CMR ENGINEERING COLLEGE
UGC AUTONOMOUS

(Approved by AICTE - New Delhi. Affiliated to JNTUH and Accredited by NAAC & NBA)

B.Tech. in COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE (R-20)

Applicable From 2020-21 Admitted Batch

I YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Linear Algebra and Calculus	3	1	0	4
2	AP102BS	Applied Physics	3	1	0	4
3	CS103ES	Programming for Problem Solving	3	1	0	4
4	EE104ES	Basic Electrical Engineering	3	0	0	3
5	ME105ES	Engineering Workshop & IT Workshop	0	0	3	1.5
6	AP106BS	Applied Physics Lab	0	0	3	1.5
7	CS107ES	Programming for Problem Solving Lab	0	0	2	1
8	EE108ES	Basic Electrical Engineering Lab	0	0	2	1
9	EN109HS	Employability Skills- I (Business English for Engineers)	0	0	2	0
		Induction Programme				
		Total Credits	12	3	12	20

I YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Differential Equations and Vector Calculus	3	1	0	4
2	CH202BS	Engineering Chemistry	3	0	0	3
3	CS203ES	Data Structures	3	0	0	3
4	ME204ES	Engineering Graphics	1	0	4	3
5	EN205HS	English	2	0	0	2
6	CH206BS	Engineering Chemistry Lab	0	0	3	1.5
7	CS207ES	Data Structures Lab	0	0	2	1
8	EN208HS	English Language and Communication Skills Lab	0	0	3	1.5
9	MA209BS	Employability Skills-II (Aptitude)	1	1	0	0
		Total Credits	**13**	**2**	**12**	**19**

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Applicable From 2020-21 Admitted Batch

II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS301PC	Database Management Systems	3	0	0	3
2	CS302PC	Computer Organization and Architecture	3	1	0	4
3	CS303PC	Operating Systems	3	0	0	3
4	CS304PC	Object Oriented Programming through Java	3	0	0	3
5	CS305PC	Discrete Mathematics	3	0	0	3
6	CS306PC	Database Management Systems Lab	0	0	2	1
7	CS307PC	Operating Systems Lab	0	0	3	1.5
8	CS308PC	Java Programming Lab	0	0	3	1.5
9	*MC309	Gender Sensitization Lab	0	0	2	0
10	MC310	Employability Skills-III	0	0	2	0
		Total Credits	15	1	12	**20**

II YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	SM401MS	Business Economics & Financial Analysis	3	0	0	3
2	MA402BS	Computer Oriented Statistical Methods	3	1	0	4
3	CS403ES	Analog & Digital Electronics	3	0	0	3
4	CS404PC	Python Programming	3	0	0	3
5	CS405PC	Software Engineering	3	0	0	3
6	CS406ES	Analog & Digital Electronics Lab	0	0	2	1
7	CS407PC	Python Programming Lab	0	0	3	1.5
8	CS408PC	Software Engineering Lab	0	0	3	1.5
9	*MC409	Environmental Science	3	0	0	0
10	MC410	Employability Skills-IV	0	0	2	0
		Total Credits	18	1	10	**20**

*MC – Satisfied/Unsatisfied

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COURSE STRUCTURE (R-20)

Applicable From 2020-21 Admitted Batch

III YEAR   I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS501PC	Design and Analysis of Algorithms	3	1	0	4
2	CS502PC	Computer Networks	3	0	0	3
3	CS503PC	Artificial Intelligence	3	0	0	3
4	CS504PC	Formal Languages and Automata Theory	3	0	0	3
5		Professional Elective - I	3	0	0	3
6	CS505PC	Artificial Intelligence Lab	0	0	2	1
7	CS506PC	Computer Networks Lab	0	0	3	1.5
8	CS507PC	Design and Analysis of Algorithms Lab	0	0	3	1.5
9	*MC509	Constitution of India	3	0	0	0
10	MC510	Employability Skills-V	0	0	2	0
		Total Credits	18	1	10	**20**

III YEAR   II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1.	CS601PC	Compiler Design	3	0	0	3
2.	CS602PC	Machine Learning	3	1	0	4
3.	CS603PC	Web Technologies	3	0	0	3
4.		Professional Elective - II	3	0	0	3
5.		Open Elective-I	3	0	0	3
6.	EN604HS	Advanced Communication Skills Lab	0	0	3	1.5
7.	CS605PC	Machine Learning Lab	0	0	2	1
8.	CS606PC	Web Technologies Lab	0	0	3	1.5
9.	*MC609	Intellectual Property Rights	3	0	0	0
10	MC610	Employability Skills-VI	0	0	2	0
		Total Credits	18	1	10	**20**

*MC – Satisfied/Unsatisfied

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B.Tech. in COMPUTER SCIENCE AND ENGINEERING

COURSE STRUCTURE (R-20)

Applicable From 2020-21 Admitted Batch

IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS701PC	Data Mining	3	0	0	3
2	CS702PC	Internet of Things	3	0	0	3
3		Professional Elective - III	3	0	0	3
4		Professional Elective -IV	3	0	0	3
5		Open Elective-II / MOOCS	3	0	0	3
6	CS703PC	Data Mining Lab	0	0	3	1.5
7	CS704PC	Internet of Things Lab	0	0	3	1.5
8	CS705PROJ	Industry Oriented Mini Project	0	0	4	2
9	CS706PROJ	Project -I	0	0	6	3
Total Credits			15	0	16	23

IV YEAR   II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Professional Elective -V / MOOCS	3	0	0	3
2		Professional Elective -VI	3	0	0	3
3		Open Elective-III / MOOCS	3	0	0	3
4	CS801PROJ	Seminar	0	0	2	1
5	CS802PROJ	Project -II	0	0	16	8
Total Credits			9	0	18	18

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COURSE STRUCTURE (R-20)

Applicable From 2020-21 Admitted Batch

Professional Elective – I

CS511PE	Cryptography & Network Security
CS512PE	Data Analytics using R
CS513PE	Principle of Programming Languages
CS514PE	Computer Graphics

Professional Elective – II

CS621PE	Network Programming & Management
CS622PE	Natural Language Processing
CS623PE	Software Project Management
CS624PE	Information Retrieval System

Professional Elective – III

CS731PE	Information Security & Risk management
CS732PE	Deep Learning
CS733PE	Object Oriented Modeling and Design
CS734PE	Image Processing

Professional Elective – IV

CS741PE	Distributed Systems
CS742PE	Semantic web and Social Networks
CS743PE	Software Testing Methodologies
CS744PE	Pattern Recognition

Professional Elective – V / MOOCS

CS851PE	Blockchain Technology
CS852PE	Mobile Application Development
CS853PE	Design Patterns
CS854PE	Virtual Reality

Professional Elective - VI

CS861PE	Cyber Security
CS862PE	Robotics Process Automation
CS863PE	Cloud Computing
CS864PE	Computer Vision

B.Tech. in COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE (R-20)

Applicable From 2020-21 Admitted Batch

Open Elective-I

CS611OE	Database Management Systems
CS612OE	Operating Systems
CS613OE	Software Engineering
CS614OE	Java Programming

Open Elective-II

CS721OE	Introduction to Data Analytics
CS722OE	Linux Programming
CS723OE	Software Project Management
CS724OE	Python Programming

Open Elective-III

CS831OE	R Programming
CS832OE	Block Chain Technology
CS833OE	Software Testing Methodologies
CS834OE	Web Programming

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B.Tech. I Year Syllabus (w.e.f. A.Y. 2020-21)
Common for CSE, CS (DS), CS (CS) and IT

I YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Linear Algebra and Calculus	3	1	0	4
2	AP102BS	Applied Physics	3	1	0	4
3	CS103ES	Programming for Problem Solving	3	1	0	4
4	EE104ES	Basic Electrical Engineering	3	0	0	3
5	ME105ES	Engineering Workshop & IT Workshop	0	0	3	1.5
6	AP106BS	Applied Physics Lab	0	0	3	1.5
7	CS107ES	Programming for Problem Solving Lab	0	0	2	1
8	EE108ES	Basic Electrical Engineering Lab	0	0	2	1
9	EN109HS	Employability skills- I (Business English for Engineers)	0	0	2	0
		Induction Program				
Total Credits			**12**	**3**	**12**	**20**

I YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Differential Equations and Vector Calculus	3	1	0	4
2	CH202BS	Engineering Chemistry	3	0	0	3
3	CS203ES	Data Structures	3	0	0	3
4	ME204ES	Engineering Graphics	1	0	4	3
5	EN205HS	English	2	0	0	2
6	CH206BS	Engineering Chemistry Lab	0	0	3	1.5
7	CS207ES	Data Structures Lab	0	0	2	1
8	EN208HS	English Language and Communication Skills	0	0	3	1.5
9	MA209BS	Employability skills-II (Aptitude (or) Mathematics Lab)	0	0	2	0
Total Credits			**12**	**1**	**14**	**19**

MA101BS: LINEAR ALGEBRA AND CALCULUS

B.Tech. I Year I Sem.   **L T P C**
                                                                                           3 1 0 4

Course Objectives:
To learn
- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

Course Outcomes:
After learning the contents of this paper the student must be able to
- Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
- Find the Eigen values and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Analyse the nature of sequence and series.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.

