CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
Kandlakoya, Hyderabad – 501 401
B. Tech (CSE-AI & M L) Course Structure-20, Regulation-18

Semester –I							
Course Code	**Category**	**Ccourse Title**	**Hours/ Week**			**Credits**	**Total Contact Hours/ Week**
			L	T	P	C	
A30004	BSC	Linear Algebra and Calculus	3	1	0	4	4
A30009	BSC	Applied Physics	3	1	0	4	4
A30501	ESC	Programming for Problem Solving	3	0	0	3	3
A30313	ESC	Engineering Drawing	1	0	3	2.5	4
A30023	BSC	Applied Physics Lab	0	0	3	1.5	3
A30502	ESC	C Programming Lab	0	0	3	1.5	3
A30505	ESC	Basic Internet of Things Lab	0	0	2	1	2
A30020	HSMC	Introduction to Social Innovation	0	0	2	1	2
Total			**10**	**2**	**13**	**18.5**	**25**

Semester –II							
Course Code	**Category**	**Course Title**	**Hours /Week**			**Credits**	**Total Contact Hours/ Week**
			L	T	P	**C**	
A30005	BSC	Ordinary Differential Equations and Multivariable Calculus	3	1	0	4	4
A30001	HSMC	English	2	0	0	2	2
A30011	BSC	Engineering Chemistry	3	0	0	3	3
A30503	ESC	Data Structures & Algorithms	3	0	0	3	3
A30002	HSMC	English Language Communication Skills Lab	0	0	3	1.5	3
A30012	BSC	Engineering Chemistry Lab	0	0	3	1.5	3
A30504	ESC	Data Structures & Algorithms Lab	0	0	3	1.5	3
A30314	ESC	Engineering Workshop	0	0	3	1.5	3
A30019	BSC	Engineering Exploration &Practice	0	0	3	1.5	3
Total			**11**	**1**	**15**	**19.5**	**27**
Total Credits I year: 38							

Semester –III							
Course Code	**Category**	**Course Title**	**Hours / Week**			**Credits**	**Total Contact Hours/ Week**
			L	T	P	C	
A30506	PCC	Discrete Mathematics	3	0	0	3	3
A30007	BSC	Numerical Techniques &ProbabilityDistributions	3	1	0	4	4
A30513	PCC	Computer Organization & Architecture	3	1	0	4	4
A36201	PCC	Object Oriented Programming	3	0	0	3	3
A30228	ESC	Basic Electrical Engineering	3	0	0	3	3
A30229	ESC	Basic Electrical Engineering Lab	0	0	3	1.5	3
A36202	PCC	JAVA Lab	0	0	3	1.5	3
A30021	HSMC	Social Innovation in Practice	0	0	2	1	2
A30015	MC	Soft Skills & Professional Ethics	0	0	2	0	2
Total			**15**	**2**	**10**	**21**	**27**

Semester –IV							
Course Code	**Category**	**Course Title**	**Hours / Week**			**Credits**	**Total Contact Hours/ Week**
			L	T	P	C	
A36601	PCC	Machine Learning	3	1	0	4	4
A30511	PCC	Design & Analysis of Algorithms	3	1	0	4	4
A30516	PCC	Operating Systems	3	0	0	3	3
A30509	PCC	Database Management Systems	3	1	0	4	4
A30510	PCC	Database Management Systems Lab	0	0	3	1.5	3
A36602	PCC	Machine Learning Lab	0	0	4	2	4
A30517	PCC	Operating Systems Lab	0	0	3	1.5	3
A30016	MC	Gender Sensitization	0	0	2	0	2
A30022	MC	NCC/NSS	0	0	2	0	2
Total			**12**	**3**	**14**	**20**	**29**
Total Credits I year: 41							

Semester –V							
Course Code	**Category**	**Course Title**	**Hours/ week**			**Credits**	**Total Contact Hours/ Week**
			L	T	P	C	
A366XX	PCC	Professional Core Course	3	0	0	3	3
A366XX	PCC	Professional Core Course	3	0	0	3	3
A366XX	PCC	Professional Core Course	3	0	0	3	3
A366XX	PCC	Professional Core Course	3	0	0	3	3
A366XX	PCC	Professional Core Course	3	0	0	3	3
PE	PEC	Professional Elective-I	3	0	0	3	3
A366XX	PCC	Professional Core Course lab	0	0	3	1.5	3
A366XX	PCC	Professional Core Course lab	0	0	3	1.5	3
A30014	MC	Environmental Sciences	2	0	0	0	2
Total			**20**	**0**	**6**	**21**	**26**
A30548	MC	Mini Project-I	During Summer Vacations / Non-Credit				
A30550		Summer Internship-I					

Semester –VI							
Course Code	**Category**	**Course Title**	**Hours/Week**			**Credits**	**Total Contact Hours/Week**
			L	T	P	C	
A366xx	PCC	Professional Core Course	3	0	0	3	3
A366xx	PCC	Professional Core Course	3	0	0	3	3
A366xx	PCC	Professional Core Course	3	0	0	3	3
A366xx	PCC	Professional Core Course	3	0	0	3	3
PE	PEC	Professional Elective-II	3	0	0	3	3
A366xx	PCC	Professional Core Course Lab	0	0	3	1.5	3
A30003	HSMC	Advanced English Communication Skills Lab	0	0	3	1.5	3
A366xx	PROJ	Technical Seminar-I	2	0	0	2	2
A30017	MC	Indian Constitution	2	0	0	0	2
A30018	MC	Essence of Indian Traditional Knowledge					
A30556	MC	Cyber Security	2	0	0	0	2
Total			**21**	**0**	**6**	**20**	**27**
Total Credits III Year: 41							

Semester –VII							
Course Code	**Category**	**Course Title**	**Hours / Week**			**Credits**	**Total Contact Hours/week**
			L	T	P	C	
A30013	HSMC	Business Management & Financial Analysis	4	0	0	4	4
PE	PEC	Professional Elective-III	3	0	0	3	3
	PEC	Professional Elective-IV	3	0	0	3	3
	PEC	Professional Elective-V	3	0	0	3	3
OE	OEC	Open Elective-I	3	0	0	3	3
	OEC	Open Elective-II	3	0	0	3	3
A366xx	PROJ	Major Project Phase-I	0	0	6	3	6
Total			**19**	**0**	**6**	**22**	**25**
A366xx	MC	Mini Project-II	During Summer Vacations / Non-Credit				
A366xx		Summer Internship-II					

Semester –VIII							
Course Code	**Category**	**Course Title**	**Hours / Week**			**Credits**	**Total Contact Hours /week**
			L	T	P	C	
PE	PEC	Professional Elective-VI	3	0	0	3	3
OE	OEC	Open Elective-III	3	0	0	3	3
	OEC	Open Elective-IV	3	0	0	3	3
A366xx	PROJ	Technical Seminar-II	2	0	0	2	2
A366xx	PROJ	Major Project Phase- II	0	0	14	7	14
Total			**11**	**0**	**14**	**18**	**25**
Total Credits IV Year: 40							

Copositon Table

Semester	BS	ES	HS&M	PC	PE	OE	Project	Total Credits
I	9.5	8	1					**18.5**
II	10	6	3.5					**19.5**
III	4	4.5	1	11.5				**21**
IV				20				**20**
V				18	3			**21**
VI			1.5	13.5	3		2	**20**
VII			4		9	6	3	**22**
VIII					3	6	9	**18**
Total	23.5	18.5	11	63	18	12	14	160
%C	***15%***	***12%***	***7%***	***39%***	***11%***	***85***	***95***	
AICTE Credits	**25**	**24**	**12**	**48**	**18**	**18**	**15**	

BS: Basic Sciences
ES: Enginerring Sciences
HS&M: Humnaities, Sciemces & Management
PC: Professional Core
PE: Professional Elective
OE: Open Elective

(A30004) LINEAR ALGEBRA AND CALCULUS
(Common to all branches)

B. Tech (CSE) I Semester

L	T	P	C
3	1	0	4

UNIT-I

Matrices: Types of matrices, Symmetric, Hermitian, Skew-symmetric, Skew-Hermitian, Orthogonal matrices, Unitary matrices, Rank of a matrix by echelon form and normal form, Inverse of non-singular matrices by Gauss-Jordan method, System of linear equations - solving system of homogeneous and non-homogeneous equations, Gauss elimination method, Gauss-Seidel iteration method.

UNIT -II

Eigen values and Eigen vectors: Eigen values, Eigen vectors and their properties, Diagonalization of a square matrix, Cayley-Hamilton theorem (without proof) - Inverse and power of a matrix by Cayley-Hamilton theorem, Quadratic forms and nature of the quadratic forms, Reduction of quadratic form to canonical form by linear and orthogonal transformations.

UNIT -III

Sequences &Series:

Sequence: Definition of a sequence, Limit, Convergent, Divergent and oscillatory sequences.

Series: Definition of a series, Convergent, Divergent and Oscillatory Series, Series of positive terms, Comparison test, P-test, D-Alembert's ratio test, Raabe's test, Cauchy's integral test, Cauchy's root test, Logarithmic test. **Alternating series:** Leibnitz test, Alternating convergent series, Absolute and conditionally convergence.

UNIT -IV

Calculus:

Mean value theorems: Rolle's theorem, Lagrange's mean value theorem with their geometrical interpretation and applications, Cauchy's mean value theorem, Taylor's series, Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (only in Cartesian coordinates),

Improper Integral: Beta, Gamma functions and their applications.

UNIT -V

Multivariable calculus (Partial Differentiation and applications): Definitions of Limit and continuity, Partial differentiation, Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

TEXT BOOKS:

1. Higher Engineering Mathematics, (36th Edition), B.S. Grewal, Khanna Publishers, 2010
2. Advanced Engineering Mathematics, (9th Edition), Erwin kreyszig, John Wiley & Sons,2006.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics (3rd edition) by R.K. Jain & S.R.K. Iyengar, Narosa Publishing House, Delhi.
2. Calculus and Analytic geometry, (9th Edition), G.B. Thomas and R.L. Finney, Pearson, Reprint, 2002.
3. A text book of Engineering Mathematics, N.P. Bali and Manish Goyal, Laxmi Publications, Reprint, 2008.
4. Higher Engineering Mathematics, (11th Reprint), Ramana B.V., Tata McGraw Hill New Delhi, 2010.
5. Engineering Mathematics – I, T.K.V. Iyengar, B. Krishna Gandhi &Others, EditionS. Chand 2013 Yr.
6. Applied Mathematics for Engineers & Physicists (3rd edition) by Pipes &Harvill, McGraw Hill Internation Book company.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Solve linear system represented by matrices.
2. Obtain eigen values, eigen vectors and diagonalization of a square matrix.
3. Analyse the nature of sequence and series.
4. Verify mean value theorems & evaluation of improper integrals by using Beta and Gamma functions
5. Find maxima & minima of functions of several variables.

