subtractive synthesis of colour – Luminous flux – Candela – Solid angle illumination – Utilization factor – Depreciation factor – MSCP – MHCP –Classification of lighting – Artificial

light sources – Spectral energy distribution – Luminous efficiency – Colour temperature – Colour rendering. Design of modern lighting – Lighting for stores, offices, schools, hospitals and house lighting. Elementary idea of special features required and minimum level of illumination required for physically handicapped and elderly in building types.

UNIT IV REFRIGERATION PRINCIPLES & APPLICATIONS 9

Thermodynamics – Heat – Temperature, measurement transfer – Change of state – Sensible heat – Latent heat of fusion, evaporation, sublimation – saturation temperature – Super heated vapour – Sub cooled liquid – Pressure temperature relationship for liquids – Refrigerants – Vapour compression cycle – Compressors – Evaporators – Refrigerant control devices – Electric motors – Starters – Air handling units – Cooling towers – Window type and packaged air-conditioners – Chilled water plant – Fan coil systems – Water piping – Cooling load – Air conditioning systems for different types of buildings – Protection against fire to be caused by A.C. Systems

UNIT V FIRE SAFETY INSTALLATION 9

Causes of fire in buildings – Safety regulations – NBC – Planning considerations in buildings like non-combustible materials, construction, staircases and lift lobbies, fire escapes and A.C. systems. Special features required for physically handicapped and elderly in building types – Heat and smoke detectors – Fire alarm system, snorkel ladder – Fire lighting pump and water storage – Dry and wet risers – Automatic sprinklers

TOTAL HRS : 45

TEXT BOOKS:

1. E.R.Ambrose, “Heat Pumps and Electric Heating”, John and Wiley and Sons, Inc., New York, 2002.
2. Handbook for Building Engineers in Metric systems, NBC, New Delhi, 2005.

REFERENCES:

1. Philips Lighting in Architectural Design, McGraw-Hill, New York, 2000.
2. A.F.C. Sherratt, “Air-conditioning and Energy Conservation”, The Architectural Press, London, 2005.
3. National Building Code.

B.E-CSE **2018-2019**

18BECEOE03 REPAIR AND REHABILITATION OF STRUCTURES 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To learn various distress and damages to concrete and masonry structures
- To know the influence of corrosion in durability of structures
- To understand the importance of maintenance of structures
- To study the various types and properties of repair materials
- To learn various techniques involved in demolition of structures
- To Assessing damage of structures and various repair techniques

COURSE OUTCOMES:

By the end of this course students will have the capability/knowledge of

- A differential principle applies to solve engineering problems dealing with force**,** displacement, velocity and acceleration.
- Analyses the forces in any structures.
- Solving rigid body subjected to dynamic forces.
- Application of friction in real life problems
- Kinetics, Kinematics, Impulse and Momentum principles
- Solving real time Engineering problems

UNIT – I INTRODUCTION 9

Quality assurance for concrete construction as built concrete properties strength, permeability, thermal properties and cracking. Effects due to climate, temperature, chemicals, wear and erosion, Design and construction errors.

UNIT – II DURABILITY OF STRUCTURES 9

Corrosion mechanism – diagnosis- causes and effects - cover thickness and cracking, measurements for corrosion - methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings, cathodic protection.

UNIT - III MAINTENANCE AND REPAIR STRATEGIES 9

Definitions: Maintenance, repair and rehabilitation, Facets of Maintenance importance of Maintenance Preventive measures on various aspects Inspection, Assessment procedure for evaluating a damaged structure causes of deterioration - testing techniques.

UNIT - IV MATERIALS FOR REPAIR 9

Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, Expansive cement, polymer concrete, sulphur infiltrated concrete, Ferro cement, Fibre reinforced concrete. eliminators and polymers coating for rebars during repair foamed concrete, mortar and dry pack, vacuum concrete.