UNIT-I: Matrices
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
Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation

UNIT-III: Sequences & Series
Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences. 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), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications
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.

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

3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.

REFERENCES:
1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010

AP102BS: APPLIED PHYSICS

B.Tech I Year I Sem.   **L T P C**
                                                                                                3 1 0 4

Course Objectives:
- The course primarily aims at understanding the behavior of matter in the condensed state and tries to explore the causes with reference to micro level mechanism of the solid matter.
- The objective of the first chapter is to study the micro level behavior of the quantum particles of the matter and their nature as wave and particle.
- The second chapter aims to assess the draw backs of the free electron theory leading to the introduction of the Band Theory of Solids.
- In the third chapter task to discuss dielectric and magnetic properties of the materials.
- In the fourth chapter, it is expected to understand the basic principles behind the coherent artificial light source (LASER) with reference to their construction, mechanism, operation and classification etc. In second part of this chapter aimed at to study an advanced communication system presently ruling the world throughout i.e. Fiber Optic communication system.
- In the fifth chapter plan to discuss on fabrication of nano particles and their characterization techniques.

Course Outcomes: After learning the contents of this paper the student must be able to

- Predict the behavior of particle and wave and solve their wave functions.
- Distinguish the different types of Semiconductor devices.
- Recall and choose different materials based on their properties.
- Examine normal light and laser light and its application in communication.
- Categorize Nano materials by fabrication methods.

UNIT-I:
Principles of quantum mechanics: Introduction to quantum physics, Waves and particles, Matter waves, de-Broglie Hypothesis, Characteristics of matter waves, Davisson and Germer's experiment, Heisenberg's uncertainty principle, Physical significance of the wave function, Schrodinger's time - independent wave equation, Particle in one dimensional potential Box.
Electron theory of Metals: Draw backs of classical free electron theory, Electron in a periodic potential, Kronig-Penny model (Qualitative Treatment), Origin of energy band formation in solids, Classification of materials, Effective mass of an electron.

UNIT-II:
Semiconductor Physics: Introduction to semi conductors, Fermi level, Calculation of carrier concentration in intrinsic and extrinsic (p-type & n-type) semiconductors, Direct and indirect band gap semiconductors, Hall effect and applications.
Physics of Semiconductor Devices: Formation of PN junction, I-V characteristics of PN junction diode, Construction, working and applications: LED, Photo diodes and Solar cells.

UNIT-III:
Dielectric Properties: Electric dipole, Dipole moment, Dielectric constant, Electronic, ionic and orientation polarizations and calculation of polarizabilities: electronic and ionic, Internal fields in solids, Clausius - Mossotti equation, concept of Piezo-electricity, Pyro- electricity and Ferro - electricity.
Magnetic Properties: Origin of magnetic moment, Bohr magneton, Classification of magnetic materials: dia, para, ferro, anti ferro and ferri magnetic materials on the basis of magnetic moment, Domain theory of ferro magnetism on the basis of hysteresis curve.

UNIT-IV:
Lasers: Characteristics of lasers, Absorption, Spontaneous and stimulated emission of radiation, Meta stable state, Population inversion, Lasing action, Einstein's coefficients and relation between them, Ruby laser, Helium-neon laser, Diode laser and applications of lasers.
Fiber Optics: Principle and construction (structure) of an optical fiber, Acceptance angle, Numerical aperture, Types of optical fibers: step index and graded index fibres, Losses in optical fibers: absorption, scattering and bending and applications of optical fibres in communication.

UNIT-V:

Nanotechnology: Origin of nanotechnology, Nano scale, Surface to volume ratio, Quantum confinement, random molecular motion, dominance of electromagnetic forces, Bottom-up fabrication: Sol-Gel method, Top-down fabrication: Chemical vapour Deposition, Physical vapour deposition, Characterization techniques (XRD, SEM & TEM) and applications of nanotechnology.

TEXT BOOKS:
1. Principles of Physics by Halliday, Resnick, Walker, Wiley India Pvt Ltd, 9th Edition.
2. Introduction to Solid State Physics by Charles Kittel, Wiley India Pvt Ltd, 7th Edition
3. Engineering Physics by R.K.GAUR & S.L.GUPTA, Dhanpat Rai Publications.
4. Solid State Physics by A J Dekker, MACMILLAN INDIA LTD.

REFERENCE BOOKS:
1. Modern Engineering Physics by Dr.K.Vijaya Kumar, Dr. S. Chandralingam, S.CHAND & COMPANY LTD
2. Applied Physics by P.K.Mittal, I K International Publishers
3. Applied Physics by P.K. Palanisamy :Scitech publishers
4. Introduction to Nanotechnology by Charles P.Poole, Jr.Frank J ownes, John Wiley & sons
5. Applied Physics for Engineers by P. Madusudana Rao, Academic Publishing Company
6. Engineering Physics by Sanjay D Jain, Girish G Sahasrbudha: University Press.

CS103ES: PROGRAMMING FOR PROBLEM SOLVING

B.Tech. I Year I Sem.   **L T P C**
                                                                                                  3 1 0 4

Course Objectives:
- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student will learn
- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

Unit - 1: Introduction to Programming
Introduction to components of a computer system: disks, primary and secondary memory, Processor, operating system, compilers, creating, compiling and executing a program etc., Number systems .Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured Programming. Introduction to C Programming Language: variables (with data types and space Requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, Static and register), type conversion, the main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators Conditional Branching and Loops: Writing and evaluation of conditionals and consequent Branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do while Loops.
I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr, Command line arguments.

Unit - II: Arrays, Strings, Structures and Pointers:
Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays.
Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings
Structures: Defining structures, initializing structures, unions, Array of structures
Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no Implementation), Enumeration data type

Unit - III: Preprocessor and File handling in C:
Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, Ifndef.
Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random Access using fseek, ftell and rewind functions.

Unit - IV: Function and Dynamic Memory Allocation:
Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C Standard functions and libraries
Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions
Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays Of different data types

Unit - V: Introduction to Algorithms:
Algorithms for finding roots of quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc. Basic searching in an array of elements (linear and binary search techniques),Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms),Basic concept of order of complexity through the example programs

TEXT 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, Cengage Learning, (3rd Edition)

REFERENCE TEXT BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PrenticeHall 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

EE104ES: BASIC ELECTRICAL ENGINEERING

B.Tech I Year I Sem.   **L T P C**
                                                                              3 0 0 3

Course Objectives:
- To introduce the concepts of electrical circuits and its components.
- To understand magnetic circuits, DC circuits and AC single phase and three phase circuits.
- To study and understand different types of DC/AC machines and transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor, its improvement.

Course Outcomes:
- To analyse and solve electrical circuits using network laws and theorems.
- To understand and analyse basic electric and magnetic circuits.
- To study the working principles of electrical machines.
- To introduce components of low voltage electrical installations.

UNIT- I: D.C CIRCUITS
Electrical circuit elements (R,L,C), voltage and current sources, KVL & KCL, analysis of simple circuits with DC excitation. Superposition, Thevenin and Norton theorems. Time-domain analysis of first – order RL and RC circuits.

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

UNIT-III: TRANSFORMS
Ideal and practical transformers, equivalent circuits, losses in transformers, regulations and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV: ELECTRICAL MACHINES
DC generators : Construction, working and emf equation, DC motors : construction, working, back emf , torque equation, generation of rotating magnetic fields , construction and working of a three-phase induction motor, significance of torque-slip characteristic. Loss components and efficiency, construction and working of synchronous generators.

UNIT-V: ELECTRICAL INSTALLATIONS
Components of LT switchgear: switch fuse unit (SFU), MCB, ELCB, MCCB, Types of wires and cables, earthing, types of batteries, important characteristics for batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

SUGGESTED TEXT-BOOKS/REFERENCE-BOOKS:
1. Basic electrical engineering -D. P. Kothari and I. J. Nagrath , 3rd edition 2010, Tata Mc Graw Hill.
2. D.C.Kulshreshtha, " Basic electrical engineering", Mc Graw Hill, 2009.
3. L.S. Bobrow , " Fundamentals of electrical engineering" , oxford university press, 2011.
4. Electrical and Electronics Technology, E. Hughes, 10th edition, Pearson, 2010.
5. Electrical engineering fundamental, Vincent Deltoro, second edition, Prentice Hall India, 1989.

ME105ES: ENGINEERING WORKSHOP & IT WORKSHOP

B.Tech. I Year I Sem.   L T P   C
                                                                         0 0 3 1.5

Pre-requisites: Practical skill

Course Objectives:
- To Study of different hand operated power tools, uses and their demonstration
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools,
- equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment   and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to   prescribed tolerances.

Course Outcomes:
Upon completion of the course, the students will be able to
- Apply safety norms while handling the workshop equipment
- Prepare required models using various engineering trades
- Make use of various power tools

LIST OF EXPERIMENTS

Part-A: Engineering Workshop

1. House Wiring
Power point, light fitting and switches.

2. Carpentry
Study of tools and joints; Practice in planning, chiseling, marking and sawing; Joints: Cross joint, T joint, Dove tail joint.