****END****

(A30009) APPLIED PHYSICS
(ECE, EEE, CSE)

B. Tech (CSE-CS) I Semester

L	T	P	C
3	1	0	4

UNIT-I

Principles of Quantum and Statistical Mechanics: Waves and particles, de-Broglie hypothesis-Matterwaves, Davisson and Germer's Experiment, Heisenberg's Uncertainty principle, Physical significance of the wave function- (qualitative treatment) Schrödinger's time dependent and time independent wave equations, Particle in a one dimensional potential box- equations for energy and wave function,Concept of electron gas,Maxwell-Boltzmann, Bose –Einstein and Fermi–Dirac statistics(qualitative treatment). Density of energy states, Estimation of Fermi energy.

UNIT-II

Semiconductor Physics: Classification of materials into Conductors, Semiconductors &Insulators.Intrinsic Semiconductors-Concentration of electrons in the conduction band &concentration of holes in the valance band, Fermi level in intrinsic semiconductors, Law of mass action, Extrinsic semiconductors, N-Type semiconductor, Carrier concentration in N-Type semiconductors, P-Type semiconductors, Carrier concentration in P-Type semiconductors, drift and diffusion current, Hall effect.

UNIT-III

Physics of Semiconductor Devices: Formation of PN junction, Open circuit PN junction, Energy diagram of PN diode, I-V Characteristics of PN junction diode, Zener diode –breakdown mechanism and characteristics.

Radiative and Non-Radiative recombination, LED, Photo diode &Solar cell-working principle & Applications, Semiconductor photo detectors- PIN and Avalanche structure and their characteristics.

UNIT-IV

Lasers: Characteristics of lasers, Absorption, spontaneous and stimulated emission of radiation, Einstein's coefficients and relation between them, Population inversion, Lasing action, Ruby laser, Helium-Neon laser, Semiconductor diode laser, Applications of lasers.

Fiber Optics: Principle of Optical fiber, Construction of optical fiber, acceptance angle and acceptance cone, Numerical Aperture, Types of optical fibers: Single and Multimode fibers, Step Index optical fibers& Pulse dispersion (qualitative treatment) Graded index optical fibers & Pulse dispersion (qualitative treatment), Attenuation in optical fibers, optical fiber communication, optical fiber sensors.

UNIT-V

Dielectric Properties: Electric dipole, Dipole moment, Relative permittivity, Polarization and polarizability, Electric susceptibility, Displacement vector, Electronic and Ionic polarization, Orientation polarization (qualitative treatment), Internal fields in solids, Clausius–Mossottiequation, Piezo electric and Pyro-electric materials, Ferro electric materials.

Magnetic Properties: Permeability, Field intensity, Magnetic field induction, Magnetization, Magnetic Permeability &Susceptibility, Classification of Dia, Para, Ferro, Ferri and Anti-Ferro magnetic materials on the basis of magnetic moment (qualitative treatment), Explanation of Hysteresis curveon the basis of Domain theory of Ferro magnetism.

Superconductivity: Introduction, Critical field, Meissner effect, Effect of Magnetic field, Type-I and Type-II Superconductors, Cooper pair, BCS Theory of superconductivity (Qualitative treatment), Applications of Superconductors

TEXT BOOKS

1. Engineering Physics by B.K. Pandey,S. Chaturvedi- Cengage Learning India Pvt. Ltd.,1st Edition, 2012.
2. Engineering Physics by PK Palanisamy , SciTech Publications,3rd edition, 2015.

REFERENCES

1. Fundamentals of Physics by Halliday, R. Resnick and J. Walker,John Wiley and Sons,6th edition, 2001.
2. Introduction to Quantum PhysicsbyEisberg and Resnick, John Wiley & Sons, 2nd edition, 1985.
3. Quantum mechanics by D.J Griffiths, Cambridge University press,2nd edition, 2017.
4. Principles of Lasers by O.Svelto, Plenum publishing Corporation,4th edition,1998.
5. Physics of Semiconductor devices by Simon.MSze and Kwok K . Ng, Wiley Student Edition,3rd edition,2006.

COURSE OUTCOMES

On completion of the course students will be able to

1. Explain the basic concepts of quantum & statistical mechanics.
2. Describe the classification of solids and the properties of semiconductors.
3. Illustrate different semiconductor devices.
4. Interpret the basic properties of lasers and characteristics of optical fibers.
5. Classify various polarization processes in solids & different dielectric materials
6. Describe different types of magnetic materials &illustrate the basic principles of superconductivity.
7. Illustrate the basic principles of superconductivity.

END

(A30501) PROGRAMMING FOR PROBLEM SOLVING
(Common to all branches)

B. Tech (CSE-CS) I Semester

L	T	P	C
3	0	0	3

UNIT -I

Introductory Concepts: Introduction to Computers, Computer Characteristics, Modes of Operation, Types of Programming Languages.
Idea of Algorithm: Steps to solve logical and numerical problems.
Representation of Algorithm: Flowchart/ Pseudo code with examples.
Algorithms to programs: Source code, variables (with data types), variables and memory locations, Syntax and Logical Errors in compilation, object and executable code
Introduction to C: Some Simple C Programs, Desirable Program Characteristics.
C Fundamentals: The C Character Set, Identifiers and Keywords, Data Types, Constants Variables and Arrays Declarations, Expressions, Statements, Symbolic Constants.
Preparing and Running a Complete C Program: Planning a C Program, writing a C Program, Entering the Program into the Computer, Compiling and Executing the Program, Error Diagnostics, Debugging Techniques.
Operators and Expressions: Unary Operators, Arithmetic Operators, Relational and Logical Operators, Bitwise Operators, Conditional Operator, Assignment Operators, Special Operators, Precedence & Associativity of Operators, Evaluation of Expressions.
Data Input and Output: Preliminaries, Single Character Input- The getchar Function, Single Character Output- The putchar Function, Entering Input Data- The scanf Function, More About the scanf Function, Writing Output Data- The printf Function, More About the printf Function, The gets and puts Functions.

UNIT -II

Control Statements: Preliminaries, Branching: The if-else Statements, looping: The while Statement, the do while Statement, the for Statement, Nested Control Structures, the switch Statement, the break Statement, the continue Statement, the goto Statement.
Arrays: Defining an Array, Processing an Array, Multidimensional Arrays.

UNIT -III

Functions: A Brief Overview, defining a Function, accessing a Function, Function Prototypes, Passing Arguments to a Function, Recursion, Passing Arrays to Functions.

Program Structure: Storage Classes- Automatic Variables, External Variables, Static Variables and Register Variables, Multi files Programs, More about Library Functions.
Strings: String Handling Functions, Sample C Programs without using library functions.

UNIT -IV

Pointers: Fundamentals Pointer Declarations, Passing Pointers to Functions, Pointers and One-Dimensional Arrays, Dynamic Memory Allocation, Operations on Pointers, Pointers and Multidimensional Arrays, Arrays of Pointers, Passing Functions to other Functions, More about Pointer Declarations.
Structures and Unions: Defining a Structure, processing a Structure, User Defined Data Types- typedef & Enumerations, Structures and Pointers, Passing Structures to Functions, Bit fields, Self-Referential Structures and Unions.

UNIT -V

Data Files: Opening and Closing a Data File, creating a Data File, Processing a Data File, Unformatted Data Files and Command Line Parameters.
Searching and Sorting: Linear and Binary Search, Bubble Sort, Selection Sort and Insertion Sort.

Text Books

1. Byron Gottfried, Schaum's Outline series, "Programming with C", McGraw-Hill.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

Course Outcomes

The student shall be able

1. Write algorithms and to draw flowcharts for solving problems.
2. Convert the algorithms/flowcharts to C programs.
3. Code and test a given logic in C programming language.
4. Decompose a problem into functions and to develop modular reusable code.
5. Write C programs using arrays, pointers, strings and structures and perform searching and sorting the data.

****END****

(A30313) ENGINEERING DRAWING

B. Tech (CSE-CS) I Semester

L	T	P	C
1	0	3	2.5

Unit – I

Introduction to Engineering Drawing: Principles of Engineering Drawing and their Significance; Conic Sections (Using eccentricity method only) Cycloid, Epi cycloid and Hypocycloid.

Unit – II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines (Excluding traces of lines) Projections of Plane regular geometric figures. (Excluding Auxiliary Planes and traces of planes)

Unit – III

Projections of Solids: Projection of regular solids- cube, Cylinder, prisms, pyramids, cone (Excluding Auxiliary Planes).

Unit-IV

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Solids and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts and combinations

Unit-V

Transformation of Projections: Conversion of Isometric Views to Orthographic Views and Vice-versa.

Text Books:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education.

Reference Books:

1. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
2. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers

Course Outcomes

At the end of the Course, the student will be able to:

1. Understand and apply the use of engineering curves in tracing the part of different machine components.
2. Evaluate the concepts of projections and acquire knowledge of visualization skills and convert it into pictorial representation.
3. Create and analyze the 3-D objects of machine components in real world.
4. Explore and evaluate the internal architecture of product by section and development of surfaces.
5. Create and imagine the solid and real objects in real world with axonometric projection.

END

(A30023) APPLIED PHYSICS LAB

B. Tech (CSE) I Semester

L	T	P	C
0	0	3	1.5

(Any 8 experiments are to be performed)

1. Energy gap of P-N junction diode: To determine the energy gap of a semiconductor diode.
2. Solar Cell:To study the V-I Characteristics of solar cell.
3. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.
4. Stewart – Gee's experiment: Determination of magnetic field along the axis of a current carrying coil.
5. Hall effect: To determine Hall co-efficient of a given semiconductor.
6. Photoelectric effect: To determine work function of a given material.
7. LASER: To study the characteristics of LASER sources.
8. Optical fibre: To determine the Numerical aperture of a given fibre and bending losses of Optical fibres.
9. LCR Circuit: To determine the Quality factor of LCR Circuit.
10. Diffraction grating: Determination of wavelength of a source (LASER).
11. Determination of Planck's constant using LED.
12. R-C Circuit: To determine the time constant of R-C circuit.