UNIT - V TECHNIQUES FOR REPAIR AND REPAIR OF STRUCTURES 9

Non-destructive Testing Techniques, Corrosion protection techniques , Gunite and Shotcrete Epoxy injection, Mortar repair for cracks, shoring and underpinning. Repairs to overcome low member strength, Deflection, Cracking, Chemical disruption, weathering wear, fire, leakage, marine exposure Engineered demolition techniques for dilapidated structures - case studies

TOTAL: 45 HRS

TEXT BOOK:

Sl.No	Title of Book	Author of Book	Publisher	Year of Publishing
1	Repair of Concrete Structures	R.T.Allen and S.C.Edwards	Blakie and Sons, UK,	2011

REFERENCES:

Sl.No	Title of Book	Author of Book	Publisher	Year of Publishing
1	Rehabilitation of concrete structures	Dr.B.Vidivelli	Standard publishers, Chennai.	2011

18BECEOE04 COMPUTER-AIDED CIVIL ENGINEERING DRAWING 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Develop Parametric design and the conventions of formal engineering drawing
- Produce and interpret 2D & 3D drawings
- Communicate a design idea/concept graphically/ visually
- Examine a design critically and with understanding of CAD - The student learn to interpret drawings
- to produce designs using a combination of 2D and 3D software.
- Get a Detailed study of an engineering artifact

COURSE OUTCOMES:

The students will be able to

- Develop Parametric design and the conventions of formal engineering drawing
- Produce and interpret 2D & 3D drawings
- Communicate a design idea/concept graphically/ visually
- Examine a design critically and with understanding of CAD - The student learn to interpret drawings, and to produce designs using a combination of 2D and 3D software.
- Get a Detailed study of an engineering artifact
- Planning and designing of structures

UNIT 1: INTRODUCTION

Introduction to concept of drawings, Interpretation of typical drawings, Planning drawings to show information concisely and comprehensively; optimal layout of drawings and Scales; Introduction to computer aided drawing, co- ordinate systems, reference planes. Commands: Initial settings, Drawing aids, Drawing basic entities, Modify commands, Layers, Text and Dimensioning, Blocks. Drawing presentation norms and standards. (7)

UNIT 2: SYMBOLS AND SIGN CONVENTIONS:

Materials, Architectural, Structural, Electrical and Plumbing symbols. Rebar drawings and structural steel fabrication and connections drawing symbols, welding symbols; dimensioning standards (6)

UNIT 3: MASONRY BONDS: English Bond and Flemish Bond – Corner wall and Cross walls - One brick wall and one and half brick wall (5)

UNIT 4: BUILDING DRAWING: Terms, Elements of planning building drawing, Methods of

making line drawing and detailed drawing. Site plan, floor plan, elevation and section drawing of small residential buildings. Foundation plan. Roof drainage plans. Depicting joinery, standard fittings & fixtures, finishes. Use of Notes to improve clarity (7)

UNIT 5: PICTORIAL VIEW: Principles of isometrics and perspective drawing. Perspective view of building.(5)

List of Drawing Experiments:

1. Buildings with load bearing walls including details of doors and windows.
2. Single storey RCC building
3. Multistorey RCC building

TEXT BOOKS:

1. Subhash C Sharma & Gurucharan Singh (2005), " Civil Engineering Drawing" , Standard Publishers
2. Ajeet Singh (2002), " Working with AUTOCAD 2000 with updates on AUTOCAD 200I", Tata- Mc Graw-Hill Company Limited, New Delhi
3. Sham Tickoo Swapna D (2009), " AUTOCAD for Engineers and Designers" , Pearson Education.

REFERENCES:

1. Venugopal (2007), "Engineering Drawing and Graphics + AUTOCAD", New Age International Pvt. Ltd.,
2. Balagopal and Prabhu (1987), " Building Drawing and Detailing", Spades publishing KDR building, Calicut

Courses Offered to other Departments by
Computer Science and Engineering

18BECSOE01	**INTERNET PROGRAMMING**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To study concepts of Internet, IP addresses and protocols
- To explain the concept of web page development through HTML
- To introduce the PERL and explore its current strengths and Weaknesses
- To write working Java code to demonstrate the use of applets for client-side programming
- To study Internet telephony and various multimedia applications
- To Elaborate on the principles of web page development

COURSE OUTCOMES:

Upon completion of this course, the student will be able to:

- Learn the advanced concepts& techniques of Internet and Java.
- Analyze the requirements for and create and implement the principles of web page development
- Understand the concepts of PERL
- Implement client-side programming using java applets
- Generate internet telephony based upon advanced concepts
- Develop applications on internet programming based on java applets and scripts

UNIT I Introduction (9)