3. Fitting
Study of tools, practice in filing, cutting, drilling and tapping; Male and female joints, stepped joints.

4. Tin Smithy
Preparation of Open scoop, Cylinder, square/rectangular tray

5. Black Smithy
S-Hook, Square /Hexagonal headed bolt.

6. Foundry
Preparation of green sand mold using single piece / split pattern

7. Demonstration of Power Tools
 Drilling machine, power hacksaw, grinding machine and wood cutting machine.

Part-B: IT Workshop

Course Objectives:
The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.
PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition

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hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. (Recommended to use Microsoft office 2007 in place of MS Office 2003)

Course Outcomes:
- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.
- Install and make use of operating systems and MS office tools

1. Windows Operating System & Drivers Installation
Windows 7/8/10. LAN, graphics, audio, video and command prompt, commands.

2. Network Connections & Troubleshooting
IP configurations, connecting devices in LAN through bridge, hub, switch; Wi-Fi, Li-Fi and Bluetooth settings; Crimping: Crossover, strait over. Hardware and software trouble shooting.

3. Cyber Hygiene
Introduction to Virus, worms, threats. Threats on Internet, Configure the Systems to be Internet safety, Install antivirus, personal firewall, block pop-ups, block active x downloads

4. MS Word
Prepare the project document and resume.

5. MS Excel
Spread sheet basics, modifying worksheets, formatting cells, formulas and functions, sorting and filtering, charts.

6. MS Power Point
Power point screen, working with slides, add content, work with text, working with tables, graphics, slide animation, reordering slides, adding sound to a presentation.

7. PC Hardware
Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

TEXT BOOKS:
1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.
3. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dreamtech

REFERENCE BOOKS:
1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ S
2. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

AP106BS: APPLIED PHYSICS LAB

B.Tech. I Year I Sem.   **L T P   C**

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List of Experiments:
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. LED & LASER: To study the I-V characteristics of LED and LASER
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. Diffraction: Determination of wavelength of a given light source.
8. Optical fibre: To determine the bending losses and Numerical aperture.
9. LCR Circuit: To determine the Quality factor of LCR Circuit.
10. R-C Circuit: To determine the time constant of R-C circuit.
11. Newton's rings experiment: Determination of radius of curvature of a plano convex lens.

Note: Any 8 experiments are to be performed

CS107ES: PROGRAMMING FOR PROBLEM SOLVING LAB

B.Tech I Year I Sem.   **L T P C**
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[Note:The programs may be executed using any available Open Source/ Freely available IDE
Some of the Tools available are:
CodeLite: https://codelite.org/
Code::Blocks: http://www.codeblocks.org/
DevCpp : http://www.bloodshed.net/devcpp.html
Eclipse: http://www.eclipse.org
This list is not exhaustive and is NOT in any order of preference]

Course Objectives:
The students will learn the following:
- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C
- like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like
- functions, arrays etc.
- To write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:
- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures
- use pointers of different types
- create, read and write to and from simple text and binary files
- modularize the code with functions so that they can be reused

Practice sessions:
a. Write a simple program that prints the results of all the operators available in C (including pre/ post increment, bitwise and/or/not, etc.). Read required operand values from standard input.
b. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

Simple numeric problems:
a. Write a program for fiend the max and min from the three numbers.
b. Write the program for the simple, compound interest.
c. Write program that declares Class awarded for a given percentage of marks, where mark<40%=Failed, 40% to <60% = Second class, 60% to <70%=First class, >= 70% = Distinction. Read percentage from standard input.
d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
   5 x 1 = 5
   5 x 2 = 10
   5 x 3 = 15
e. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:
a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula $s = ut + (1/2)at^2$ where u and a are the initial velocity in m/sec (= 0) and acceleration in m/sec^2 (= 9.8 m/s^2)).
b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

c. Write a program that finds if a given number is a prime number
d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome
e. 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 generate the first n terms of the sequence.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user
g. Write a C program to find the roots of a Quadratic equation.
h. Write a C program to calculate the following, where x is a fractional value
    $1-x/2 +x^2/4-x^3/6$
i. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+ \ldots\ldots\ldots +x^n$. For example: if n is 3 and x is 5, then the program computes $1+5+25+125$

Arrays and Pointers and Functions:
a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a functions to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.
c. Write a C program that uses functions to perform the following:
    i. Addition of Two Matrices
    ii. Multiplication of Two Matrices
    iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
d. Write C programs that use both recursive and non-recursive functions
    i. To find the factorial of a given integer.
    ii. To find the GCD (greatest common divisor) of two given integers.
    iii. To find x^n
e. Write a program for reading elements using pointer into array and display the values using array.
f. Write a program for display values reverse order from array using pointer.
g. Write a program through pointer variable to sum of n elements from array.

Files:
a. Write a C program to display the contents of a file to standard output device.
b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
d. Write a C program that does the following:
    It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function)
    Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)
    The program should then read all 10 values and print them back.
e. Write a C program to merge two files into a third file (i.e., the contents of the firs t file followed by those of the second are put in the third file).

Strings:
a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
c. Write a C program that uses functions to perform the following operations:
    i. To insert a sub-string in to a given main string from a given position.
    ii. To delete n Characters from a given position in a given string.
d. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
e. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
f. Write a C program to count the lines, words and characters in a given text.

Miscellaneous:

a) Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

b) Write a C program to construct a pyramid of numbers as follows:

```
1           *          1          1          *
1 2         * *        2 3        2 2        * *
1 2 3       * * *      4 5 6      3 3 3      * * *
                                 4 4 4 4    * *
                                            *
```

Sorting and Searching:

a. Write a C program that uses non recursive function to search for a Key value in a given list of integers using linear search method.
b. Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using binary search method.
c. Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
d. Write a C program that sorts the given array of integers using selection sort in descending order
e. Write a C program that sorts the given array of integers using insertion sort in ascending order
f. Write a C program that sorts a given array of names

Suggested Reference Books for solving the problems:

i. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
ii. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)
iii. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
iv. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
v. Programming in C, Stephen G. Kochan, Fourth Edition, and Pearson Education.
vi. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

EE108ES: BASIC ELECTRICAL ENGINEERING LAB

B. Tech I Year I Sem.   **L T P C**
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Course objectives:
- To analyze a given network by applying various electrical laws and network theorems.
- To know the response of electrical circuits for different excitations
- To calculate, measure and know the relation between basic electrical parameters.
- To analyze the performance characteristics of DC and AC electrical machines.

Course Outcomes:
- Get an exposure to basic electrical laws.
- Understand the response of different types of electrical circuits to different excitations.
- Understand the measurement, calculation and relation between the basic electrical parameters.
- Understand the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:
1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Transient Response of Series RL and RC circuits using DC excitation
4. Transient Response of RLC Series circuit using DC excitation
5. Resonance in series RLC circuit
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits.
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer
8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
9. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
10. Measurement of Active and Reactive Power in a balanced Three-phase circuit
11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor
13. Performance Characteristics of a Three-phase Induction Motor
14. Torque-Speed Characteristics of a Three-phase Induction Motor
15. No-Load Characteristics of a Three-phase Alternator

<div align="center">

EN109HS: EMPLOYABILITY SKILLS- I
(BUSINESS ENGLISH FOR ENGINEERS)

</div>

B.Tech. I Year I Sem.   **L T P C**
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Introduction

The rapid breakdown of national barriers over the last decade has resulted in English language skills acquiring a great deal of importance in business sector. Ability to communicate at work place is vital, particularly in the present professional and business climate. In a world with ever-growing levels of globalization and interconnectivity, the significance of Business Communication increased rapidly. But lack of exposure towards Business Communication is a serious handicap for many aspirants. By recognizing this, the institution has focused to train the Engineering Students for Business Communication and motivating to appear BEC examination which is an internationally recognized qualification for getting employability. It has been introduced from B.Tech first year onwards, that can instruct and prepare the students to get the advantage when enter the job world. In today's globalization, it is more significant to show employers that you can communicate in English effectively in every-day business circumstances.