LABORATORY MANUAL:

1. Laboratory Manual of Engineering Physics by Dr.Y. Aparna&Dr.K. VenkateswaraRao (V.G.S Publishers).
2. Laboratory Manual of Engineering, Published by CMR College of Engineering & Technology

COURSE OUTCOMES

On completion of the course students will be able to

1. Explain the concept of oscillations and resonance.
2. Determine energy gap of a semiconductor diode, Planck's constant and magnetic fields.
3. Describe the characteristics of semiconductor devices
4. Design new experiments in engineering.
5. Evaluate the basic properties of lasers and optical fibers.

END

(A30502) C PROGRAMMING LAB
(Common to all branches)

B. Tech (CSE-CS) I Semester

L	T	P	C
0	0	3	1.5

Lab 1: Familiarization with programming environment

i. Write a simple C program to display "Hello, World!" on the screen

ii Identify various parts in C program.

iii.Compile & Run the C- Program using various Compilers.

iv. Identify Syntax Errors and correct them.

Lab 2: Simple computational problems using arithmetic expressions

i.Write a C program to find the roots of a quadraticequation.

ii.Write a C program to convert centigrade toFahrenheit.

Lab 3:

i.Write a C program to find maximum of given threenumbers.

ii.Write a C program to find the factorial of a positiveinteger.

Lab 4:

i.Write a C program to determine if the given number is a prime number or not.

ii.A Fibonacci sequence is defined as follows:

the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to print the Fibonacci sequence up to n^{th}term.

Lab 5:

i.Write a C program to generate all the prime numbers between 1 and n, where n is avalue supplied by the user using Sieve of Eratosthenesalgorithm.

ii.Write a C program to convert a positive integer to a roman numeral. Ex. 11 isconverted toXI.

Lab 6:

i.Write a C program to print the Pascal trianglespyramid
ii.Write a C program to calculate the followingseries

a) Sin(x) b) Cos(x) c)log(x)

Lab 7:

i.Write a C program that reads two matrices and uses functions to perform the following:

a) Addition of two matrices b) Multiplication of two matrices c) Transpose of a Matrix.

ii.Define four pointer variables, one each of type char, short, int, float. Fill these pointers by allocate memory of required size by calling malloc () function. Read data from the user and fill in the memory (allocated using malloc ()). Finally display the data

Lab 8:

Write a C program to read N students data (Rollo, Name, Marks1, Marks2, Marks3)and find the topper (Use array of structures and implement usingfunctions).

Lab 9:

i.Write a C program that reads 15 names each of up to 30 characters, stores them in an array and use an array of pointers to display them in ascending (ie. alphabetical) order.

ii.Two's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2’s complement of 11100 is 00100. Write a C program to find the 2’s complement of a binarynumber.

Lab 10:

i.Write a C program to display the contents of a file to standard outputdevice.
ii.Write a C program which copies one file to another, replacing all lowercase characters with their uppercaseequivalents

Lab 11:

i.Write a C program that uses non-recursive functions to count the number of palindromes in a givenstring.

ii.Write a C program to replace a substring with another in a given line oftext.

Lab 12:

i.Write C programs for implementing the followingmethods

a) BubbleSort b) Selection Sort c) BinarySearch

Additional Programs:

1.Write a C program that implements the Insertion sort method to sort a given list of integers in ascendingorder.

2.Write a C program that uses functions to perform the following operations:

2.1 To insert a sub-string into a given main string from a givenposition.

2.2 To delete n characters from a given position in a givenstring.

3.Write a C program to compare two files, printing the first line where theydiffer.

4.Write a C program to reverse the first n characters in a file.

The file name and nare specified on the command line. Use fseek () function

5.Write a C program to merge two files into a third file (i.e., the contents of the firstfile Followed by those of the second are put in the third file)

REFERENCE BOOKS:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, CengageLearning, (3rdEdition)
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
4. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, PearsonEducation.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4thEdition

Course outcomes

The student shall be able

1. To test and execute the programs and correct syntax and logical errors.
2. To implement conditional branching, iteration and recursion.
3. To use arrays and structures to formulate algorithms and programs.
4. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
5. Create, read and write to and from simple text and binary files and verifythrough execution.

END

(A30505) BASIC INTERNET OF THINGS LAB
(Common to all branches)

B. Tech (CSE-CS) I Semester	L	T	P	C
	0	0	2	1

Lab Requirements:

Raspberry Pi3 single board Computer, Android SDK, Eclipse IDE, JDK1.8.

Week 1: Introduction to IoT

- Definition of IoT
- History of IoT
- IoT Architecture
- Enabling Technologies for IoT
- Fundamental characteristics of IoT
- Benefits and Applications of IoT
- Introduction to Basic Components

Basic Components				
Jumper wires	LEDs (Light Emitting Diodes)	Resistors	Potentiometer	Diode,
Photo resistor	Buzzer	Temperature Sensor	DC Motor	Push Button
RC Servo	Relays	Breadboard		

Week 2: Programming in python

- Introduction to Python
- Python Installation
- Understanding Python Basics
- Using Arithmetic in your programs
- Learning about Loops

Week 3: Platform Based Development – Raspberry Pi
Introduction to Raspberry Pi

- Why Raspberry Pi?
- Setting up the Raspberry Pi
- Python on Raspberry Pi

Week 4: Basic Experiments Level-1
Demonstration of the following Experiments
Experiment 1: Your First Circuit – To Blink an LED (Light Emitting Diode)
Experiment 2: To Blink an RGB LED

Additional Experiments (optional)

Experiment 1: To read the temperature and display the same in serial monitor. (use LM35 Temperature sensor)
Experiment 2: To make an LED glow when controller detects a button pressed.

Week 5: Basic Experiments Level -2
Demonstration of the following Experiment

Experiment 1: To control an LED according to the range of analog input sensed using photo resistor. (use Light DependantResistor (LDR))

Additional Experiments (optional)

Experiment 1: To interface the Liquid Crystal Display (LCD) with the Raspberry Pi3 to display the characters on the LCD.

Week 6: Basic Experiments Level -3
Demonstration of the following Experiment

Experiment1: To interface the Ultrasonic Sensor with the Raspberry Pi3 to determine the distance of an object from the sensor.

Additional Experiments (optional)

Experiment1: To interface the Infrared sensor with the Raspberry Pi3 to sense the path is clear/indicate the presence of any obstacles.

Week 7: Introduction to Android

- Introduction to Android
- Explain the structure of Android App.

Experiment 1: Create Hello World application with Android.

Week 8

Experiment 1: Create Application to change the Background Color and Background Image
Experiment 2: Explain simple User interface components in Android and create simple Application

Week 9
Experiment 1: Create an application that display color or image as background when selected the radio buttons or checkboxes
Experiment 2: Create an Application to perform addition, Subtraction, multiplication, division.

Week 10

Explain what is activity, intent and its functions.
Experiment 1: Create an application with Android intent.

Week 11

Experiment 1: Create a simple android application with the following event handlers.

a) On Click
b) On Key Down
c) On Focus changed

Week 12

Experiment 1: Explain about Toast, Create Application with User defined Toast Notifications.
Additional Experiment: Create login page by using login activity

Reference Books:

1. ArshdeepBahga, VijayMadisetti, Internet of Things: A Hands-On Approach, Orient Blackswan Private Limited - New Delhi; First edition (2015)
2. John Horton, Android Programming for Beginners, PACKT publications.

Course Outcomes

At the end of the course the student will be able to:

1. Identify and differentiate various components used in IoT Architecture.
2. Write & execute programs in python programming language
3. Use Python programming language to interface with Raspberry
4. Demonstrate the various real time applications using Raspberry Pi
5. Create and Deploy Mobile applications using Android

END

(A30020) INTRODUCTION TO SOCIAL INNOVATION
(Common for all branches)

B. Tech (CSE) I Semester	L	T	P	C
	0	0	2	1

UNIT 1

Community Study: Types and features of communities- Rural, Suburban, Urban and regional, Service based learning, Aims of community-based projects, Community visits.

UNIT 2

Social Innovation across Four Sectors: The four sectors – the non-profit sector, public sector, the private sector, the informal sector, links between and cross sectors.

UNIT 3

Stages of Social Innovation: Social organizations and enterprises, social movements, politics and government, markets, academia, philanthropy, social software and open source methods, common patterns of success and failure.

UNIT 4

Engineering Ethics: Introduction to ethics, moral values, significance of professional ethics, code of conduct for engineers, identify ethical dilemmas in different tasks of engineering, applying moral theories and codes of conduct for resolution of ethical dilemmas.

UNIT 5

Steps forPatent filing and Startups, poster presentation.

References:

1. Social Entrepreneurship for the 21st Century: Innovation Across the Non Profit, Private and Public Sectors; Georgia Levenson Keohane; Tata McGraw Hill
2. Social Enterprises: An Organizational Perspective edited; Benjamin Gidron, YeheskelHasenfeld; Palgrave Macmillan
3. Engineering Ethics: An Industrial Perspective; Gail Baura; Elsevier

4. Intellectual Property and Financing Strategies for Technology Startups; Gerald B. Halt, Jr., John C. Donch, Jr., Amber R. Stiles, Robert Fesnak; Springer
5. Fundamentals of Intellectual Property (English) 1st Edition (Paperback, Dr. Kalyan C. Kankanala) Publisher: Asia Law House ISBN: 9789381849514, 938184951X Edition: 1st Edition, 2012.
6. Indian Patent Law (English, Paperback, Kalyan C. Kankanala) Publisher: Oxford University Press- New Delhi, ISBN: 9780198089605, 0198089600 Edition: 2012.

Course Outcomes:

On Completion of the course, the students will be able to

1. Illustrate the factors affecting social innovation
2. Illustrate the impact of social innovation in various sectors
3. Adopt the ethical values in doing innovation, which leads to betterment of society.

END

(A30005) ODEs AND MULTIVARIABLE CALCULUS
(Common to all branches)

B. Tech (CSE) II Semester

L	T	P	C
3	1	0	4

UNIT-I

First Order ODE: Exact, Linear and Bernoulli's differential equations, Applications, Newton's law of cooling, Law of natural growth and decay.

Equations not of first degree: Equations solvable for p, Equations solvable for y, Equations solvable for x and Clairaut's type.

UNIT -II

Ordinary Differential Equations of Higher Order: Second and higher order linear differential equations with constant coefficients, Non-Homogeneous terms of the type $e^{ax}, \sin ax, \cos ax,$ polynomials in x, $e^{ax}V(x)$ and $x\,V(x)$, Method of variation of parameters, Equations reducible to linear ODE with constant coefficients, Legendre's equation, Cauchy-Euler equation.