Introduction - Network of Networks, Intranet, Extranet and Internet. World Wide Web- Domain and Sub domain, Address Resolution, DNS, Telnet, FTP, HTTP. TCP/IP- Features, Segment, Three-Way Handshaking, Flow Control, Error Control, Congestion control, IP Datagram, IPv4 and IPv6. IP Subnetting and addressing- Classful and Classless Addressing, Subnetting

UNIT II HTML (9)

Introduction, Editors, Elements, Attributes, Heading, Paragraph. Formatting, Link, Head, Table, List, Block, Layout, CSS. Form, Iframe, Colors, Colorname, Colorvalue. Image Maps- map, area, attributes of image area- Extensible Markup Language (XML)- Introduction, Tree, Syntax, Elements, Attributes, Validation, Viewing. XHTML in brief. CGI Scripts- Introduction- Environment Variable, GET and POST Methods.

UNIT III PERL (9)

Introduction, Variable, Condition, Loop, Array, Implementing data structure, Hash, String, Regular Expression, File handling, I/O handling- JavaScript- Basics, Statements, comments, variable, comparison, condition, switch, loop, break. Object – string, array, Boolean, reg-ex. Function, Errors, Validation. Cookies- Definition of cookies, Create and Store a cookie with example. Java Applets- Container Class, Components, Applet Life Cycle, Update method, Applications.

UNIT IV Client-Server programming (9)

Client-Server programming In Java - Java Socket, Java RMI. Threats - Malicious code-viruses,

Trojan horses, worms; eavesdropping, spoofing, modification, denial of service attacks- Network security techniques- Password and Authentication- VPN, IP Security, security in electronic transaction, Secure Socket Layer (SSL), Secure Shell (SSH). Firewall- Introduction, Packet filtering, Stateful, Application layer, Proxy.

UNIT V Internet Telephony (9)

Introduction, VoIP- Multimedia Applications- Multimedia over IP: RSVP, RTP, RTCP and RTSP- Streaming media, Codec and Plugins, IPTV- Search Engine and Web Crawler- Definition, Meta data, Web Crawler, Indexing, Page rank, overview of SEO.

Total Hours: 45

TEXT BOOKS:

1. Paul Deitel, Harvey Deitel and Abby Deitel, "Internet and World Wide Web-How to Program", 5th Edition, 2011.
2. Web Technology: A Developer's Perspective, N.P. Gopalan and J. Akilandeswari, PHI Learning, Delhi, 2013.

REFERENCES:

1. Rahul Banerjee, Internetworking Technologies, An Engineering Perspective, PHI Learning, Delhi, 2011.
2. Robert W. Sebesta, "Programming the World Wide Web", Pearson Education, 2016

B.E-CSE **2018-2019**

18BECSOE02 **MULTIMEDIA AND ANIMATION** **3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To impart the fundamental concepts of Computer Animation and Multimedia
- To study the graphic techniques and algorithms using flash
- Explain various concepts available in 3D animation
- Explain various devices available for animation
- To study the multimedia concepts and various I/O technologies for concept development
- To understand the three-dimensional graphics and their transformations

COURSE OUTCOMES

Upon completion of this course, the student will be able to:

- Develop their creativity using animation and multimedia
- Understand the concepts of Flash and able to develop animation using it
- Understand about various latest interactive 3D animation concepts
- Know the various devices and software available in motion capture
- Understand the concept development process
- Develop an interactive multimedia presentation by using multimedia devices and identify theoretical and practical aspects in designing multimedia applications surrounding the emergence of multimedia technology.

UNIT I Introduction (9)

What is mean by Animation – Why we need Animation – History of Animation– Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects -Creating Animation.

UNIT II Creating Animation in Flash (9)

Introduction to Flash Animation – Introduction to Flash – Working with the Timeline and Frame-based Animation - Working with the Timeline and Tween-based Animation – Understanding Layers - Action script.

UNIT III 3D Animation & its Concepts (9)

Types of 3D Animation – Skeleton & Kinetic 3D Animation – Texturing & Lighting of 3D Animation – 3D Camera Tracking – Applications & Software of 3D Animation.

UNIT IV Motion Caption (9)

Formats – Methods – Usages – Expression – Motion Capture Software's – Script Animation Usage – Different Language of Script Animation Among the Software.

UNIT V Concept Development (9)

Story Developing – Audio & Video – Color Model – Device Independent Color Model – Gamma and Gamma Correction - Production Budgets- 3D Animated Movies.