Course Objectives:

• It provides language Skills for real life business situations and improves confidence among students.
• To train the students to qualify the BEC examination
• Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

• Use Business English Language effectively in spoken and written forms.
• Comprehend the given texts and respond appropriately.
• Communicate confidently in various contexts and different cultures.
• Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills

Syllabus
Exercise-I
➢ Business Communication Skills: Intrapersonal skills and Interpersonal skills.
➢ Active Listening Skills- Listening Comprehension.
➢ Reading skills: Skimming and Scanning.
➢ Verbal Ability: Fundamentals of Grammar - Sentence Structure - Parts of Speech.
➢ Online Communication- "The power of word of mouse": an article on the power of online customer opinions

Exercise-II
➢ Corporate Communication: First impression, Personal Grooming, Corporate & Business etiquettes.
➢ Business Relationships: Career advice: letters to an advice column, corporate gift-giving, teamwork, thinking globally- "Global HR Management": an article.
➢ Technical and Business Vocabulary: Idioms, Phrases, Collocations, Abbreviations, and Analogy.
➢ Reading Skills: Intensive Reading and Extensive Reading

Exercise-III
➢ Presentation Skills: Group Discussion, Presentations Telephone Handling
➢ Reading Comprehension and Techniques: Interpreting bar charts, pie chart, table, and tree diagram.
➢ Listening to statistical information: short extracts- "Cafe Coffee Day": an article on the growth of the Indian Coffee shop;

Exercise-IV
➢ Writing skills: Paragraph writing, Business letters, E-mail, Memo, Report and Essay writing.
➢ Recruitment- Preparing for an interview, Staff development: "Advertisements for training courses: variation between a memo and an advert: sport and business" an article.
➢ "Picture Description" including Description of Photos/Images/Posters/Advertisement etc.,

Exercise-V
➢ Exercises on Common Errors in Grammar: Tenses, Passive forms, Model verbs, Degrees of comparison, Articles, Reference words, word types and Quantity expressions.
➢ Usage of Words: Model verbs of obligation, Contrast words, words to describe causes and effects.
➢ Practice of previous BEC Exam: Listening tracks, Reading, Writing and Speaking parts, Communication activities, and Exam skills practice.

R20 B.TECH. COMPUTER SCIENCE & ENGG

REFERENCES:

1. Business BENCHMARK,2nd Edition, South Asian Edition Student's Book- CUP

2. Swan, M. (2016). Practical English Usage. Oxford University Press.

3. Kumar, S and Lata, P. (2018). Communication Skills. Oxford University Press.

4. Wood, F.T. (2007). Remedial English Grammar. Macmillan.

5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.

WEBSITE LINKS:

- http://www.cambridge.org
- http://www.learnenglish.com
- http://www.eslgames.com
- https://www.cambridgeenglish.org/supporting-teachers/
- .https://britishcouncil.zoom.us/webinar/register/WN_Ddm6jFvxTpWAfYwWeZzX_Q
- .https://www.cambridge.org/gb/education/elevate-trial/
- https://learnenglishteens.britishcouncil.org/skills/listening
- https://www.cambridgeenglish.org/teaching-english/resources-for-teachers/webinars/assessing-writing-introducing-new-teacher-guides/

MA201BS: DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

B.Tech I Year II Sem.   **L T P C**
                                                                                   3 1 0 4

Course Objectives: To learn
- Methods of solving the differential equations of first and higher order.
- Concepts & properties of Laplace Transforms
- Solving differential equations using Laplace transform techniques
- Evaluation of multiple integrals and their applications.
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes: After learning the contents of this paper the student must be able to
- Solve higher differential equation and apply the concept of differential equation to real world problems
- Use Laplace transform techniques for solving DE's.
- Evaluate the multiple integrals and apply the concept to find areas, volumes.
- Evaluate the line, surface and volume integrals and converting them from one to another.

UNIT-I: First Order ODE

Exact, linear and Bernoulli's 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 order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{as}, sin ax , cos ax, polynomials in x, $e^{as}V(x)$ 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), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelopiped).

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, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:
1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition,2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint,2002.

REFERENCES:
1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India,1984.

CH202BS:-ENGINEERING CHEMISTRY

B.Tech. I Year II Sem.   **L T P C**
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Course Objectives
- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them
- To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry.

Course Outcomes: The basic concepts included in this course will help the student to gain:
- Identify different types of boiler troubles, choose appropriate method for softening and cleaning of water
- Define and differentiate atomic and molecular orbital, describe band theory for solid
- Compare and contrast the chemical behavior & physical properties of polymers .Identify the materials & methods that prevent corrosion in a particular environment
- Explain different types of electrode, electrode potential and determine EMF of a cell using Nernst equation
- Understanding on different types of fuels, their synthesis and analysis

UNIT-I:
Water and its treatment
Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Numerical problems. Boiler troubles: Sludges, scales and Caustic embrittlement. Boiler feed water and its treatment –Internal treatment(Calgon conditioning, Phosphate conditioning and Colloidal conditioning). External Treatment- Softening of water by ion exchange processes. **Potable water** – specifications, steps involved in the treatment of potable water - Disinfection of potable water by chlorination and Ozonization Desalination of water – Reverse osmosis

Unit-II:
Molecular structure and Theories of Bonding: Atomic and Molecular orbitals
Linear Combination of Atomic Orbitals (LCAO), molecular orbital of diatomic molecules, molecular energy level diagram of N_2, O_2, and F_2 molecules**.** π-molecular orbitals of butadiene and benzene.
Crystal Field Theory (CFT): Salient Features of CFT- Crystal Field Splitting of Transition metal ion d-orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

Unit-III:
Electrochemistry & Batteries
Electrochemistry: Electrochemical cells: Daniel cell – cell notation, cell reaction and cell EMF – Numerical problems. Electrochemical series and its applications- Nernst equation . Construction and functioning of Standard hydrogen electrode, calomel electrode, Quinhydrone and glass electrode. Determination of pH of a solution by using Quinhydrone and glass electrode.
Batteries: Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).
Fuel cells: Hydrogen–Oxygen fuel cell, Methanol-Oxygen fuel cell ,Advantages and Applications.

UNIT-IV:
Fuels and Combustions.
Classification – solid fuels: coal – analysis of coal - proximate and ultimate analysis and their significance.
Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process.
Gaseous fuels - constituents, characterstics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems.
Combustion – Definition, Calorific value of fuel – HCV, LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

Unit-V:
Engineering Materials and Corrosion
Polymers: Introduction, classification and mechanism of polymerisation- Addition (Free radical polymerisation mechanism and Condensation polymerisation. Classification of polymers - Thermoplastics & Thermosetting resins. Types of Polymerization of polymers (i) Addition (ii) Condensation (iii) Co-Polymerization.
Preparation, properties and engineering application of PVC, Teflon and Bakelite. Fibers- characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) Glass Fibres – applications. Rubber – Natural rubber and its vulcanization. Synthetic Elastomers- Buna S, Butyl rubber and Thiokol Rubber.
Conducting polymers: Introduction, classification and mechanism of conduction in Poly-acetylene, applications of

conducting polymers.

Biodegradable polymers: Introduction preparation, properties and applications of polylactic acid

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of wet corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion- nature of metal and nature of environment– Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), metal cladding, Electroless plating (Ni plating)

TEXT BOOKS:
1. Engineering Chemistry by P.C Jain and M.Jain, Dhanpatrai Publishing Company, New Delhi 2010.
2. Engineering Chemistry by Prasanta Rath,B. Rama Devi, Ch.Venkata Ramana Reddy and subhendu Chakroborty, Cengage learning, New Delhi. 2019.
3. Physical Chemistry, by P.W. Atkins

REFERENCE TEXT BOOKS
1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi 3rd, 2015
2. Text Book of Engineering Chemistry by S.S. Dara &Mukkati S. Chand & Co Publishers, New Delhi (2010)

CS203ES: DATA STRUCTURES

B.Tech I Year II Sem.   **L T P C**
                                                                              3 1 0 4

Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:
- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

Course Outcomes:
- Ability to select the data structures that efficiently model the information in a problem.
- Ability to assess efficiency trade-offs among different data structure implementations or combinations.
- Implement and know the application of algorithms for sorting and pattern matching.
- Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

UNIT - I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

UNIT - II

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching.
Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT - III

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

UNIT - IV

Graphs: Graph Implementation Methods. Graph Traversal Methods.
Sorting: Heap Sort, External Sorting- Model for external sorting, Merge Sort.

UNIT - V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

TEXTBOOKS:
1. Fundamentals of Data Structures in C, 2ndEdition, E. Horowitz, S. Sahni and Susan Anderson Freed, *Universities Press*.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, *PHI/Pearson Education*.

REFERENCE BOOKS:
1. Data Structures: A Pseudocode Approach with C, 2ndEdition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.

ME204ES: ENGINEERING GRAPHICS

B.Tech I Year II Sem.   **L T P C**
                                                                                                  1 0 4 3

Pre-requisites: Nil
Course Objectives:
- To provide basic concepts in engineering drawing.

- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

Course Outcomes: At the end of the course, the student will be able to:
- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.
- Estimate different projections of lines, planes, solids and sectional views
- Able to sketch two-dimensional orthographic drawings and three-dimensional isometric views
- Create and modify two-dimensional orthographic drawings using Auto CAD software

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

UNIT – IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

Introduction to CAD:

Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package

TEXTBOOKS:

1. Engineering Drawing N.D. Bhatt /Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/Oxford

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and McAgrawal/ McGrawHill
2. Engineering Drawing/ M. B. Shah, B.C. Rane /Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBSPublishers
4. Engineering Drawing and Graphics / K.Venugopal/ New Age InternationalPublishers
5. Engineering Drawing / K.L.Narayana, P.kannaiah/SCITECH

EN205HS: ENGLISH

B.Tech. I Year II Sem.   **L T P C**
                                                                                                          2 0 0 2

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on

training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class.