UNIT -III

Multivariable Calculus (Integration): Evaluation of Double Integrals (Cartesian and polar coordinates), Change of order of integration (only Cartesian form), Evaluation of Triple Integrals, Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals, **Applications:** Areas (by double integrals) and volumes (by double integrals and triple integrals).

UNIT -IV

Vector Differentiation: Vector point functions and scalar point functions, Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line, Vector Identities, Scalar potential functions, Solenoidal and Irrotational vectors.

UNIT -V

Vector Integration: Line, Surface and volume Integrals. Theorems of Green's, Gauss and Stoke's(without proofs) and their applications.

TEXT BOOKS :

1. Higher Engineering Mathematics, (36th Edition), B.S. Grewal, Khanna Publishers, 2010
2. Advanced Engineering Mathematics, (9th Edition), Erwin kreyszig, John Wiley & Sons,2006.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics (3rd edition) by R.K. Jain & S.R.K. Iyengar, Narosa Publishing House, Delhi.
2. Differential Equations with Applications & Historical Notes(2ndEdi) by George F Simmons, Tata Mc. graw Hill Publishing Co Ltd.
3. Advanced Engineering Mathematics(8thEdition) by Kreyszig, John Wiley & Sons Publishers
4. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry(9thEdition), Pearson, Reprint, 2002
5. Mathematics for Engineering and Scientists (6th Edi), by. Alan Jeffrey, 2013, Chapman & Hall / CRC
6. Engineering Mathematics – I by T.K.V. Iyengar, B. Krishna Gandhi & Others, 2012 Yr. Edition S. Chand.
7. Differential Equations (3rd Ed), S. L. Ross Wiley India, 1984.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Determine first order differential equations and obtain solutions.
2. Solve higher order linear differential equations using various methods.
3. Evaluate areas and volumes using multiple integrals.
4. Evaluate Gradient, Divergence, Curl and directional derivatives.
5. Evaluate integrals by converting line to surface integral and surface to volume integrals.

****END****

(A30001) ENGLISH

B. Tech (CSE-CS) II Semester

L	T	P	C
2	0	0	2

UNIT-I:
Reading: On the Conduct of Life: William Hazlittfrom "Language and Life: A Skills Approach" Published by Orient Black Swan, Hyderabad.
Grammar: Prepositions
Vocabulary: Word Formation I: Introduction to Word Formation
Writing: Clauses and Sentences

UNIT-II:
Reading: The Brook: Alfred Tennyson from "Language and Life: A Skills Approach" Published by Orient Black Swan, Hyderabad**.**
Grammar: Articles
Vocabulary: Word Formation II: Root Words from Other Languages
Writing: Punctuation
Life Skills: Self Improvement- 'How I Became a Public Speaker': George Bernard Shah

UNIT-III:
Grammar: Noun-Pronoun Agreement, Subject-Verb Agreement
Vocabulary: Word Formation III: Prefixes and Suffixes from Other Languages
Writing: Principles of Good Writing
Life Skills: Time Management- 'On Saving Time': *Seneca*

UNIT-IV:
Grammar: Misplaced Modifiers
Vocabulary: Synonyms and Antonyms
Writing: Essay Writing
Life Skills: Innovation- Muhammad Yunus – A biography

UNIT –V:
Reading: Politics and English Language: George Orwell from "Language and Life: A Skills Approach" Published by Orient Black Swan, Hyderabad.
Grammar: Clichés, Redundancies
Vocabulary: Common Abbreviations
Writing: Writing a Summary

TEXTBOOKS:

1. A Text book entitled **"Language and Life: A Skills Approach"** Published by Orient Black Swan, Hyderabad. ISBN:978-93-5287-422-4

REFERENCES:

1. Practical English Usage. Michael Swan. OUP. 1995
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

COURSE OUTCOME:

At the end of the course the student will be able to:

1. Apply the Noun-Pronoun Agreement, Subject-Verb Agreement in sentence formation.
2. Identify the Root Words from other Languages.
3. Describe the word formation in English language.
4. Employ Synonyms, Antonyms, Affixation and Acronyms in writing and speaking correct English.
5. Compose essays and summaries in English.
6. Apply the time management skills to make best use of time effectively.
7. Apply the public speaking skills in giving presentations and speeches in English.

END

(A30011) ENGINEERING CHEMISTRY

B. Tech (CSE-CS) II Semester

L	T	P	C
3	0	0	3

UNIT-I

Molecular Structure and Theories of Bonding:

Introduction, Concept of atomic and molecular orbitals, Linear combination of atomic orbitals (LCAO), Molecular orbitals of diatomic molecules, Molecular orbital energy level diagrams of diatomic molecules- N_2, O_2 and F_2, π –molecular orbitals of butadiene and benzene.

Crystal Field Theory (CFT):

Salient features of CFT, Crystal field splitting patterns of transition metal ion d-orbitals- tetrahedral, octahedral and square planar complexes.

UNIT-II

Electrochemistry:

Introduction**,** Conductance- Specific conductance, Equivalentconductance, Molar conductance and their inter relationship, Numerical problems, Electrochemical cell, Electrode potential, Standard electrode potential and E.M.Fof the cell, Nerns't equation- derivation and applications, Types of electrodes- Quinhydrone electrode, Calomel electrode and Glass electrode. Electro chemical series and its applications. Concept of concentration cells, Electrolytic concentration cell and numerical problems, Batteries- primary (Lithium cell), secondary (Lead acid storage battery and Lithium ion battery) and Fuel cells(H_2-$O_2$and methanol-oxygen).

Corrosion:

Causes and effects of corrosion, Theories of chemical and electrochemical corrosion, Mechanism of electrochemical corrosion, Pilling-Bedworth rule, Types of corrosion- Galvanic, Waterline and Pitting corrosion, Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection, Sacrificial anode and Impressed current cathodic methods, Surface coatings- Metallic coatings, hot dipping, galvanizing and tinning,Electroplating- Copper plating andelectrolessplating - Nickel plating.

UNIT –III

Spectroscopic Techniques and Applications:

Principles of spectroscopy and selection rules, Applications of UV-Visible spectroscopy, Vibrational and rotational spectroscopy (IRspectroscopy)-Applications, Nuclear magnetic resonance-Chemical shift, Splitting pattern and Integration, Introduction to magnetic resonance imaging.

UNIT-IV

Water Technology:

Sources of water, Impurities in water, Hardness of water, Temporary and permanent hardness, Units of hardness, Estimation of temporary and permanent hardness of water, EDTA method, Numerical problems, Potable water treatment-Specifications, Steps involved in treatment-Sedimentation, Coagulation, Filtration, Sterilization, Desalination of Brackish Water, Reverse Osmosis and Electro dialysis.

Industrial water treatment, Boiler Troubles-Scales andsludges, Caustic embrittlement, Boiler corrosion, Priming and foaming. Hot lime and cold lime soda process-Numerical problems, Zeolite process and Ion exchange process. Internal conditioning methods like Phosphate, Carbonate, Calgon and Colloidal conditioning.

UNIT-V

Stereochemistry:

Representations of three-dimensional structures, Structural isomers and stereoisomers, Configurations and symmetry, Chirality- Enantiomers, Diastereomers, Optical activity, Absolute configurations and conformational analysis of n-butane.

Organic Reaction Mechanisms and Synthesis of a Drug Molecule:

Introduction, Substitution reactions- Nucleophilic substitution reactions (Mechanisms of SN^1 and SN^2 reactions, Addition Reactions-Electrophilic and nucleophilic addition reactions, Addition of HBr to propene, Mar kownikoff and anti markownikoff'sadditions, Grignard additions on carbonyl compounds, Elimination reactions- Dehydrohalogenation of Alkyl halides, Shetzeff rule.
Oxidation reactions- Oxidation of Alcohols using $KMnO_4$ and chromic acid, Reduction reactions-reduction of carbonyl compounds using $LiAlH_4$, $NaBH_4$, Synthesis of a commonly used drug molecules (Paracetamoland Ibuprofen).

Text Books:

1. "Engineering Chemistry", P.C Jain and Jain Monika,DhanpatRai Publication Company, 16th Edition, 2015.
2. Text Book of Engineering Chemistry by A.Jaya Shree, Wiley India Pvt. Ltd, New Delhi.

Reference Books:

1. University chemistry, by B. H. Mahan, Narosa Publication.1998.
2. Chemistry: Principles and Applications, by M. J. Sienko and R.A. Plane, McGraw-Hill, 3rd edition, 1980.
3. Fundamentals of Molecular Spectroscopy, by C. N. Banwell, McGraw-Hill, 3rdrevised edition, 1983.
4. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S.Krishnan.
5. Physical Chemistry, by P. W. Atkins, W.H. Freeman and Company, 5th Edition, 1994.
6. "Text Book of Engineering Chemistry", B.Rama Devi, Ch. VenkataRamana Reddy and PrasanthRath,Cengage Learning 2017.
7. "Organic Chemistry", Morison and Boyd, Pearson publications, 7th Edition 2011.
8. Organic Chemistry: Structure and Function by K.P.C.Volhardt and N.E.Schore,5thEdition
   http://bcs.whfreeman.com/vollhardtschore5e/default.asp

Course Outcomes:

After completion of the course students will be able to

1. Explain the benefits of treated water as source in steam generation in industrial applications.
2. Describe how electrochemical concepts can be used in various practical applications, like batteries, fuel cells etc.
3. Apply knowledge of corrosion science to problems in materials engineering.
4. Explain various methods of prevention of corrosion of metals.
5. Explain the chemical applications of electricity.
6. Analyze microscopic chemistry in terms of atomic and molecular orbitals.
7. List major chemical reactions that are used in the synthesis of drugs.

****END****

(A30503) DATA STRUCTURES & ALGORITHMS
(Common to ECE, CSE, EEE, IT)

B. Tech (CSE) II Semester

L	T	P	C
3	0	0	3

UNIT - I

Data Structures: Introduction, classification of Data structures, ADT and applications, Over view of List and its operations.

Linked Lists: Representation in memory, Operations of Singly Linked List: Traversing, Searching, Insertion, Deletion and Reverse, Doubly Linked List and its Operations, Circular Linked Lists and its Operations.

UNIT - II

Stacks: Stack ADT and its implementations, Applications of Stacks: Infix to Postfix Conversion and Postfix evaluation – Corresponding algorithms.

Queues: Queue ADT and its implementations, Types of Queue: Simple Queue, Circular Queue, Priority Queue; Operations on each type of Queues-Corresponding Algorithms.

UNIT - III

Trees: Basic Tree Terminologies, Representations, types of Binary Trees: Threaded Binary Tree, Binary Search Tree, AVL Tree and their operations: Insertion Deletion, Traversal.