Total Hours: 45

TEXT BOOK:

1. Computer Graphics, Multimedia and Animation-Malay K. Pakhira,PHI Learning PVT Ltd,2010

REFERENCES:

1. Principles of Multimedia – Ranjan Parekh, 2007, TMH. (Unit I, Unit V)
2. Multimedia Technologies – Ashok Banerji, Ananda Mohan Ghosh – McGraw Hill Publication.
3. Encyclopedia of Multimedia and Animations-Pankaj Dhaka, Anmol Publications-2011

18BECSOE03 PC HARDWARE AND TROUBLE SHOOTING 3H-3C

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To study the basic parts of computer in detail
- Introduce various peripheral devices available for computer and its detailed working concepts
- Overview of various interfaces and other hardware overview
- Assemble/setup and upgrade personal computer systems and discuss about power supplies and the skills to trouble-shoot various power-related problems.
- To study basic concepts and methods in troubleshooting
- To study the installation/connection and maintenance of computer and its associated peripherals.

COURSE OUTCOME:

Upon completion of this course, the student will be able to:

- Identify the main components for the PC, familiarize themselves with PC memories such as RAM and ROM devices and so on.
- Identify various peripheral devices available and its working
- Understand various concepts of hardware and its interface and control
- Perform basic installation of PC. Importance of maintenance is understood
- Understand Various faults and failures are identified and troubleshooting in detail
- Understand overall PC hardware, interfacing, maintenance and troubleshooting

UNIT I Introduction (9)

Introduction - Computer Organization – Number Systems and Codes – Memory – ALU – CU – Instruction prefetch – Interrupts – I/O Techniques – Device Controllers – Error Detection Techniques– Microprocessor – Personal Computer Concepts – Advanced System Concepts – Microcomputer Concepts – OS – Multitasking and Multiprogramming – Virtual Memory – Cache Memory – Modern PC and User.

UNIT II Peripheral Devices (9)

Introduction – Keyboard – CRT Display Monitor – Printer – Magnetic Storage Devices – FDD – HDD – Special Types of Disk Drives – Mouse and Trackball – Modem – Fax-Modem – CD ROM Drive – Scanner – Digital Camera – DVD – Special Peripherals.

UNIT III PC Hardware Overview (9)

Introduction – Hardware BIOS DOS Interaction – The PC family – PC hardware – Inside the System Box – Motherboard Logic – Memory Space – Peripheral Interfaces and Controllers – Keyboard Interface – CRT Display interface – FDC – HDC.

UNIT IV Installation and Preventive Maintenance (9)

Introduction – system configuration – pre installation planning – Installation practice – routine checks – PC Assembling and integration – BIOS setup – Engineering versions and compatibility – preventive maintenance – DOS – Virus – Data Recovery.

UNIT V Troubleshooting (9)

Introduction – computer faults – Nature of faults – Types of faults – Diagnostic programs and tools – Microprocessor and Firmware – Programmable LSI's – Bus Faults – Faults Elimination process – Systematic Troubleshooting – Symptoms observation and analysis – fault diagnosis – fault rectification – Troubleshooting levels – FDD, HDD, CD ROM Problems.

Total Hours: 45

TEXT BOOK:

1. B. Govindarajalu, "IBM PC Clones Hardware, Troubleshooting and Maintenance", 2/E, TMH, 2002.

REFERENCES:

1. Peter Abel, Niyaz Nizamuddin, "IMB PC Assembly Language and Programming", Pearson Education, 2007
2. Scott Mueller, "Repairing PC's", PHI, 1992

B.E-CSE **2018-2019**

18BECSOE04	**JAVA PROGRAMMING**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To understand Object Oriented Programming concepts and basic characteristics of Java
- To know the principles of packages, inheritance and interfaces
- To define exceptions and use I/O streams
- To develop a java application with threads, generics classes and swings
- To explain the need for generic programming
- To design and build simple Graphical User Interfaces

COURSE OUTCOMES:

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

- Develop Java programs using OOP principles
- Develop Java programs with the concepts inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Develop Java applications with threads and generics classes and swings
- Understand various aspects for motivation of generic programming
- Develop various interactive Java programs using OOP concepts of Java

UNIT I INTRODUCTION TO JAVA (9)

Object oriented programming concepts – objects – classes – methods and messages –abstraction and encapsulation – inheritance – abstract classes – polymorphism.- Objects and classes in Java – defining classes – methods - access specifiers – static members –constructors – finalize method

UNIT II PACKAGES (9)

Arrays – Strings - Packages – Java-Doc comments –- Inheritance – class hierarchy –polymorphism – dynamic binding – final keyword – abstract classes

UNIT III I/O STREAMS (9)

The Object class – Reflection – interfaces – object cloning – inner classes – proxies - I/O Streams - Graphics programming – Frame – Components – working with 2D shapes.