Learning Objectives: The course will help to

   a. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
   b. equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
   c. develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

   • use English Language effectively in spoken and written forms.
   • comprehend the given texts and respond appropriately.
   • communicate confidently in various contexts and different cultures.
   • acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

SYLLABUS

UNIT –I:
'The Raman Effect' from the prescribed textbook 'English for Engineers' published by
Cambridge University Press.
Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes. **Grammar:** Identifying Common Errors in Writing with Reference to Articles and Prepositions.
Reading: Reading and Its Importance- Techniques for Effective Reading.
Writing: Paragraph writing – Types, Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents. Importance of Proper Punctuation

UNIT –II:
'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Synonyms and Antonyms, Idioms and Phrases.
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
Reading: Improving Reading Comprehension Skills – Techniques for Good Comprehension
Writing: Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, and Job Application with Resume.

UNIT –III:
'Blue Jeans' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Collocations, one word substitute
Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.
Reading: Sub-skills of Reading- Skimming and Scanning
Writing: Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence

UNIT –IV:
'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.
Vocabulary: Standard Abbreviations in English, Verbal Analogy.
Grammar: Redundancies in Oral and Written Communication, Tag questions.
Reading: sub skills- Intensive Reading and Extensive Reading
Writing: Writing Practices- Essay Writing and Précis Writing.

UNIT –V:

'Mokshagundam Visvesvaraya' from the prescribed text book by JNTUH 'Epitome of Wisdom' - Maruthi Publications.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Error identification

Reading: "If Poem" by Rudyard Kipling

Writing: Creative writing- Advertisement making, Poster preparation, Technical Reports- Characteristics of a Report Writing,

PRESCRIBED TEXTBOOK:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.
2. 'Epitome of Wisdom' - Maruthi Publications.
3. Handouts for 'If' poem.

REFERENCES:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

CH206BS: ENGINEERING CHEMISTRY LAB

B.Tech. I Year II Sem.   **L T P C**
                                                                                                    0 0 3 1.5

LIST OF EXPERIMENTS: (PERFORM ANY 10 EXPERIMENTS)

Volumetric Analysis:
Experiment No. 1: Determination total hardness of water by complexometric method using EDTA.

Experiment No. 2: Estimation of ferrous iron in the given solution by permanganometry.
Experiment No. 3: Estimation of amount of chloride in water.

Conductometry:
Experiment No. 4: Estimation of HCl by Conductometric titrations
Experiment No. 5: Estimation of Acetic acid by Conductometric titrations

Potentiometry:
Experiment No. 6: Estimation of Ferrous iron by Potentiometry using $KMnO_4$
Experiment No. 7: Estimation of HCl by Potentiometry using NaOH

pH Metry:
Experiment No. 8: Estimation of HCl by pH Metry using NaOH

Colorimetry:
Experiment No. 9: Estimation of Manganese by Colorimetry.

Physical properties:
Experiment No. 10: Determination of surface tension of liquid by using stalagmometer
Experiment No. 11: Determination of viscosity of liquid by using Ostwald's viscometer.

Drug Synthesis:
Experiment No. 12: Preparation of Aspirin and Paracetamol.

<div align="center">

CS207ES: DATA STRUCTURES LAB

</div>

B.Tech I Year II Sem.   **L T P C**
                                                                                               0 0 2 1

Prerequisites: A Course on "Programming for problem solving".

Course Objectives:
- It covers various concepts of C programming language

- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes:
- Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

LIST OF EXPERIMENTS
1. Write a program that uses functions to perform the following operations on singly linked list.:
   i) Creation   ii) Insertion   iii) Deletion   iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.:
   i) Creation   ii) Insertion   iii) Deletion   iv) Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.:
   i) Creation ii) Insertion   iii) Deletion   iv) Traversal
4. Write a program that implement stack (its operations)using
   i) Arrays   ii) Pointers
5. Write a program that implement Queue (its operations)using
   i) Arrays   ii) Pointers
6. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
   i) Bubble sort ii) Selection sort   iii) Insertion sort
7. Write a program that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
   i) Linear search   ii) Binary search
8. Write a program to implement the tree traversal methods.

9. Write a program to implement the graph traversal methods.

TEXTBOOKS:
1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, *Universities Press*.
2. Data Structures using C–A.S.Tanenbaum,Y.Langsam, and M.J.Augenstein, *PHI/Pearson Education*.

REFERENCES:
1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage *Learning*.

EN208HS: ENGLISH LANGUAGE AND COMMUNICATION SKILS LAB

B.Tech I Year II Sem.   L T P C
                                                            0 0 3 1.5

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 both in formal and informal contexts.

Course Objectives:
- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking and interviews
  Learning Outcomes: Students will be able to attain
- Better understanding of nuances of English language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus

English Language and Communication Skills Lab (ELCS) shall have two parts:
   a. **Computer Assisted Language Learning (CALL) Lab**
   b. **Interactive Communication Skills (ICS) Lab**

Listening Skills
Objectives
1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills
Objectives
- To involve students in speaking activities in various contexts
- To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice: Just A Minute (JAM) Sessions
- Describing objects/situations/people
- Role play – Individual/Group activities

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.

ICS Lab: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab: Minimal Pairs- Word Accent and Stress Shifts.

ICS Lab: Listening for General Details, Oral Presentations, instructions on formal presentations and Practice.

Exercise – IV

CALL Lab: Listening for Specific Details, Intonation and Common Errors in Pronunciation.
ICS Lab: Group Discussion for General Purpose

Exercise – V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice
ICS Lab: Introduction to Interview Skills: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:
> **The Computer Assisted Language Learning Lab** has to accommodate 40 students with
> 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):
Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:
   i)   Computers with Suitable Configuration
   ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:
> **The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

MA209BS: EMPLOYABILITY SKILLS-II
(APTITUDE)

B.Tech. I Year II Sem.   L T P C
                                                                                                                 0 0 2 0

Course Objectives:
- To enhance the problem solving skills, to improve the basic mathematical skills and to help students who are preparing for any type of competitive examinations.

Course Outcomes:
- Students will be expected to actively do mathematics such as analyzing data, constructing hypotheses, solving problems, reflecting on their work, and making connections. The Quantitative techniques is organized around big mathematical and statistical concepts.

Unit-I:
H.C.F & L.C.M: Division Method, Factorisation method, H.C.F.& L.C.M. of fractions.
Averages: Arithmetic mean, Geometric mean, Harmonic mean.
Problems on Ages: using algebraic equations.
Percentages: Percentage difference, Percentage increase & decrease, fraction to Percentage, Percentage vs per cent.

Unit-II:
Profit & Loss: Cost price, selling price, percentages of profit & loss.
Partnerships: definition, Ratio of division of gains, working and sleeping partners.
Simple & compound interest: Principal amount, interest, time & rate of interest.

Unit-III:
Time & Work: Introduction, time & work by using fractions and percentages, negative work.
Pipes & Cisterns: Inlet, Outlet, time to emptying & filling a tank.

Unit-IV:
Time & Distance: Time, speed, Average and Distance related problems.
Boats & Streams: Upstream, downstream, still water, stream related problems. Average speed, distance, speed when time is given.
Problems on trains: pass a point, Stationary object of length, moving objects same & opposite directions.

Unit-V:
Permutations & Combinations: Definitions, permutations with repetitions allowed & not allowed, rank of dictionary words.
Probability: Basic definitions, axioms, addition theorem, conditional probability, multiplication theorem, total probability theorem, baye's theorem.

TEXTBOOKS:
1. Quantitative aptitude by Dr.R.S.Aggarwal, S.Chand publications

REFERENCES:
1. https://amzn.to/2ZPul7k
2. https://amzn.to/2LjDsI4.

CMR ENGINEERING COLLEGE
UGC AUTONOMOUS
(Approved by AICTE - New Delhi. Affiliated to JNTUH and Accredited by NAAC & NBA)

B.Tech. in COMPUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE (R-20)

Applicable From 2020-21 Admitted Batch

II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	CS301PC	Database Management Systems	3	0	0	3
2	CS302PC	Computer Organization and Architecture	3	1	0	4
3	CS303PC	Operating Systems	3	0	0	3
4	CS304PC	Object Oriented Programming through Java	3	0	0	3
5	CS305PC	Discrete Mathematics	3	0	0	3
6	CS306PC	Database Management Systems Lab	0	0	2	1
7	CS307PC	Operating Systems Lab	0	0	3	1.5
8	CS308PC	Java Programming Lab	0	0	3	1.5
9	*MC309	Gender Sensitization Lab	0	0	2	0
10	MC310	Employability Skills-III	0	0	2	0
		Total Credits	15	1	12	**20**

II YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	SM401MS	Business Economics & Financial Analysis	3	0	0	3
2	MA402BS	Computer Oriented Statistical Methods	3	1	0	4
3	CS403PC	Python Programming	3	0	0	3
4	CS404ES	Analog & Digital Electronics	3	0	0	3
5	CS405PC	Software Engineering	3	0	0	3
6	CS406PC	Python programming Lab	0	0	3	1.5
7	CS407ES	Analog & Digital Electronics Lab	0	0	2	1
8	CS408PC	Software Engineering Lab	0	0	3	1.5
9	*MC409	Environmental Science	3	0	0	0
10	MC410	Employability Skills-IV	0	0	2	0
		Total Credits	18	1	10	**20**

*MC – Satisfied/Unsatisfied

CS301PC: DATABASE MANAGEMENT SYSTEMS

B.TECH	II	Year	I	Sem.		L T P C
						3 0 0 3

Prerequisites: A course on "Data Structures.