UNIT – IV

Graphs: Basic Terminologies, Representations, Graph traversal algorithms.

Dictionaries: Dictionary as a linear list and its operations-Insertion, Deletion, Searching, Hash tables, Hash Functions, Collision Resolution Techniques-Linear Probing, Quadratic Probing, and Double Hashing.

UNIT V

Sorting: Quick Sort, Merge Sort, Heap Sort, comparison of techniques.

Pattern Matching Algorithms: Brute-Force Algorithm and Knuth-Morris-Pratt Algorithm.

Text books:

1. Ellis Horowitz, Sartaj Sahni, Fundamentals of Data Structures in C, Second Edition Universities Press.
2. Thomas H. Cormen Charles E. Leiserson, Introduction to Algorithms, PHI Learning Pvt. Ltd. Third edition.

Reference books:

1. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. E.Balagurusamy Data Structures Using C, McGraw Hill Education; First edition

Course Outcomes:

On completion of the course students will be able to

1. Use data structure concepts for realistic problems.
2. Identify appropriate data structure for solving computing problems in respective language.
3. Develop algorithms, operations on queues, stacks and Linked Lists.
4. Demonstrate the representation and traversal techniques of graphs and their applications
5. Implement basic operations on binary trees.

END

(A30002) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

B. Tech (CSE) II Semester

L	T	P	C
0	0	3	1.5

English Language Communication Skills Labshall have **two** parts

A. **Computer Assisted Language Learning (CALL) Lab**
B. **Interactive Communication Skills (ICS) Lab**

INTRODUCTION:
The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

EXERCISE – I
CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants
ICS Lab: Ice-Breaking activity and JAM session

EXERCISE – II
CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.
ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

EXERCISE – III
CALL Lab: Minimal Pairs- Word accent and Stress Shifts.
ICS Lab: Descriptions – Place, Person, Object

EXERCISE – IV
CALL Lab: Intonation and Common errors in Pronunciation.
ICS Lab: Extempore- Public Speaking

EXERCISE – V
CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab: Giving Directions

COURSE OUTCOMES:

At the end of the lab session, learner comprehends, acquaints and adopts the following.

1. Illustrates How to Work in Teams
2. Demonstrates Soft Skills and Communications Skills well and Exhibits Decorum with ease
3. Minimizes the usage of Mother Tongue and Apprises Neutral Accent
4. Prepares for employability skills
5. Speaks English Confidently and does Presentations with self-confidence
6. Distinguishes between Sympathy and Empathy
7. Demonstrates the art of persuasion

****END****

(A30012) ENGINEERING CHEMISTRY LAB

B. Tech (CSE-CS) II semester

L	T	P	C
0	0	3	1.5

1. Estimation of Hardness of water by EDTA method.
2. Estimation of Alkalinity of water.
3. Estimation of Copper by Colorimetric Method.
4. Conductometric Titration of a strong acid vs a strong base.
5. Conductometric Titration of a week acid vs a week base.
6. Potentiometric Titration of a strong acid vs a strong base.
7. Potentiometric Titration of week acid vs a week base.
8. Preparation of Paracetmol and Asprin.
9. Determination of Viscosity of a Liquid.
10. Determination of Surface Tension of a liquid.
11. Adsorption of acetic acid on Activated charcoal.
12. Estimation of iodine in table salt.
13. Thin Layer Chromatography (Ortho-Nitro phenol &Para-Nitro phenol).
14. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate.

Course outcomes:

At the end of the course the student will be able to

1. Predict the extent of hardness range present in water sample and its consequences in industrial operations
2. Prepare drugs like Aspirin and Paracetmol
3. Estimate the strength of solutions, pH of various solutions
4. Evaluate the viscosity and surface tension of liquids
5. Employ the conductometric and potentiometric titrations
6. Describe the principlesof adsorption phenomenon.

REFERENCES:

1.Engineering Chemistry Lab Manual, Glaze Publishers 2018.
2.Engineering chemistry by B. Rama Devi & Ch. VenkataRamana Reddy; Cengage Learning, 2012.
3.A Textbook of Engineering Chemistry, SashiChawla, DhanapathRai& Sons.

****END****

(A30504) DATA STRUCTURES & ALGORITHMS LAB
(Common to ECE, CSE, EEE, IT)

B. Tech (CSE) II Semester

L	T	P	C
0	0	3	1.5

Lab 1: Write a C program to perform the following operations on the givenarray
(i) insert element in specific position in toarray
(ii) Delete random element fromarray
(iii) Reverse the arrayelements

Lab 2: A) Write a C program to implement Single linkedlist
i) Insertion ii) Deletion iii) Display
B)Write a C program to implement Circular linkedlist
i) Insertion ii) Deletion. iii)Display

Lab 3: A) Write a C program to implement Doubly linkedlist
i) Insertion ii) Deletion. iii)Display
B) Write C programs to implement Stack ADTusing
i)Array ii) LinkedList

Lab 4:
A. Write a C program that uses stack operations to convert a given infix expression in to its postfix equivalent. (Display the role ofstack).
B. Write a C program for Evaluation of postfixexpression.
.

Lab 5: Write C programs to implement Queue ADT using
i) Array ii) Linked List

Lab 6: Write a C program to implement Binary search tree
i) Insertionii) deletioniii) Traversals

Lab 7:
Write a C program to implement binary search tree Non - recursively traversals
i) Pre- Order ii) Post –Order iii) In-Order

Lab 8:
(A) Write a C Program to Check if a Given Binary Tree is an AVL Tree or Not
(B) Write a C program to find height of a Binary tree
(C) Write a C program to count the number of leaf nodes in a tree.

Lab 9:
Write a C program for implementing Graph traversal
i) DFS ii) BFS

Lab 10:
A) Write a C program to implement different hash methods
B) Write a C program to implement the following collisionresolving
i) Quadratic probing. ii) Linear Probing

Lab 11:
Write C programs for implementing the following Sorting methods and display the important steps.
i) Quick Sort ii) Heap sort

Lab 12:
Write a C program for implementing pattern matching algorithms
i) Knuth-Morris-Pratt ii) Brute Force

Additional

1. Implement the priority queue using Heap
2. Write a C Program to Implement Merge sort
3. Write a C program to implement AVL tree
   i) Creation ii) Deletion iii) Traversals
4. Write a function to reverse the nodes of a linked list
5. Write a C program to implement 2-3-4 tree operations
6. Write a C program to implement B tree operations
7. Write a C program to implement B+ tree operations

Reference Books:

1. Ellis Horowitz, Sartaj Sahni, Fundamentals of Data Structures in C, Second Edition Universities Press.
2. Thomas H. Cormen Charles E. Leiserson, Introduction to Algorithms, PHI Learning Pvt. Ltd. Third edition.
3. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
4. E.Balagurusamy Data Structures Using C, McGraw Hill Education; First edition

Course Outcomes

At the end of the course the student will be able to

1. Write and execute C-programs to implement Linked List Data Structures
2. Evaluate postfix expressions by implementing in C-language
3. Implement Non- linear Data Structures in C-language
4. Implement various sorting techniques in C-language
5. Test various pattern matching algorithms by implementing in C-language.

(A30314) ENGINEERING WORKSHOP

B. Tech (CSE-CS) II Semester

L	T	P	C
0	0	3	1.5

I Trade for Exercise:

(Two experiments each from any six trades of the following)

1. Carpentry
2. Fitting
3. Tin-smithy
4. House-wiring
5. Foundry
6. Plumbing
7. Welding
8. Black smithy

II Trades for Demonstration and Exposure:

1. Power tools
2. Machine Tools- Turning on Lathe and other Operations on Lathe.,

TEXT BOOK:

1. Workshop Manual, Second edition/ P Kannaiahand K L Narayana/ Scitech publishers

Course Outcomes

On completion of the course students will be able to

1. Create the different patterns with desired shape and size by using wood.
2. Align and assemble different components to create a product by fitting operations.
3. Fabricate the given material to desired product in a particular pattern by tin smithy.
4. Understand the basic principles of electrical systems in day-to-day applications.
5. Mould the component to desire pattern and shape by black smithy.
6. Create the object by casting process using molten metal.
7. Assemble the components with permanent joint by welding process.
8. Understand the process, transfer of fluid or gases from one place to another place by connecting set of pipes with different requirements in plumbing process

END

(A30019) ENGINEERING EXPLORATION & PRACTICE
(Common to all branches)

B. Tech (CSE) II Semester

L	T	P	C
0	0	3	1.5

Module 1

Introduction to Engineering and Engineering Study: Introduction to Engineering and Engineering Study: Difference between science and engineering, scientist and engineer needs and wants, various disciplines of engineering, some misconceptions of engineering, Expectation for the 21st century engineer.

Module 2

Engineering Design: Engineering Design Process, Multidisciplinary facet of design, Importance of analysis in engineering design, general analysis procedure, Pair wise comparison chart, Introduction to mechatronics system, generation of multiple solution, decision matrix, Concepts of reverse engineering

Module 3

Mechanisms: Basic Components of a Mechanism, Degrees of Freedom or Mobility of a Mechanism, 4 Bar Chain, Crank Rocker Mechanism, Slider Crank Mechanism.

Module 4

Platform based development: Introduction to various platform-based development, programming and its essentials, Introduction to transducers and actuators and its interfacing. Concepts of reverse engineering

Data Acquisition and Analysis: Types of Data, Descriptive Statistics techniques as applicable to different types of data, Types of graphs as applicable to different types of data, Usage of data acquisition tools for descriptive statistics, Data Acquisition, Exporting acquired data to analysis using visual representation

Module 5

Project Management: Introduction, Significance of teamwork, Importance of communication in engineering profession, Project management tools: Checklist, Timeline, Gantt Chart, Significance of documentation

Sustainability: Introduction to sustainability, Sustainability leadership, Life cycle assessment, carbon footprint

References:

1. Engineering Fundamentals: An Introduction to Engineering (MindTap Course List) 5th Edition by Saeed Moaveni
2. Software Project Management (SIE), (Fifth Edition); Bob Hughes,MikeCotterell,Rajib Mall; Published by Tata McGraw-Hill Education Pvt. Ltd (2011) ; ISBN 10: 0071072748 ISBN 13: 9780071072748
3. A Ghosh and AK Malik: Theory of Mechanism and Machine; East West Press (Pvt) Ltd., New Delhi.
4. Arduino Cookbook, 2nd Edition by Michael Margolis: O'Reilly Media
5. Data Acquisition and Analysis - Building an Excel Budget Forecast Workbook by Andrew Greaney (Kindle Edition)ISBN: 1521903468
6. Concepts in Engineering Design – 2016; by Sumesh Krishnan (Author), Dr. Mukul Shukla (Author), Publisher: Notion Press

Course Outcomes:

On Completion of the course, the students will be able to

1. Explain the role of an Engineer as a problem solver.
2. Identify multi-disciplinary approach required in solving an engineering problem
3. Analyse a given problem using process of engineering problem analysis.
4. Build simple systems using engineering design process.
5. Analyse engineering solutions from sustainability perspectives.
6. Use basics of engineering project management skills in doing projects.
7. Demonstrate data acquisition and analysis skills using a tool.