UNIT IV EXCEPTION HANDLING (9)

Basics of event handling – event handlers – adapter classes – actions – mouse events – AWT event hierarchy – introduction to Swing – Model-View-Controller design pattern –buttons – layout

management – Swing Components – exception handling – exception hierarchy – throwing and catching exceptions.

UNIT V MOTIVATION FOR GENERIC PROGRAMMING (9)

Motivation for generic programming – generic classes – generic methods – generic code and virtual machine – inheritance and generics – reflection and generics - Multi-threaded programming – interrupting threads – thread states – thread properties – thread synchronization – Executors – synchronizers.

TEXT BOOK:

1. Cay S. Horstmann and Gary Cornell Core Java: Volume I – Fundamentals Sun Microsystems Press 2008

REFERENCES:

1. K. Arnold and J. Gosling The JAVA programming language Third edition, Pearson Education, 2009
2. Timothy Budd Understanding Object-oriented programming with Java Updated Edition, Pearson Education 2002
3. C. Thomas Wu An introduction to Object-oriented programming with Java Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2008

WEBSITES:

1. http://elvis.rowan.edu/~kay/cpp/vc6_tutorial/
2. http://www.winprog.org/tutorial/msvc.html
3. http://www.tutorialized.com/tutorials/Visual-C/1
4. http://www.freeprogrammingresources.com/visualcpp.html

B.E-CSE **2018-2019**

18BECSOE05	**MACHINE LEARNING**	**3H-3C**

Instruction Hours/week: L:3 T:0 P:0 **Marks:** Internal**:40** External**:60** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES

- To introduce the basic concepts and techniques of Machine Learning, supervised and unsupervised learning techniques
- To have a complete understanding of linear models and tree models in machine learning
- To study the various probability based learning techniques
- To learn Dimensionality Reduction Techniques.
- To understand Evolutionary Models and Graphical models of machine learning algorithms
- To discuss the overall concepts of various models in Machine learning

COURSE OUTCOMES

Upon completion of this course, the students will be able to:

- Distinguish between, supervised, unsupervised and semi-supervised learning
- Apply the appropriate machine learning strategy for any given problem based on linear and tree model
- Suggest probability learning algorithms for any given problem
- Understand various dimensionality reduction techniques
- Design systems that uses the appropriate graph models of machine learning
- Modify existing machine learning algorithms to improve classification accuracy / efficiency

UNIT I-INTRODUCTION

Foundations: Linear Algebra-Probability-Vectorization
Learning – Types of *Machine Learning – Supervised Learning* – Preliminaries-Testing Machine Learning Algorithms-Data into Probabilities – Basic Statistics-The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression-Logistic Regression

UNIT II-LINEAR MODELS AND TREE

Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi- layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Networks – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines-Introduction to Deep Learning.

UNIT III - PROBABILISTIC MODELS

Decision Trees – Constructing Decision Trees – Classification and Regression Trees –Feature

Selection-Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning –Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K-Means and K-Medoids Algorithms – Vector Quantization – Self Organizing Feature Map-

Case Study 1 : Analysis of Feature Selection Algorithms for Real World Problems

Case Study 2 : Evaluation of Neural Network Model, Decision Trees and Support Vector Machines for Real World Problems

Case Study 3 : Evaluation of Clustering Algorithms such as K-Means and K-Medoids for Real World Problems

Case Study 4: Modify Supervised & Unsupervised Learning algorithms to improve the learning performance.