Course Objectives:
- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- Topics include data models, database design, relational model, relational algebra, transaction control, concurrency control, storage structures and access techniques.

Course Outcomes:
- Gain knowledge of fundamentals of DBMS, database design and normal forms
- Master the basics of SQL for retrieval and management of data.
- Be acquainted with the basics of transaction processing and concurrency control.
- Familiarity with database storage structures and access techniques

UNIT - I
Database System Applications: A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS
Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model

UNIT - II
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. Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT - III
SQL: QUERIES, CONSTRAINTS, TRIGGERS: form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.
Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT - IV
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, Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions.

UNIT - V
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 Management Systems, Raghurama Krishnan, Johannes Gehrke, *Tata Mc GrawHill* 3rd Edition
2. Database System Concepts, Silberschatz, Korth, *Mc Graw hill*, Vedition.

REFERENCES:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7thEdition.
2. *Fundamentals of Database Systems, Elmasri Navrate, Pearson Education*
3. Introduction to Database Systems, C. J. Date, *Pearson Education*
4. Oracle for Professionals, The X Team, S.Shah and V. Shah,*SPD*.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,*PHI*.
6. Fundamentals of Database Management Systems, M. L. Gillenson, *Wiley Studen t*Edition.

CS302PC: COMPUTER ORGANIZATION AND ARCHITECTURE

B.TECH II Year I Sem.   L T P C
                                                                             3 1 0 4

Pre-requisite: A Course on "Digital Logic Design and Microprocessors".

Course Objectives:
- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
- It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, micro programmed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

Course Outcomes:
- Understand the basics of instructions sets and their impact on process or design.
- Demonstrate an understanding of the design of the functional units of a digital computer system.
- Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Recognize and manipulate representations of numbers stored in digital computers

UNIT - I
Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.
Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.
Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT - II
Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.
Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT - III
Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.
Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT - IV
Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.
Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

UNIT - V
Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.
Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline,

RISC Pipeline, Vector Processing, Array Processor.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor communication and synchronization, Cache Coherence.

TEXT BOOK:

1. Computer System Architecture – M. Moris Mano, Third Edition, Pearson/PHI.

REFERENCES:

1. Computer Organization – Car Hamacher, Zvonks Vranesic, Safea Zaky, Vth Edition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings Sixth Edition,Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition,PHI/Pearson.

CS303PC: OPERATING SYSTEMS

B.TECH II Year I Sem.   **L T P C**
                                                                                                  3 0 0 3

Prerequisites:
- A course on "Computer Programming and Data Structures".
- A course on "Computer Organization and Architecture".

Course Objectives:
- Provide an introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)
- Introduce the issues to be considered in the design and development of operating system
- Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix

Course Outcomes:
- Will be able to control access to a computer and the files that may be shared
- Demonstrate the knowledge of the components of computer and their respective roles in computing.
- Ability to recognize and resolve user problems with standard operating environments.
- Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

UNIT - I
Operating System - Introduction, Structures - Simple Batch, Multiprogrammed, 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 **Interprocess 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 Gagne 7th Edition, JohnWiley
2. Advanced programming in the UNIX environment, W.R. Stevens, Pearson education.

REFERENCE BOOKS:
1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition–2005, Pearson Education/PHI
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/ PearsonEducation
5. UNIX Internals -The New Frontiers, U. Vahalia, PearsonEducation.

CS304PC: OBJECT ORIENTED PROGRAMMING THROUGH JAVA

B.TECH II Year I Sem.   L T P C
                                                                          3 0 0 3

Course Objectives:
- To introduce the object oriented programming concepts.
- To understand object oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
- To introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

Course Outcomes:
- Able to solve real world problems using OOP techniques.
- Able to understand the use of abstract classes.
- Able to solve problems using java collection framework and I/o classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

UNIT - I
Object-Oriented Thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.
Inheritance– Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

UNIT - II
Packages- Defining a Package, CLASSPATH, Access protection, importing packages, Interfaces- defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.
Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

UNIT - III
Exception handling - Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.
Multithreading- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

UNIT - IV
The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collection classes-Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque. Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable, Properties, Stack, Vector
More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner

UNIT - V

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.
Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.
A Simple Swing Application, Applets – Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, **The Swing Buttons**- JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JCombo Box, Swing Menus, Dialogs.

TEXT BOOKS:
1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS:
1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley &sons
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ.Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

CS305PC: DISCRETE MATHEMATICS

B.TECH II Year I Sem.   **L T P C**
                                                                                                              3 0 0 3

Prerequisites: An understanding of Mathematics in general is sufficient.

Course Objectives
- Introduces the elementary discrete mathematics for computer science and engineering.
- Topics include formal logic notation, methods of proof, induction, sets, relations, graph theory, permutations and combinations, counting principles; recurrence relations and generating functions.

Course Outcomes:
- Ability to understand and construct precise mathematical proofs
- Ability to use logic and set theory to formulate precise statements
- Ability to analyze and solve counting problems on finite and discrete structures
- Ability to describe and manipulate sequences
- Ability to apply graph theory in solving computing problems

UNIT - I
The Foundations: Logic and Proofs: Propositional Logic, Applications of Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Introduction to Proofs, Proof Methods and Strategy.

UNIT - II
Basic Structures, Sets, Functions, Sequences, Sums, Matrices and Relations Sets, Functions, Sequences & Summations, Cardinality of Sets and Matrices Relations, Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.

UNIT - III
Algorithms, Induction and Recursion: Algorithms, The Growth of Functions, Complexity of Algorithms
Induction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness

UNIT - IV
Discrete Probability and Advanced Counting Techniques: An Introduction to Discrete Probability, Probability Theory, Bayes' Theorem, Expected Value and Variance
Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion- Exclusion, Applications of Inclusion-Exclusion

UNIT - V
Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Coloring.
Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees

TEXT BOOK:
1. Discrete Mathematics and its Applications with Combinatorics and Graph Theory- Kenneth HRosen, 7th Edition, TMH.

REFERENCES BOOKS:
1. Discrete Mathematical Structures with Applications to Computer Science-J.P. Tremblayand R. Manohar, TMH,
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe L. Mott, Abraham Kandel, Teodore P. Baker, 2nd ed, Pearson Education.

3. Discrete Mathematics- Richard Johnsonbaugh, 7Th Edn., Pearson Education.
4. Discrete Mathematics with Graph Theory- Edgar G. Goodaire, Michael M.Parmenter.
5. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, 5th edition, Pearson Education.

CS306PC: DATABASE MANAGEMENT SYSTEMS LAB

B.TECH **II** **Year** **I** **Sem.** **L T P C**

0 0 2 1

Co-requisites:

- Co-requisite of course "Database Management Systems"

Course Objectives:
- Introduce ER data model, database design and normalization
- Learn SQL basics for data definition and data manipulation

Course Outcomes:
- Design database schema for a given application and apply normalization
- Acquire skills in using SQL commands for data definition and data manipulation.
- Develop solutions for database applications using procedures, cursors and triggers

LIST OF EXPERIMENTS:
1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS:
1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rdEdition
2. Database System Concepts, Silberschatz, Korth, McGraw Hill, Vedition.

REFERENCES BOOKS:
1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7thEdition.
2. Fundamentals of Database Systems, Elmasri Navrate, *Pearson Education*
3. Introduction to Database Systems, C.J. Date, *Pearson Education*
4. Oracle for Professionals, The X Team, S. Shah and V. Shah,*SPD*.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah,*PHI*.
6. Fundamentals of Database Management Systems, M. L. Gillenson, *Wiley Student Edition.*

CS307PC: OPERATING SYSTEMS LAB (Using UNIX/LINUX)

B.TECH II Year I Sem.   **L T P C**
                                                                       0 0 3 1.5

Prerequisites:

- A course on "Programming for Problem Solving".
- A course on "Computer Organization and Architecture".

Co-requisite:
- A course on "Operating Systems".

Course Objectives:
- To provide an understanding of the design aspects of operating system concepts through simulation
- Introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix

Course Outcomes:
- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Able to implement C programs using Unix system calls

LIST OF EXPERIMENTS:
1. Write C programs to simulate the following CPU Scheduling algorithms
a) FCFS   b)SJF   c)Round Robin d)priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms
   a) Pipes   b)   FIFOs   c)   Message Queues   d)   Shared Memory
6. Write C programs to simulate the following memory management techniques
a) Paging   b) Segmentation

TEXT BOOKS:
1. Operating System Principles- Abraham Silberschatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R. Stevens, *Pearson* education.

REFERENCE BOOKS:
1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition–2005, Pearson Education/PHI
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

<div align="center">

CS308PC: JAVA PROGRAMMING LAB

</div>

B.TECH	II	Year	I	Sem.		L T P C
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Course Objectives:

- To write programs using abstract classes.
- To write programs for solving real world problems using java collection framework.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

Course Outcomes:
- Able to write programs for solving real world problems using java collection framework.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

Note:
1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

LIST OF EXPERIMENTS:
1. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

3. a)Develop an applet in Java that displays a simple message.
 b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

4. 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 Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

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

6. Write a Java program for the following: Create a doubly linked list of elements. Delete a given element from the above list.Display the contents of the list after deletion.