END

(A30506) DISCRETE MATHEMATICS

B. Tech (CSE-AIML) III Semester

L	T	P	C
3	0	0	3

Unit-I

Sets, Relations and Functions: Operations and Laws of Sets, Cartesian Products, Binary Relation, Partial Ordering Relation, Equivalence Relation, Image of a Set, Sum and Product of Functions, Bijective functions, Inverse and Composite Function, Size of a Set, Finite and infinite Sets, Countable and uncountable Sets, Cantor's diagonal argument and The Power Set theorem, Schroeder-Bernstein theorem.

Unit-II

Principles of Mathematical Induction: The Well-Ordering Principle, Recursive definition, The Division algorithm: Prime Numbers, The Greatest Common Divisor: Euclidean Algorithm, The Fundamental Theorem of Arithmetic. Basic counting techniques-inclusion and exclusion, pigeon-hole principle, permutation and combination.

Unit-III

Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.

Unit-IV

Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Free and Cyclic Monoids and Groups, Permutation Groups, Substructures, Normal Subgroups, Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean Algebra and Boolean Ring, Identities of Boolean Algebra, Duality, Representation of Boolean Function, Disjunctive and Conjunctive Normal Form

Unit-V

Graphs and Trees: Graphs and their properties, Degree, Connectivity, Path, Cycle, Sub Graph, Isomorphism, Eulerian and Hamiltonian Walks, Graph Coloring, Coloring maps and Planar Graphs, Coloring Vertices, Coloring Edges, List Coloring, Perfect Graph, definition properties and Example, rooted trees, trees and sorting, weighted trees and prefix codes, Bi-connected component and Articulation Points, Shortest distances.

Text books:

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th Edition, Tata McGraw – Hill
2. Susanna S. Epp, Discrete Mathematics with Applications,4th edition, Wadsworth
Publishing Co. Inc.
3. C L Liu and D P Mohapatra, Elements of Discrete Mathematics A Computer OrientedApproach, 3rd Edition by, Tata McGraw – Hill.

Reference books:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structure and It's Application toComputer Science", TMG Edition, TataMcgraw-Hill
2. Norman L. Biggs, Discrete Mathematics, 2nd Edition, Oxford University Press. Schaum's Outlines Series, Seymour Lipschutz, Marc Lipson,
3. Discrete Mathematics, Tata McGraw – Hill

Course Outcomes

On completion of the course students will be able to

1. Identify various types of Sets, Relations and Functions.
2. Apply Principle of Inclusion and Exclusion technique.
3. Describe various methods of Proving a logical statement.
4. Classify various Algebraic Structures.
5. State the properties of Graphs & Trees.

****END****

(A30007) NUMERICAL TECHNIQUES & PROBABILITY DISTRIBUTIONS
(Common to CE, ME, CSE, IT)

B. Tech (CSE-AIML) III Semester

L	T	P	C
3	1	0	4

UNIT-I: NUMERICAL METHODS-I

Solution of polynomial and transcendental equations: Bisection method, Iteration method, Newton-Raphson method and Regula-False method.

Interpolation: Finite differences, Forward differences, Backward differences, Central differences, Symbolic relations and separation of symbols, Interpolation using Newton's forward and backward difference formulae. Central difference interpolation, Gauss's forward and backward formulae, Lagrange's method of interpolation.

UNIT-II: NUMERICAL METHODS-II

Numerical integration: Trapezoidal rule, Simpson's 1/3rd and 3/8 rules.

Numerical Solutions of Ordinary Differential Equations -Taylor's series, Picard's method, Euler and modified Euler's methods, Runge-Kutta method of fourth order.

UNIT-III: LAPLACE TRANSFORMS

Laplace transform of standard functions, First shifting theorem, Laplace transforms of functions when they are multiplied and divided by't'. Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transforms of special functions, Laplace transform of periodic functions. Inverse Laplace transform by different methods, Convolution theorem (without Proof), Solving ODEs by Laplace transform method.

UNIT- IV:

RANDOM VARIABLES & DISTRIBUTIONS

Random Variables: Discrete and continuous random variables.

Distributions: Binomial distribution, Poisson distribution and their Properties, Normal distribution, Sampling distribution of means (σ - known and unknown).

UNIT- V:TEST OF HYPOTHESIS

Test of hypothesis, Null hypothesis, Alternative hypothesis, Type-I & II errors, Critical region, Confidential interval for the mean & proportions. Test of

hypothesis for large samples, Single mean, Difference between the means, Single proportion and difference between the proportions. Test of hypothesis for Small samples, Confidence interval for the t- distribution, Tests of hypothesis t -test, F-test, χ2- test, goodness of fit.

TEXT BOOKS:

1. Higher Engineering Mathematics (36th edition) by B.S. Grewal, Khanna Publishers.
2. Fundamentals of Mathematical Statistics (11th Edition) by S.C. Gupta& VK Kapoor, Sultan Chand & Sons.

REFERENCE BOOKS:

1. Advanced Engineering Mathematics (3rd edition) by R.K. Jain & S.R.K. Iyengar, Narosa Publishing House, Delhi.
2. Introductory Methods of Numerical Analysis, S.S. Sastry, 4h Edition, Prentce Hall of India Pvt. Ltd.
3. Advanced Engineering Mathematics (9th edition) by Erwin Kreyszig John Wiley & Sons Publishers.
4. Probability & Statistics by T.K.V. Iyengar, B. Krishna Gandhi & Others, 2015 Yr. Edition S. Chand.
5. Applied Mathematics for Engineers & Physicists (3rd edition) by Pipes & Harvill, McGraw Hill Internation Book company.

COURSEOUTCOMES:

On completion of the course students will be able to

1.Find the root of given equation and estimate unknown value using interpolation.

2.Find numerical solutions of ordinary differential equations.

3.Solve ordinary differential equations using Laplace transform.

4.Analyse random variables involved in probability models.

5.Test hypothesis for large and small samples.

END

(A30513) COMPUTER ORGANIZATION & ARCHITECTURE

B. Tech (CSE-AIML) III Semester

L	T	P	C
3	1	0	4

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

Unit-II

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-and-add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.

Unit-III

Introduction to x86 architecture. CPU control unit design: hardwired and micro-programmed design approaches, 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-IV

Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards. Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency

Unit-V

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.

Reference books:

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.

Course Outcomes

On completion of the course students will be able to

1. Describe basic computer organization
2. Explain the design of Control Unit.
3. Illustrate Data representation in computer's memory
4. Describe Input-Output, Memory Organization.
5. Distinguish between RISC and CISC Instruction Set.

END

(A36201) OBJECT ORIENTED PROGRAMMING

B. Tech (CSE) III Semester

L	T	P	C
3	0	0	3

Unit-I

Introduction to Object Oriented Programming: Need for Object Oriented Programming - Characteristics of Object-Oriented Languages, Objects, Overloading, Overriding Functions and Object Polymorphism, Inheritance, Abstraction, Interfaces, java introduction & language fundamentals

Packages: Defining, Creating and Accessing a Package, Understanding Class path, Importing Packages

Unit-II

Inner Classes: Use of Inner Classes, Local Inner Classes, Anonymous Inner Classes, Static Inner Classes, Example.

Exception Handling: Dealing with Errors, Benefits of Exception Handling, The Classification of Exceptions, Exception Hierarchy, Checked Exceptions and Unchecked Exception, Usage of Try, Catch, Throw, Throws, and Finally, Re-Throwing Exceptions, Exception Specification, Built in Exceptions, Creating Own Exception Sub Classes.

Unit-III

Multithreading: Difference Between Multiple Processes and Multiple Threads, Thread States, Creating Threads, Interrupting Threads, Thread Priorities, Synchronizing Threads, Inter-Thread Communication, Producer Consumer Pattern.

File I/O: Streams-Byte Streams, Character Streams, Text Input /Output, Binary Input/output, File Management using File Class

Unit-IV

Collection Framework in Java: Introduction to Java Collections, Overview of Java Collection Frame Work, Generics, Commonly used Collection Classes-Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendar and Properties.

Connecting to Database: JDBC Type I To IV Drivers, connecting to a Database, querying a Database and Processing the Results, Updating Data With JDBC.

Unit-V

GUI Programming with Java: Introduction to Scala and Swing, Hierarchy for Swing and Scala Components, ContainersJFrame, JApplet, JDialog, JPanel, Overview of Some Swing Components, JButton, JLabel, JTextfield, JTextarea, Simple Swing Applications, Layout Management- Layout Manager Types- Border Grid and Flow. Event Handling: Events, Event Sources, Event Classes, Event Listeners, Relationship Between Event Sources and Listeners, Delegation Event Model, Examples: Handling a Button Click, Handling Mouse Events, Adapter Classes.

Textbooks

1.Java Fundamentals: A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

2.Programming Development in Java, BarbaraLiskov, Addison-Wesley

References

1. Data Abstraction and Problem Solving with Java: Walls and Mirrors by Frank M. Carrano and Janet J. Prichard

2. Java for Programming, P.J. Dietel Pearson Education

3. Object Oriented Programming through Java, P. Radha Krishna, and Universities Press.

4. Thinking in Java, Bruce Eckel, Pearson Education

5. Programming in Java, S. Malhotra and S. Choudhary, Oxford University Press

Course Outcomes

On completion of the course students will be able to

1. Describe the characteristics of Object-Oriented Programming Languages.
2. Illustrate Java Exception Handling Mechanism
3. Develop applications using Java Multi-Thread Concept.
4. Use Java Collection Framework
5. Design GUI applications using Java Swings.

END

(A30228) BASIC ELECTRICAL ENGINEERING

B. Tech (CSE-AIML) III Semester

L	T	P	C
3	0	0	3

UNIT-1

DC Circuits: Circuit Concept–R-L-C parameters–Voltage and Current sources Ohm's law ,Kirchhoff's laws, types of sources, source transformations, V-I relation for passive elements ,series parallel circuits, star- delta and delta –star transformations, mesh and nodal analysis, network theorems –super position, thevenin's, maximum power transfer theorem, simple problems.