UNIT IV -DIMENSIONALITY REDUCTION, EVOLUTIONARY MODELS

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process

UNIT V - GRAPHICAL MODELS

Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

Case Study 5 : Working with Dimensionality Reduction Algorithms for Real World Problems

Case Study 6 : Demonstrating the use of Evolutionary Algorithms to improve the efficiency of the algorithm / to optimization problem for Real World scenarios

Case Study 7 : Working with Markov Models and Bayesian Networks to forecast future for Real World scenarios

TEXt BOOKS:

1. Stephen Marsland, -Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Jason Bell, -Machine learning – Hands on for Developers and Technical Professionals, First Edition, Wiley, 2014
3. Michael Bowles, Machine Learning in Python-Essential Techniques for Predictive Analysis, Wiley Publication, 2015.

REFERENCES:

1. Ethem Alpaydin, -Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014
2. Peter Flach, -Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012.
3. Tom M Mitchell, -Machine Learning, First Edition, McGraw Hill Education, 2013.

WEB RESOURCES:

1) http://nptel.ac.in/courses/106106139/
2)https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-867-machine-learning-fall-2006/
3) https://www.kdnuggets.com/2015/11/seven-steps-machine-learning-python.html
4) https://www.dataquest.io/blog/machine-learning-python/
5)https://www.analyticsvidhya.com/blog/2016/10/16-new-must-watch-tutorials-courses-on-machine-learning/

VALUE ADDED COURSES

18BECS351 PC HARDWARE ASSEMBLY AND TROUBLE SHOOTING 3H-3C

Instruction Hours/week: L:1 T:1 P:0 **Marks:** Internal**: 100** External**:0** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To study the basic parts of computer in detail
- Introduce various peripheral devices available for computer and its detailed working concepts
- Overview of various interfaces and other hardware overview
- Assemble/setup and upgrade personal computer systems and discuss about power supplies and the skills to trouble-shoot various power-related problems.
- To study basic concepts and methods in troubleshooting
- To study the installation/connection and maintenance of computer and its associated peripherals.

COURSE OUTCOME:

Upon completion of this course, the student will be able to:

- Identify the main components for the PC, familiarize themselves with PC memories such as RAM and ROM devices and so on.
- Identify various peripheral devices available and its working
- Understand various concepts of hardware and its interface and control
- Perform basic installation of PC. Importance of maintenance is understood
- Understand Various faults and failures are identified and troubleshooting in detail
- Understand overall PC hardware, interfacing, maintenance and troubleshooting

UNIT I Introduction (6)

Introduction - Computer Organization – Number Systems and Codes – Memory – ALU – CU – Instruction prefetch – Interrupts – I/O Techniques – Device Controllers – Error Detection Techniques – Microprocessor – Personal Computer Concepts – Advanced System Concepts – Microcomputer Concepts – OS – Multitasking and Multiprogramming – Virtual Memory – Cache Memory – Modern PC and User.

UNIT II Peripheral Devices (6)

Introduction – Keyboard – CRT Display Monitor – Printer – Magnetic Storage Devices – FDD – HDD – Special Types of Disk Drives – Mouse and Trackball – Modem – Fax-Modem – CD ROM Drive – Scanner – Digital Camera – DVD – Special Peripherals.

UNIT III PC Hardware Overview (6)

Introduction – Hardware BIOS DOS Interaction – The PC family – PC hardware – Inside the System Box – Motherboard Logic – Memory Space – Peripheral Interfaces and Controllers – Keyboard Interface – CRT Display interface – FDC – HDC.

UNIT IV Installation and Preventive Maintenance (6)

Introduction – system configuration – pre installation planning – Installation practice – routine checks – PC Assembling and integration – BIOS setup – Engineering versions and compatibility – preventive maintenance – DOS – Virus – Data Recovery.

UNIT V Troubleshooting (6)

Introduction – computer faults – Nature of faults – Types of faults – Diagnostic programs and tools –

Microprocessor and Firmware – Programmable LSI‟s – Bus Faults – Faults Elimination process – Systematic Troubleshooting – Symptoms observation and analysis – fault diagnosis – fault rectification – Troubleshooting levels – FDD, HDD, CD ROM Problems.