7. 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.

8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that

each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in GridLayout.

10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

11. 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).

12. Write a Java program that correctly implements the producer – consumer problem using the concept of interthread communication.

13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order

15. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

REFERENCE BOOKS
1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition *Pearson* education.
2. Thinking in Java, Bruce Eckel, *Pearson* Education.
3. Java Programming, D. S. Malik and P. S. Nair, *Cengage* Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, *Pearson*.

*MC309: GENDER SENSITIZATION LAB
(An Activity-based Course)

B.TECH   II   Year   I   Sem.   **L T P C**

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COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical

questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender- based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Learning Outcomes

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT - I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences- Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

UNIT – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work.
Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

UNIT – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu*".
Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives.

Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

UNIT – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature-Gender Development Issues-Gender Issues - Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks- The Brave Heart.

Note: **Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.**

> *Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on"Gender".*

> **ESSENTIAL READING**: The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender" written* by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu**published by Telugu Akademi, Telangana Government in 2015.**

ASSESSMENT AND GRADING

- Discussion & Classroom Participation:20%
- Project/Assignment:30%
- End Term Exam:50%

MC310: EMPLOYABILITY SKILLS-III

B.TECH	II	Year	I	Sem.		L T P C
						0 0 2 0

UNIT - I
Module 1 - Introduction to Python and Computer Programming: Python - a tool, not a reptile, there is more than one Python, let's start our Python adventure
Module 2 - Data Types, Variables, Basic Input-Output Operations, Basic Operators: Your first program, Python literals, Operators - data manipulation tools, Variables - data-shaped boxes, How to talk to computer?

UNIT - II

Module 3 - Boolean Values, Conditional Execution, Loops, Lists and List Processing, Logical and Bitwise Operations: Making decisions in Python, Python's loops, Logic and bit operations in Python, Lists - collections of data, Sorting simple lists - the bubble sort algorithm, Lists - some more details, Lists in advanced applications

Module 4 - Functions, Tuples, Dictionaries, and Data Processing: Writing functions in Python, How functions communicate with their environment?, Returning a result from a function, Scopes in Python ,Let's make some fun... sorry, functions ,Tuples and dictionaries

Module 5 - Modules, Packages, String and List Methods, and Exceptions: Using modules, Some useful modules, What is package?, Errors - the programmer's daily bread, The anatomy of exception, Some of the most useful exceptions, Characters and strings vs. computers, Python's nature of strings, String methods, Strings in action, Four simple programs

UNIT - III
Module 6 - The Object-Oriented Approach: Classes, Methods, Objects, and the Standard Objective Features; Exception Handling, and Working with Files: Basic concepts of object programming, A short journey from procedural to object approach, Properties, Methods, Inheritance - one of object programming foundations, Exceptions once again, Generators and closures, Processing files, Working with real files

UNIT - IV
Module: 7 Data Structures: List Data Structures, Stacks, Queues, Searching & Sorting, Trees, Graphs

UNIT - V
Module: 8 Databases Management, Mysql & Mongo DB: Creating Database, Insertion, Deletion, Updating, Selection

SM401MS: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

B.TECH II Year II Sem.

L T P C
3 0 0 3

Prerequisites: None

Course Objective: To learn the basic Business types, impact of the Economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.

Course Outcome: The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

UNIT – I
Introduction to Business and Economics:
Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.
Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT - II
Demand and Supply Analysis:
Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.
Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

UNIT - III
Production, Cost, Market Structures & Pricing:
Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.
Cost analysis: Types of Costs, Short run and Long run Cost Functions.
Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition.
Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT -IV
Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts.

UNIT - V
Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems).
Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS:
1. D.D. Chaturvedi, S.L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd.2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill,2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd.2012.

REFERENCES:
1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press,2015.
2. S.N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications,2013.

MA402BS: COMPUTER ORIENTED STATISTICAL METHODS

B.TECH II Year II Sem.   **L T P C**
                                                                    3 1 0 4

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn
- The theory of Probability, and probability distributions of single and multiple random variables
- The sampling theory and testing of hypothesis and making inferences
- Stochastic process and Markov chains.

Course Outcomes: After learning the contents of this paper the student must be able to
- Apply the concepts of probability and distributions to some case studies
- Correlate the material of one unit to the material in other units

- Resolve the potential misconceptions and hazards in each topic of study.

UNIT - I
Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule.
Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence.

UNIT - II
Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.
Discrete Probability Distributions: Introduction and Motivation, Binomial, Distribution, Geometric Distributions and Poisson distribution.

UNIT - III
Continuous Probability Distributions: Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions.
Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S2, t – Distribution, F-Distribution.

UNIT - IV
Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.
Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Tests Concerning a Single Mean, Tests on Two Means, Test on a Single Proportion, Two Samples: Tests on Two Proportions.

UNIT - V
Stochastic Processes and Markov Chains: Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n- step transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:
1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

REFERENCE BOOKS:
1. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley & Sons Ltd,2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.

CS403PC: PYTHON PROGRAMMING

B.TECH   II   Year   II   Sem.   **L T P C**

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Course Objectives: This course will enable students to
- Learn Syntax and Semantics and create Functions in Python.
- Handle Strings and Files in Python.
- Understand Lists, Dictionaries and Regular expressions in Python.
- Implement Object Oriented Programming concepts in Python.
- Build Web Services and introduction to Network and Database Programming in Python.

Course Outcomes: The students should be able to:
- Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
- Demonstrate proficiency in handling Strings and File Systems.
- Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use

Regular Expressions.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

UNIT - I

Python Basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types
Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules
Sequences - Strings, Lists, and Tuples, Mapping and Set Types

UNIT - II

FILES: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules
Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, *Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, *Creating Exceptions, Why Exceptions (Now)?, Why Exceptions at All?, Exceptions and the sys Module, Related Modules
Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules

UNIT - III

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules

UNIT - IV

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs
WEB Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI, Web (HTTP) Servers

UNIT – V

Database Programming: Introduction, Python Database Application Programmer's Interface (DB-API), Object Relational Managers (ORMs), Related Modules

TEXTBOOKS:
1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

CS404ES: ANALOG AND DIGITAL ELECTRONICS

B.TECH II Year II Sem.　　　　　　　　　　　　　　　　　　　　　　　L T P C
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Course Objectives:
- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To give understanding of various types of amplifier circuits
- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand the concepts of combinational logic circuits and sequential circuits.

Course Outcomes: Upon completion of the Course, the students will be able to:
- Know the characteristics of various components.

- Understand the utilization of components.
- Design and analyze small signal amplifier circuits.
- Learn Postulates of Boolean algebra and to minimize combinational functions
- Design and analyze combinational and sequential circuits
- Know about the logic families and realization of logic gates.

UNIT - I

Diodes and Applications: Junction diode characteristics: Open circuited p-n junction, p-n junction as a rectifier, V-I characteristics, effect of temperature, diode resistance, diffusion capacitance, diode switching times, breakdown diodes, Tunnel diodes, photo diode, LED.

Diode Applications - clipping circuits, comparators, Half wave rectifier, Full wave rectifier, rectifier with capacitor filter.

UNIT - II

BJTs: Transistor characteristics: The junction transistor, transistor as an amplifier, CB, CE, CC configurations, comparison of transistor configurations, the operating point, self-bias or Emitter bias, bias compensation, thermal runaway and stability, transistor at low frequencies, CE amplifier response, gain bandwidth product, Emitter follower, RC coupled amplifier, two cascaded CE and multi stage CE amplifiers.

UNIT - III

FETs and Digital Circuits: FETs: JFET, V-I characteristics, MOSFET, low frequency CS and CD amplifiers, CS and CD amplifiers.

Digital Circuits: Digital (binary) operations of a system, OR gate, AND gate, NOT, EXCLUSIVE OR gate, De Morgan Laws, NAND and NOR DTL gates, modified DTL gates, HTL and TTL gates, output stages, RTL and DCTL, CMOS, Comparison of logic families.

UNIT - IV

Combinational Logic Circuits: Basic Theorems and Properties of Boolean Algebra, Canonical and Standard Forms, Digital Logic Gates, The Map Method, Product-of-Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Exclusive-OR Function, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

UNIT - V

Sequential Logic Circuits: Sequential Circuits, Storage Elements: Latches and flip flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Shift Registers, Ripple Counters, Synchronous Counters, Random-Access Memory, Read-Only Memory.

TEXTBOOKS:

1. Integrated Electronics: Analog and Digital Circuits and Systems, 2/e, Jaccob Millman, Christos Halkias and Chethan D. Parikh, *Tata McGraw-Hill Education*, India,2010.
2. Digital Design, 5/e, Morris Mano and Michael D. Cilette, *Pearson,*2011.

REFERENCE BOOKS:

1. Electronic Devices and Circuits, Jimmy J Cathey, *Schaum's outline series*,1988.
2. Digital Principles, 3/e, Roger L. Tokheim, *Schaum's outline series*,1994.

