CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

B. Tech. I Year Syllabus

Common for CSE, IT & CSIT

I SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1	22MA101BS	Matrices and Calculus	3	1	0	4
2	22CH102BS	Engineering Chemistry	3	1	0	4
3	22CS103ES	Programming for Problem Solving	3	0	0	3
4	22EC104ES	Basic Electrical and Electronics Engineering	3	1	0	4
5	22ME105ES	Computer Aided Engineering Graphics	1	0	2	2
6	22CH106BS	Engineering Chemistry Laboratory	0	0	2	1
7	22CS107ES	Programming for Problem Solving Laboratory	0	0	2	1
8	22EC108ES	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1
9	22CH109MC	Environmental Science	3	0	0	0
		Induction Programme				
Total			**16**	**3**	**08**	**20**

II SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1	22MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	22PH202BS	Applied Physics	3	1	0	4
3	22CS203ES	Data Structures	3	0	0	3
4	22EN204HS	English for Skill Enhancement	3	0	0	3
5	22CS205ES	IT Workshop	0	0	3	1.5
6	22PH206BS	Applied Physics Laboratory	0	0	3	1.5
7	22CS207ES	Data Structures Laboratory	0	0	2	1
8	22EN208HS	English Language and Communication Skills Laboratory	0	0	2	1
9	22CS209ES	Basic Elements of Engineering and Technology	0	0	2	1
Total			**12**	**2**	**12**	**20**

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B. Tech. II Year Syllabus (W.e.f.A.Y:2022-23)

Information Technology

III SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	22MA301BS	Computer Oriented Statistical Methods	3	1	0	4
2	22EC302ES	Digital Electronics	3	0	0	3
3	22IT303PC	Programming with Python	3	0	0	3
4	22IT304PC	Computer Organization and Architecture	3	0	0	3
5	22IT305PC	Object Oriented Programming through Java	3	0	0	3
6	22IT306PC	Python Lab	0	0	3	1.5
7	22IT307PC	Object Oriented Programming through Java Lab	0	0	3	1.5
8	22IT308PC	NodeJS/ReactJS/Django	0	0	2	1
9	22EN309MC	Gender Sensitization Lab	0	0	2	0
		TOTAL	**15**	**1**	**10**	**20**

IV SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	22IT401PC	Discrete Mathematics	3	0	0	3
2	22IT402PC	Database Management Systems	3	0	0	3
3	22 IT403PC	Operating Systems	3	0	0	3
4	22 IT404PC	Web Technologies	3	0	0	3
5	22 IT405PC	Software Engineering	3	0	0	3
6	22 IT406PC	Web Technologies Lab	0	0	2	1
7	22 IT407PC	Database Management Systems Lab	0	0	2	1
8	22IT408PC	Data Visualization- R Programming/Power BI	0	0	2	1
9	22IT409PC	Real time Research Project/ Societal Related Projects	0	0	4	2
10	22EN410MC	Constitution of India	3	0	0	0
	Total:		**18**	**0**	**10**	**20**

Matrices and Calculus

B. Tech. I Semester **L T P C**

Subject Code: 22MA101BS **3 1 0 4**

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

1. Types of matrices, their properties and concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
2. Concept of eigen values and eigenvectors and to reduce the quadratic form to canonical form.
3. Apply geometrical approach to the mean value theorems and their application to the mathematical problems and evaluation of improper integrals using Beta and Gamma functions.
4. Utilize partial differentiation, concept of total derivative and finding maxima and minima of function of two and three variables.
5. Evaluation of multiple integrals and their applications.

Course Outcomes:

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

1. Use the matrix representation of a set of linear equations and to analyze the solution of the system of equations.
2. Find the Eigen values and Eigenvectors and reduce the quadratic form to canonical form using orthogonal transformation.
3. Solve the applications on the mean value theorems and evaluate the improper integrals using Beta and Gamma functions.
4. Apply the extreme values of functions of two variables with/ without constraints.
5. Compute multiple integrals and apply the concept to find areas, volumes.

UNIT-I: Matrices [12 Lectures]

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 [12 Lectures]

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: 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: Calculus [12 Lectures]

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem (without proof) with their Geometrical Interpretation and applications, Cauchy's Mean Value Theorem (without proof), Taylor's series for single variable.

Definition of improper integral: Definition of Beta and Gamma functions, properties, other forms of Beta functions, Relation between Beta and Gamma functions and their applications.

UNIT-IV: Multivariable Calculus (Partial Differentiation and Applications) [12 Lectures]

Definitions of Limit and continuity. Partial Differentiation, Euler's Theorem; Total derivative, Jacobian, Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration) [12 Lectures]

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 integrals.