Total Hours: 30

TEXT BOOK:

1. B. Govindarajalu, “IBM PC Clones Hardware, Troubleshooting and Maintenance”, 2/E, TMH, 2002.

REFERENCES:

1. Peter Abel, Niyaz Nizamuddin, “IMB PC Assembly Language and Programming”, Pearson Education, 2007
2. Scott Mueller, “Repairing PC's”, PHI, 1992

B.E-CSE **2018-2019**

18BECS451	**MOBILE APPLICATION DEVELOPMENT**	**3H-3C**

Instruction Hours/week: L:0 T:1 P:1 **Marks:** Internal**:100** External**:0** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- Describe those aspects of mobile programming that make it unique from programming for other platforms
- Explain installation and working of Android
- Critique mobile applications on their design pros and cons
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- Program mobile applications for the Android operating system that use basic and advanced phone features
- Deploy applications to the Android marketplace for distribution.

COURSE OUTCOMES:

- Ability to install Android in Eclipse
- Understanding of the Android environment to develop projects
- Ability to develop simple Android projects
- Understanding of the android widgets and inclusion of it in projects
- Ability to create android application for playing audio and video files
- Ability to deploy application to the android market place for distribution

LIST OF EXPERIMENTS

1. Installation of Android in eclipse and study of Android Development Tools, Components and Architecture.
2. Creating and Running Android Virtual Device (AVD)
3. Running Hello World Android Project
4. Working with different Android User Interface
5. A simple android application to study various android widgets like text box, buttons, toggle Buttons and Images
6. Working with Android Activity life cycle
7. Working with intents
8. Working with fragments
9. Working with TTS engine in Android
10. A simple android application for playing audio and video files

Total Hours: 3

B.E-CSE **2018-2019**

18BECS651	**CCNA- Introduction to Networks**	**3H-3C**
Instruction Hours/week: L:0 T:0 P:1	**Marks:** Internal**:100** External**:0** Total**:100**	

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To describe how networks, impact our daily lives.
- To describe the role of data networking in the human network.
- To identify the key components of any data network.
- To describe network access, ethernet and network layers concept
- To describe the characteristics of network architectures: fault tolerance, scalability, quality of service and security.
- To devices that make up the network.

COURSE OUTCOMES:

Upon completion of this course the student will be able to:

- Identify and describe internet architecture, structure, functions, components, and models;
- Describe the use of OSI and TCP layered models;
- Identify and describe the nature and roles of protocols and services at the application, network, data link, and physical layers;
- Describe principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations;
- Build simple LAN topologies by applying basic principles of cabling, device configuration, and IP subnetting
- To develop the applications of networks

UNIT-1 **(3)**

Exploring the Network: Globally Connected-LANs, WANs, and the Internet -The Network as a Platform-The Changing Network Environment, **Configuring a Network Operating System:** Introduction-IOS Bootcamp-Getting Basic-Addressing Schemes**, Network Protocols and Communications:** Rules of Communication-Network Protocols and Standards-Moving Data in the Network

UNIT-2 **(4)**

Network Access: Physical Layer Protocols-Network Media-Data Link Layer Protocols-Media Access Control**, Ethernet:** Introduction-Ethernet Protocol -Address Resolution Protocol -LAN Switches, **Network Layer-** Network Layer Protocols- Routing-Routers-Configuring a Cisco Router

UNIT-3 **(4)**

Transport Layer: Introduction-Transport Layer Protocols-TCP and UDP**, IP Addressing:** Introduction-IPv4 Network Addresses -IPv6 Network Addresses -Connectivity Verification, **Subnetting IP Networks:** Introduction-Subnetting IPv4 Network-Addressing Schemes-Design Considerations for IPv6

UNIT-4 **(4)**

Application Layer: Introduction-Application Layer Protocols -Well-Known Application Layer Protocols and Service -The Message Heard around the World**, It's a Network:** Introduction-Create and Grow-Keeping the Network Safe-Basic Network Performance-Managing IOS Configuration Files-Integrated Routing Services

Total Hours:15

REFERENCES:

1. Todd Lammle , CCNA Routing and Switching Study Guide, Wiley; 1 edition, 2013.
2. Wendell Odom , Cisco Ccnet/CCNA Icnd1 100 - 101 Official Cert Guide, Pearson Education; 1 edition, 2013
3. Wendell Odom, Cisco CCNA Routing and Switching Icnd2 200 - 101 Official Cert Guide, Pearson Education; 1 edition, 2013.
4. Kevin Wallace, CCNP Routing and Switching ROUTE 300-101 Official Cert Guide, Cisco Press, 2014.