UNIT-2

AC Circuits: Representation of sinusoidal waveforms, waveforms and basic definitions, RMS and Average values of the alternating quantity, form factor and peak factor, phasor representation of alternating quantities, the 'j' operator and phasor algebra, Analysis of AC circuits with single basic network elements. Single phase series circuits. Three phase circuits –phase sequence, star and delta connection, relation between line and phase voltage and currents in a balanced system.

UNIT-3

DC Machines:

DC Generators -Principle and operation, constructional details, types, EMF equation, DC Motor- Principle and operation, Principle and operation, types, Torque equation, Losses and Efficiencyin DC Generators and Motors, Speed control of DC Motors

UNIT-4

Transformer:

Single phase transformer-Principle and operation, construction details, Ideal transformer andpractical transformer, equivalent circuit, losses, OC and SC Test, Efficiency and Regulation, simple problems. Three phase transformer-Classification.

UNIT-5

AC Machines:

Three phase induction Motor: Generation of rotating magnetic field, Principle and operation, constructional details, types, Concept of slip, significance of torque slip

characteristic, problemson slip, rotor frequency, rotor EMF and Torque. Principle and operation of Alternator, Singlephase induction motors – Classification.

TEXT BOOKS:

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.

REFERENCE BOOKS:

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudiptanath, Chandrakumar Chanda, Tata-McGraw- Hill.
2. Principles of Electrical Engineering, V. K Mehta, Rohit Mehta, S. Chand Publications.
3. Basic Electrical Engineering, T.K. Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P. Kothari, I.J. Nagrath, McGraw-Hill.

Course Outcomes

On completion of the course, students will be able to

1. Apply Kirchoff 's Laws & network reduction techniques.
2. Explain AC fundamentals of single & three phase circuits,
3. Categorize DC machines, operation and its characteristics, with the help of tests and speed control methods.
4. Acquire the knowledge of operation and performance Analysis of transformers
5. Analyze three phase induction motor operation with their characteristics & acquire the knowledge of alternators and single-phase Induction motors.

****END****

(A30229) BASIC ELECTRICAL ENGINEERING LAB

B. Tech (CSE-AIML) III Semester

L	T	P	C
0	0	3	1.5

PART A:

1. Verification of KCL and KVL.
2. Verification of Superposition theorem
3. Verification of Maximum power transfer theorem.
4. Verification of Thevenin ‘s theorem.
5. Time Response of First Order RC/RL Network for periodic, non-sinusoidal inputs- timeconstant and steady state error determination

PART B:

1. Magnetization characteristics of D.C. Shunt generator.
2. Speed control of DC motor.
3. Swinburne ‘s Test on DC shunt machine.
4. Brake test on DC shunt motor.
5. OC and SC tests on Single-phase transformer.
6. Brake test on 3-phase Induction motor.
7. Load Test on single phase Transformer

Note: Any 10 of the above experiments are to be conducted.

Course Outcomes

On Completion of the course, students will be able to

1. Verify KCL & KVL.
2. Verify different theorems.
3. Analyze time response of RC/RL networks.
4. Acquire the knowledge of different tests conducted on DC machines
5. Acquire the knowledge of performance of single-phase transformers and Three PhaseInduction Motors

END

(A36202) JAVA LAB
(Common to CSE-CS, CSE-AI&ML)

B. Tech (CSE-AIML) III Semester

L	T	P	C
0	0	3	1.5

Week 1:

1. Write a java program that works as a simple calculator for the +,-,*,/,% operations using classes and objects in java.
2. Write a java program to find result of a given arithmetic expression? (EX: if you given arithmetic expression like 10+20-24*4/2-4.5= it should print 7.5)

Week 2:

3. Write a program to demonstrate the following
i) Super, Final ii) Single inheritance iii) Multi –level inheritance
4. Write a program to demonstrate the usage of method overriding, calling super class constructor in derived class.

Week 3:

5. Write a java program to create an abstract class named **shape** that contains two integers and an empty method named printarea (). Provide three classes named Rectangle, Triangle and Circle such that each one of these classes extends the class Shape. Each one of the classes contains only the method printarea () that prints the area of the given shape.

Week 4:

6. Write a program to demonstrate method overloading and constructor overloading.
7. Write a program to demonstrate polymorphism using interface (interface in package P1 and class in package P2)

Week 5: Exception handling in java

8. Implement pre-defined exceptions
9. Implement user defined exceptions

Week 6:

10. Develop a scala and swing component in java that displays a simple message.

11. Write a java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, num1 and Num2. The division of Num1 and Num2 is displayed in the result fields when the division button is clicked. If Num1 or Num2 were not an integer, the program should throw a Number Format Exception. If Num2 were Zero the program should throw an Arithmetic Exception. Display the exception in a message dialog box.

Week 7:

12. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second. if the generated value is even, second thread computes the square of the number and prints. If the generated value is odd, the third thread will print the value of cube of the number

Week 8:

13. Write a java program to demonstrate Generic class and generic methods
14. Write a java to perform string operations using sting buffer class and its methods.

Week 9:

15. Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with ―Stop‖ or ―ready‖ or ―Go‖ should appear above the buttons in selected color initially, there is no message shown.

Week 10:

16. Write a java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab(\t). it takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

Week 11:

17. Write a java program that connects to a data base using JDBC and does add, delete, modify and retrieve operations.

Week12

18. Implement the week 10 program with database instead of a text file.
19. Write a java program that takes tab separated data (one record per line) from a text file and inserts them into a database.

Textbooks

1. Java Fundamentals- A Comprehensive introduction, Herbert schildt and Dale skrien, TMH.
2. Programming Development in Java, Barbara Liskov, Addison-Wesley

References

1. Java for programming, P.J. Dietel Pearson education (OR) Java: How to Program P.J. Dietel and H.M. Dietel, PHI
2. Data Abstraction and Problem Solving with Java: Walls and Mirrors by Frank M. Carrano and Janet J. Prichard
3. Object Oriented Programming through java, P. Radha Krishna, Universities Press.
4. Thinking in Java, Bruce Eckel, Pearson Education
5. Programming in Java, S. Malhotra and S. Choudhary, Oxford University Press

Course Outcomes

On completion of the course students will be able to

1. Write & execute programs using JAVA Programming Language Syntax
2. Use Java API functions to write and execute programs for problem solving.
3. Demonstrate the usage of Java Exception handling mechanisms.
4. Write and execute Java applications using Java String Buffer Class
5. Design Java Applications using JAVA GUI components and test them by execution.

****END****

(A30021) SOCIAL INNOVATION IN PRACTICE

(Common for all branches)

	L	T	P	C
B. Tech (CSE-AIML) III Semester	**0**	**0**	**2**	**1**

UNIT 1

Identify community issues to be addressed, Requirements Analysis: Extensive User requirements analysis, Generating effective System Requirement document.

UNIT 2

Social Innovation – Case Studies

Presentation of the case studies with a focus on impact and vision on society.

UNIT 3

Process of Social Innovation

Prompts – identifying needs, Proposals – generating ideas, Prototyping – testing the idea in practice,

UNIT 4

Sustaining-developing a business model, Scaling and diffusion-growing social innovations, Systematic change.

UNIT 5

Report writing, Documentation and Panel presentation

Reference Books:

1. Requirements Analysis: From Business Views to Architecture; David C. Hay; Prentice Hall Professional
2. Social Enterprises: An Organizational Perspective edited; Benjamin Gidron, YeheskelHasenfeld; Palgrave Macmillan
3. Social Enterprise Law: Trust, Public Benefit and Capital Markets By Dana Brakman Reiser & Steven A. Dean

Course Outcomes:

On Completion of the course, the students will be able to

1. Summing up several social issues to be addressed
2. Analyse the feasibility and economical factors
3. Develop a scalable business model.

END

(A30015) SOFT SKILLS & PROFESSIONAL ETHICS

B. Tech (CSE-AIML) III Semester

L	T	P	C
0	0	2	0

UNIT-I:
Business Communication Skills:
English Language Enhancement the Art of Communication.

UNIT-II:
Intrapersonal & Interpersonal Relationship Skills:

- Intrapersonal Relationships
- Interpersonal Relationships – To be an Effective Team Player

UNIT-III:
Campus to Company:

- Corporate Dressing
- Corporate Grooming
- Business Etiquette
- Communication Media Etiquette

UNIT-IV:
Group Discussions, Interviews and Presentations:

- Group Discussions
- Interviews
- Presentations

UNIT-V:
Entrepreneurial Skills Development:

- Goal Setting
- Entrepreneurial Skills – Awareness and Development

REFERENCES

1. UNLEASH the power within Soft Skills – Training Manual (Infosys Campus Connect)

Course Outcomes

At the end of the course, the students will be able to

1. Express themselves with proper pronunciations and sentence construction
2. Demonstrate a strong teamwork and be a team player
3. Develop a strong personal etiquette
4. Demonstrate good leadership qualities
5. Recognize and identify basic English grammar

END

(A36601) MACHINE LEARNING

B. Tech (CSE-AI&ML) IV Semester

L	T	P	C
3	0	0	3

Unit 1:

I**ntroduction:** What is machine learning, Examples of machine learning applications: learning association, classification, regression, unsupervised learning, reinforcement learning.

Supervised Learning: Learning a class from examples, Vapnik-Chervonekis (VC) dimension, Noise, Learning multiple classes, regression, Model selection and Generalization, Dimensions of supervised machine learning algorithm.

Unit-2

Bayesian Decision Theory: Introduction, classification, Losses and Risks, Discriminant Functions, Utility Theory, Association Rules.

Parametric Methods: Introduction, Maximum Likelihood Estimation, Evaluating an Estimator: Bias and Variance, The Bayes' Estimator, Parametric Classification, k-NN, SVM, Regression, Tuning Model complexity: Bias/variance Dilemma, Model Selection Procedures.

Unit-3

Dimensionality Reduction: Introduction, Subset Selection, Principal Component Analysis, Factor Analysis, Multidimensional Scaling, Linear Discriminant analysis.

Clustering: Introduction, Mixture Densities, k-Means Clustering, Expectation-Maximization Algorithm, Mixtures of Latent Variable Models. Supervised Learning after Clustering, Hierarchical Clustering. Choosing the Number of Clusters.

Unit-4

Decision Trees: Introduction, Univariate Trees: Classification, Regression, Pruning, Learning Rules from Data, Multivariate Trees.

Linear Discrimination: Introduction, Generalizing the linear model, geometry of the linear discriminant, pairwise separation, Parametric discrimination, Gradient Descent, Logistic Discrimination, Discrimination by regression.