CS405PC: SOFTWARE ENGINEERING

II Year B.Tech II-Sem   **L T P C**
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Course Objectives
- The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
- Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

Course Outcomes
- Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document(SRD).
- Identifyandapplyappropriatesoftwarearchitecturesandpatternstocarryouthighleveldesign of a system and be able to critically compare alternative choices.

- Willhaveexperienceand/orawarenessoftestingproblemsandwillbeabletodevelopasimple testing report

UNIT - I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT - II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System models: Context models, behavioral models, data models, object models, structured methods.

UNIT - III

Design Engineering: Design process and design quality, design concepts, the design model.

Creatinganarchitecturaldesign:softwarearchitecture,datadesign,architecturalstylesandpatterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT - IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT - V

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

QualityManagement: Qualityconcepts,softwarequalityassurance,softwarereviews,formaltechnical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS:
1. Software Engineering, A practitioner's Approach-Roger S. Pressman,6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCES:
1. SoftwareEngineering,anEngineeringapproach-JamesF.Peters,WitoldPedrycz,JohnWiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

4. Software Engineering by K K Agarwal and Yogesh Singh 3rd Edition, New Age International.

CS406PC:PYTHON PROGRAMMING LAB

B.TECH II Year II Sem.   **L T P   C**
                                                                                                 0 0 3 1.5

Prerequisites: Students should install Python on Linux platform.

Course Objectives
- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.

Course Outcomes

- Student should be able to understand the basic concepts scripting and the contributions of scripting language
- Ability to explore python especially the object oriented concepts, and the built in objects of Python.
- Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations

List of Programs

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write program to create, append, and remove lists in python.
5. Write a program to demonstrate working with tuples in python.
6. Write a program to demonstrate working with dictionaries in python.
7. Write a Python program to construct the following pattern, using a nested for loop

```
    *
    * *
    * * *
    * * * *
    * * * * *
    * * * *
    * * *
    * *
    *
```

8. Write a Python script that prints prime numbers less than20.
9. Write a python program to find factorial of a number using Recursion.
10. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
11. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
12. Write a python program to define a module and import a specific function in that module to another program.
13. Write a script named **copyfile.py**. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
14. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
15. Write a Python class to convert an integer to a roman numeral.
16. Write a Python class to implement pow(x,n)
17. Write a Python class to reverse a string word byword.
18. write a Python Program to perform Linear Search
19. write a Python Program to perform Binary Search
20. Write a GUI for an Expression Calculator using tk.

CS407ES: ANALOG AND DIGITAL ELECTRONICS LAB

B.TECH II Year II Sem.   **L   T   P   C**
                                                                                                                 0   0   2   1

Course Objectives
- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To give understanding of various types of amplifier circuits
- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand the concepts of combinational logic circuits and sequential circuits.

Course Outcomes: Upon completion of the Course, the students will be able to:
- Know the characteristics of various components.
- Understand the utilization of components.
- Design and analyze small signal amplifier circuits.

- Postulates of Boolean algebra and to minimize combinational functions
- Design and analyze combinational and sequential circuits
- Known about the logic families and realization of logic gates.

LIST OF EXPERIMENTS
1. Full Wave Rectifier with & without filters
2. Common Emitter Amplifier Characteristics
3. Common Base Amplifier Characteristics
4. Common Source amplifier Characteristics
5. Measurement of h-parameters of transistor in CB, CE, CC configurations
6. Input and Output characteristics of FET in CS configuration
7. Realization of Boolean Expressions using Gates
8. Design and realization logic gates using universal ates
9. generation of clock using NAND / NOR gates
10. Design a 4 – bit Adder /Subtractor
11. Design and realization a Synchronous and Asynchronous counter using flip-flops
12. Realization of logic gates using DTL, TTL, ECL,etc.

CS408PC: SOFTWARE ENGINEERING LAB

B.TECH II Year II Sem.   **L T P C**
                                                                                 0 0 3 1.5

Prerequisites
- A course on "Programming for Problem Solving"
- A course on "Database Management Systems"

Co-requisite
- A Course on "Software Engineering"

Course Objectives
- To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

Course Outcomes

- Ability to translate end-user requirements into system and software requirements
- Ability to generate a high-level design of the system from the software requirements
- Willhaveexperienceand/orawarenessoftestingproblemsandwillbeabletodevelopasimple testing report

List of Experiments

Dothefollowing8exercisesforanytwoprojectsgiveninthelistofsampleprojectsoranyother projects:

1) Development of problem statement.
2) PreparationofSoftwareRequirementSpecificationDocument,DesignDocumentsandTesting   Phase related documents.
3) PreparationofSoftwareConfigurationManagementandRiskManagementrelateddocuments.
4) Study and usage of any Design phase CASE tool
5) Performing the Design by using any Design phase CASE tools.
6) Develop test cases for unit testing and integration testing
7) Develop test cases for various white box and black box testing techniques.

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TEXT BOOKS:

1. SoftwareEngineering,Apractitioner'sApproach-RogerS.Pressman,6thedition,McGrawHill   International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

*MC409:ENVIRONMENTAL SCIENCE

B.TECH	II	Year	II	Sem.		L T P C
						3 0 0 0

Course Objectives:

- S – skills (Acquire the skills for identifying and solving environmental problems)
- P – protection qualities(participate in improvement and protection of the environment)
- E – evaluation abilities(develop the ability to evaluate measures for the protection of environment)
- A – attitude (acquire an attitude of concern for the development)
- K – knowledge (gain knowledge about the environment and its allied problems)

Course Outcomes:

Based on this course, the Engineering graduate will

- **Define** basic definitions and can explain complex relationship between predators, prey and the plant community.
- **Categorize** resources in natural environment and its relationships with human activities as well as human impacts.

- **Demonstrate** an awareness, knowledge and appreciation of the intrinsic values of ecological processes and communities
- **Assess** different scientific research strategies, including collection, management, evaluation and interpretation of environmental data and role of information technology in environment
- **Examine** the transnational character of environmental problems, protection acts and ways of addressing them, including interactions across local to global scales

UNIT-I :
Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem-Food chains, food webs and ecological pyramids. Flow of energy, biogeochemical cycles, bioaccumulation, biomagnifications, ecosystem value, services and carrying capacity.

UNIT-II:
Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: forest resources, Energy resources: growing energy needs, renewable and non renewable energy sources.

UNIT-III:
Biodiversity and biotic resources: Introduction, definition, genetic, species and ecosystem diversity. Values of biodiversity- **c**onsumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity.. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV:
Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-waste and its management. Pollution control technologies: Wastewater treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. Global environmental problems and Global Efforts: Climate change and impacts on human environment. Ozone depletion and ozone depleting substances (ODS). International conventions / Protocols: Earth summit, Kyoto protocol and Montréal protocol.

UNIT-V:
Environmental Policy, Legislation & EIA: Environmental protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).
Towards Sustainable future: Concept of sustainable development, population and its explosion, Crazy Consumerism, Environmental education, Urban sprawl, Human health, Environmental ethics, Concept of green building, Ecological foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental studies by Anubha Kaushik and C.P.Kaushik

REFERENCE BOOKS:
1. Environmental Studies –From crisis to cure by Dr. R. Rajagopaln
2. Text book for Environmental science and Technology by M. Anji Reddy
3. Environmental engineering and Disaster management by KR.Chandoke
4. Environmental engineering and science- Third edition by Gilbert M.Masters and Wendell P.Ella
5. Environmental studies by O.V.K.Reddy
6. Environmental Science and Engineering by Aloka Debi.

MC410: EMPLOYABILITY SKILLS-IV

B.TECH II Year II Sem.   **L T P C**
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UNIT-I
Introduction: Why Java, Paradigms, Diff B/W Java & Other (C,C++), Java History, Java Features, Java programming format, Java Statements, Java Data Types, packages

UNIT-II
OOPS (Object Oriented Programming & Systems): Introduction, Object, Constructors, This Key Word, Inheritance, Super Key Word, Polymorphism (Over Loading & Over Riding), Abstraction, Interface, Encapsulation, Introduction to all predefined packages, User Defined Packages, Access Specifiers

UNIT-III
STRING Manipulation: String, String Buffer
Array: What is Array, Single Dimensional Array, Multi Dimensional Array, Sorting of Arrays

UNIT-IV
Exception Handling: Introduction, Pre Defined Exceptions, Try-Catch-Finally, Throws, throw, User Defined Exception examples
I/O Streams: Introduction, Byte-oriented streams, Character – oriented streams, File

UNIT-V
Multithreading: Introduction, Thread Creations, Thread Life Cycle, Life Cycle Methods, Synchronization, Wait() notify() notify all() methods
Wrapper Classes: Introduction, Byte, Short, Integer, Long, Float, Double, Character, Boolean classes
Inner Classes: Introduction, Member Inner Class, Static Inner Class, Local Inner Class, Anonymous Inner Class
Collection Frame Work: Introduction, Util Package interfaces, List, Set, Map, List Interface 7 Its Classes, Set Interface & Its Classes, Map Interface & Is Classes