B.E-CSE **2018-2019**

18BECS751	**CCNA –Routing and Switching Essentials**	**3H-3C**

Instruction Hours/week: L:0 T:0 P:1 **Marks:** Internal**:100** External**:0** Total**:100**

End Semester Exam:3 Hours

COURSE OBJECTIVES:

- To discuss the concepts of basic switched networks and configuration
- To describe the concepts of VLAN and routing concepts
- To describe Inter-VLAN Routing and static routing concepts
- To describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols.
- To analyze, configure, verify, and troubleshoot the primary routing protocols RIPv1, RIPv2, EIGRP, and OSPF.
- To Recognize and correct common routing issues and problems. Model and analyze routing processes.

LEARNING OUTCOMES:

Upon completion of this course the student will be able to:

- Describe the purpose, nature, and operations of a router; describe the purpose and nature of routing tables;
- Describe the purpose and procedure of configuring static routes;
- Develop Inter-VLAN Routing and static routing-based applications
- Design and implement a classless IP addressing scheme for a given network;
- Describe the basis features and concepts of link-state routing protocols;
- Configure and verify basic RIPv1, RIPv2, single area OSPF, and EIGRP operations in a small routed network.

UNIT-1 **(3)**

Introduction to Switched Networks-Objectives-Key Terms-Introduction-LAN Design The Switched Environment. **Basic Switching Concepts and Configuration**-Objectives-Key Terms-Introduction-Basic Switch Configuration-Configure Switch Ports-Switch Security: Management and Implementation

UNIT-2 **(3)**

VLANs Objectives-Key Terms-Introduction-VLAN Segmentation-VLANs in a Multiswitched Environment-VLAN Implementations-VLAN Trunks-Dynamic Trunking Protocol-Troubleshoot VLANs and Trunks-VLAN Security and Design-Design Best Practices for VLANs **Routing Concepts**-Objectives-Key Terms-Introduction-Functions of a Router Connect Devices-Basic Settings on a Router-Verify Connectivity of Directly Connected-Networks Switching Packets Between Networks-Path Determination-Analyze the Routing Table-Directly Connected Routes-Statically Learned Routes-Dynamic Routing Protocols

UNIT-3 **(3)**

Inter-VLAN Routing-Objectives-Key Terms-Introduction-Inter-VLAN Routing Configuration-

Configure Legacy Inter-VLAN Routing-Configure Router-on-a-Stick Inter-VLAN Routing Troubleshoot Inter-VLAN Routing-Layer 3 Switching-Troubleshoot Layer 3 Switching. **Static Routing**-Objectives-Key Terms-Introduction-Static Routing-Types of Static Routes-Configure IPv4 Static Routes-Configure IPv4 Default Routes-Configure IPv6 Static Routes -Configure IPv6 Default Routes-Review of CIDR and VLSM-CIDR-VLSM-Configure IPv6

UNIT-4 **(3)**

Routing Dynamically-Routing Dynamically-Dynamic Routing Protocol-Operation Dynamic Versus Static Routing-Routing Protocol Operating Fundamentals-Types of Routing Protocols -Distance Vector Routing Protocol Operation-Types of Distance Vector Routing Protocols-RIP and RIPng Routing-Configuring the RIPng Protocol-Link-State Dynamic Routing

Single-Area OSPF-Characteristics of OSPF-OSPF Messages-OSPF Operation-Configuring Single-Area-OSPFv2

UNIT-5 **(3)**

Access Control Lists-IP ACL Operation-Standard Versus Extended IPv4 ACLS-Wildcard Masks in ACLs-Guidelines for ACL Creation- Securing VTY Ports with a Standard IPv4 ACL-IPv6 ACLs.**DHCP**-Dynamic Host Configuration Protocol v4-Configuring a Basic DHCPv4 Server-Configure DHCPv4 Client-Troubleshoot DHCPv4. **Network Address Translation for IPv4** - NAT Operation-Types of NAT-Benefits of NAT-Configuring NAT- Configuring Dynamic NAT Configuring- Port Address Translation (PAT)-Port Forwarding

Total Hours:15

REFERENCES:

1. Todd Lammle , CCNA Routing and Switching Study Guide, Wiley; 1 edition, 2013.
2. Wendell Odom , Cisco Ccnet/CCNA Icnd1 100 - 101 Official Cert Guide, Pearson Education; 1 edition, 2013
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