Unit-5

Multilayer Perceptron: Introduction, Perceptron, training a perceptron, Learning Boolean Functions, Multilayer perceptron's, MLP as a universal approximator, Backpropagation algorithm, training procedures.

Combining Multiple Learners: Bagging, Boosting.

Text Books:

1. Ethem Alpaydın, Introduction to Machine Learning, Second Edition, The MIT Press

Reference Books:

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, h The Elements of Statistical Learning, 2nd edition, springer series in statistics.
2. Tom M. Mitchell, Machine Learning, India Edition 2013, McGraw Hill Education.

Course Outcomes

After studying this course, students will be able to

CO1: Identify the problems for machine learning. And select the either supervised, unsupervised or reinforcement learning.

CO2: Explain theory of probability and statistics related to machine learning

CO3: Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, SVM..etc.

***END**

(A30511) DESIGN AND ANALYSIS OF ALGORITHMS

B.Tech (CSE-AIML) IV Semester

L	T	P	C
3	1	0	4

Unit-I

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-II

Fundamental Algorithmic Strategies – I: Divide and Conquer, Greedy, and Dynamic Programming, methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving, Strassen's Matrix Multiplication, Bin Packing, job sequencing with deadlines, Huffman codes, Knapsack, OBST, Matrix chain multiplication, TSP.

Unit-III

Fundamental Algorithmic Strategies – II: Branch and Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving, N-Queens, 0/1 Knapsack, TSP, Sum of sub sets, Graph coloring, Hamiltonian cycle.

Unit-IV

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-V

Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Game tree, min-max search Standard NP-complete problems and Reduction techniques.

Text books:

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

Reference books:

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.

Course Outcomes

On completion of the course students will be able to

1. Explain various asymptotic notations to measures the performance of an algorithm
2. Discuss algorithms design strategies
3. Apply Graph & Tree algorithms for real world applications
4. Describe various computability Classes
5. Illustrate P & NP –Type Problems

****END****

(A30516) OPERATING SYSTEMS

B. Tech (CSE-AIML) IV Semester

L	T	P	C
3	0	0	3

UNIT-I

Operating System Introduction, Structures - Simple Batch, Multi-programmed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls.

UNIT –II

Process and CPU Scheduling- Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling.
System call interface for process management-fork, exit, wait, waitpid, exec

UNIT –III

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

Process Management and Synchronization- The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors. Inter process Communication Mechanisms: IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT –IV

Memory Management and Virtual Memory- Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

UNIT -V

File System Interface and Operations-Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. usage of open, create, read, write, close, lseek, stat, ioctl, system calls

Text Books:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R. Stevens, Pearson education.

Reference Books:

1. Operating Systems – Internals and Design Principles, Stallings, 5th Edition, Pearson Education/PHI,2005.
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI.
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Unix Internals the New Frontiers, U. Vahalia, Pearson Education.

Course Outcomes

Students shall be able to

1.Describe the components of computer and their respective roles in computing.
2.Explain process concepts and CPU Scheduling Algorithms
3.Demonstrate the Mutual exclusion, deadlock detection and Inter Process Communications.
4.Analyze various memory management and allocation methods.
5.Discuss File System Interface and Operations.

****END****

(A30509) DATABASE MANAGEMENT SYSTEMS

B. Tech (CSE-AIML) IV Semester

L	T	P	C
3	1	0	4

Unit-1:

Database System Applications: Database system vs file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational model, other models, database languages, DDL, DML, database users and administrator, transaction management, database system structure, storage manager, the query processor, data base design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER Model

Unit-2:

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying, altering tables and views.

Form of basic SQL query, examples of basic SQL queries, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity's, AND, OR and NOT, impact on SQL constructs, outer joins, disallowing NULL values

Unit-3:

Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus. Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, schema refinement in database design, multi valued dependencies, FOURTH normal form, FIFTH normal form.

Unit-4:

Transactions: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity.

Unit-5:

Storage: Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

Text Books:

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

2." Database Management Systems",3rd Edition by Johannes Gehrke and Raghu Ramakrishnan, McGraw-Hill.

Reference Books:

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.

Course Outcomes

On completion of the course students will be able to

1. Explain the significance of Database Management Systems.
2. Write SQL queries to interact with RDBMs
3. Describe various Normal Forms of Relations.
4. Evaluate various concurrency control protocols
5. Classify Indexing Techniques based on prime attributes.

****END****

(A30510) DATABASE MANAGEMENT SYSTEMS LAB

B. Tech (CSE-AIML) IV Semester	L	T	P	C
	0	0	3	1.5

Week-1: Working with DDL, DML, DCL and Key Constraints
(Creation, Altering and Dropping of Tables and Inserting Rows into a Table (Use Constraints While Creating Tables) Examples Using Select Command.)

Week-2: Working with Queries and Nested QUERIES
(Queries (along with sub-Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints)

Week-3: Working **with Queries USING Aggregate Operators & views**
Queries using Aggregate Functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and Dropping of Views

Week-4: Working with Conversion Functions & String Functions
Queries using Conversion Functions (to_char, to_number and to_date), String Functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), Date Functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)

Week-5: Working **with Triggers using PL/SQL**
Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

Week-6: Working with PL/SQL Procedures
Programs Development using Creation of Procedures, Passing Parameters IN and OUT of PROCEDURES.

Week-7: Working with LOOPS using PL/SQL and Exception Handling
Program Development using WHILE LOOPS, Numeric FOR LOOPS, Nested Loops using ERROR Handling, BUILT-IN Exceptions, USE Defined Exceptions, RAISE- APPLICATION ERROR

Week-8: Working with Functions Using PL/SQL
Program Development using Creation of Stored Functions, Invoke Functions in SQL Statements and Write Complex Function

Week-9: Working with CURSORS
Develop Programs using Features Parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of Clause and CURSOR Variables

Week-10: Working with PL/SQL Packages
Program development using Packages.

Week-11: Case Study-I
Design & Implementation of Library Management System

Week-12: Case Study-II
Design & Implementation of Hospital Management System

Reference books:

1. Oracle PL/SQL by Example, Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Edition
2. Oracle Database LogG PL/SQL Programming, Scott Urman, Tata Mc-Graw Hill.
3. SQL and PL/SQL for Oracle 10g, Black Book, Dr .P.S. Deshpande.

Course Outcomes
On completion of the course students will be able to

1. Demonstrate the usage of SQL statements for the creation, manipulation of data in the Database.
2. Write & execute queries on the given Database
3. Write & Execute PL/SQL programs for a given application
4. Develop & Demonstrate the usage of Cursors in PL/SQL
5. Design & Implement a given Enterprise Database

****END****

(A36602) MACHINE LEARNING LAB

B.Tech(CSE-AI&ML) IV Sem

L	T	P	C
0	0	4	2

LAB EXPERIMENTS

Note: Use Open-Source Software Tools, Programming Languages (Java, Python.R. etc) to perform the experiments or to implement the Machine Learning Algorithms.

1. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
2. Write a program to demonstrate the working of the decision tree algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
3. Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions.
4. Write a program to implement Support Vector Machine algorithm to classify the iris data set. Print both correct and wrong predictions.
5. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering.
6. Apply Hierarchical Clustering algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering.
7. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set.
8. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
9. Write a program to implement AdaBoost algorithm to classify the iris data set. Print both correct and wrong predictions.
10. Perform model aggregation on MNIST digit dataset.

****END****

(A30517) OPERATING SYSTEMS LAB

B. Tech (CSE-AIML) IV Semester	L	T	P	C
	0	0	3	1.5

List of Experiments

Week 1: Simulate the following CPU Scheduling Algorithms
a). FCFS b). SJF c). Priority d). Round Robin
Week 2: Simulate Banker's Algorithm for Deadlock Avoidance.
Week 3: Simulate Memory Management Technique.
a) Paging b) Segmentation
Week 4: Simulate the following Page Replacement Algorithms
a). FIFO b). LRU c). OPTIMAL
Week 5: Simulate the following File Allocation Strategies
a). Sequential b). Indexed c. Linked
Week 6: Simulate the following disk scheduling algorithms
a). SCAN b). CSCAN c). SSTF
Week 7: Write a C program to simulate the following contiguous memory allocation techniques
a). First-fit b) Best-fit c) Worst-fit
Week 8: Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
Week 9:
a) Write a C program to simulate producer-consumer problem using semaphores.
b) Write a C program to simulate the concept of Dining-Philosophers problem
Week 10: Write C programs to illustrate the following IPC mechanisms
a) Pipes b) FIFOs c) Message Queues d) SharedMemory

Course outcomes
Students shall be able to
1.Implement CPU Scheduling Algorithms
2. Demonstrate Inter-process communication
3. Demonstrate Page Replacement Algorithms

****END****

(A30016) GENDER SENSITIZATION

B. Tech (CSE-AIML) IV Semester

L	T	P	C
0	0	2	0

UNIT-I:
Understanding Gender
Lesson 1 – Gender: Why should we study it?
Lesson 2 – Socialization: Making Women, Making Men
Lesson 12 – Just Relationships: Being together as Equals

UNIT-II:
Gender and Biology
Lesson 4 – Missing Women: Sex selection and its consequences
Lesson 10 – Gender Spectrum: Beyond the Binary
Lesson 13 – Additional Reading: Our Bodies, Our Health

UNIT-III:
Gender and Labour
Lesson 3 – Housework: The Invisible Labour
Lesson 7 – Women's Work: Its Politics and Economics

UNIT-IV:
Issues of Violence
Lesson 6 – Sexual Harassment: Say No!
Lesson 8 – Domestic Violence: Speaking Out
Lesson 11 – Thinking about Sexual Violence

UNIT-V:
Gender Studies
Lesson 5 – Knowledge: Through the Lens of Gender
Lesson 9 – Who's History? Questions for Historians and Others.

COURSE OUTCOMES

1. Learners identify realities of gender discrimination prevalent in the society at all levels.
2. Learners infer and discuss historical evidences, historical perspective and historical voices of discrimination against women in all societies and civilizations.
3. Learners recognize their bodies and value its health. Learners demonstrate their rights regarding their bodies.
4. Learners can identify, protest and overcome the evils of body shaming.
5. Learners analyze discrimination and exploitation of women labour in domestic as well as social sphere. Learners can infer women's rights, women's wage disparities, women's issues and demonstrate these grievances through law.
6. Learners identify different types of sexual exploitation; sexual violence and marital violence show empathy towards victims of such violence and generate public opinion in face of any exploitation.

****END****