Applications: Areas and volumes by double integrals.

TEXT BOOKS:

1. T.K.V.Iyengar, B.Krishna Gandhi, Engineering Mathematics, S.Chand Publishers, 19th edition,2020
2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44thEdition,2018.
3. R.K. Jain and S.R.K. Iyengar, Advanced Engineering mathematics, Narosa Publications, 6th Edition, 2020.

REFERENCE BOOKS:

1. Erwin kreyzig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint,2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi publications, Reprint,2008.
4. H.K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S.Chand publishers, 2014.

Web Links:

1. https://www.mooc-list.com/tags/matrix
2. https://www.mooc-list.com/tags/mean-value-theorem

Engineering Chemistry

B. Tech. I Semester **L T P C**

Subject Code: 22CH102BS **3 1 0 4**

Prerequesities: Engineering chemistry knowledge in school and college level.

Course Objectives:

To bring adaptability to new developments in Engineering Chemistry and to acquire the skillsrequired to become a perfect engineer.

1. To include the importance of water in industrial usage.
2. Analyze the properties and applications of industrial polymers.
3. Fundamental aspects of battery chemistry, significance of corrosion its control to protect the structures.
4. To imbibe the basic concepts of petroleum and its products.
5. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes:

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

1. Identify the basic properties of water and its usage in domestic andindustrial purposes.
2. Learn the fundamentals and general properties of polymers and other engineeringmaterials. Apply in day to day life.
3. Make use of basic knowledge of electrochemical procedures related to corrosionand its control.
4. Interpret the concepts of petroleum products and cement, Smartmaterials.
5. Find potential applications of chemistry and practical utility in order to becomegood engineers and entrepreneurs.

UNIT - I: Water Chemistry [8 Lectures]

Introduction to hardness of water – Estimation of hardness of water by complexometric method and numerical problems. Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning -Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation – Removal of F^- ion in water by Nalgonda method. Desalination of water – Reverse osmosis.

UNIT – II : Polymers [8 Lectures]

Definition – Classification of polymers with examples – Types of polymerization –addition (free radical addition) and condensation polymerization with examples – Nylon 6:6.

Plastics: Definition and characteristics - thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite.

Rubbers: Natural rubber and its vulcanization.

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Elastomers: Characteristics –preparation – properties and applications of Buna-S, andThiokol rubber.

Biodegradable polymers: Concept and advantages - poly vinyl alcoholand their applications.

Conducting polymers: Characteristics and Classification with examples - mechanism Of conduction intrans - polyacetylene and applications of conducting polymers.

UNIT - III: Batteries & Corrosion [8 Lectures]

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Construction, working and applications of Lithium, Lithium ion and Zn-air battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells-Construction and applicationsof Methanol Oxygen fuel cell.

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods. Metallic coating methods:Galvanization, Tinning and Eelectroplating

UNIT - IV: Energy Sources: [8 Lectures]

Introduction, Classification- Calorific value of fuel – HCV, LCV- Dulongs formula. solidfuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Trans esterification, advantages.

UNIT - V: Engineering Materials: [8 Lectures]

Cement: Portland cement, its composition, setting and hardening.

Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermo response materials- Polyacryl amides, Poly vinyl amides.

Lubricants: Classification of lubricants with examples-characteristics Of good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure) properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

TEXT BOOKS:

1. P.C. Jain and M. Jain, Engineering Chemistry by Dhanpatrai Publishing Company, 2010.
2. Rama Devi, Venkata Ramana Reddy and Rath, Engineering Chemistry by Cengage learning,2016.
3. Jaya Shree Anireddy, Textbook of Engineering Chemistry by Wiley Publications.
4. M. Thirumala Chary, E. Laxminarayana and K.Shashikala, A text book of Engineering Chemistry by

Pearson Publications, 2021.

REFERENCE BOOKS:

1. Shikha Agarwal, Engineering Chemistry by Cambridge University Press, Delhi 2015.
2. Shashi Chawla, Engineering Chemistry by Dhanpatrai and Company (P) Ltd. Delhi 2011.

Web Links

1. https://nptel.ac.in/courses/122106030
2. https://in.coursera.org/learn/corrosion
3. https://onlinecourses.nptel.ac.in/noc20_cy21/preview
4. https://archive.nptel.ac.in/courses/103/105/103105110/

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Programming for Problem Solving

B. Tech. I Semester	L	T	P	C
Subject Code: 22CS103ES	3	0	0	3

Prerequisites: Basic knowledge on mathematics & problem solving skills.

Course Objectives:

1. Design solutions to simple engineering problem by applying the basic programming principles of C language and basic mathematical knowledge.
2. Implement the programs using conditional statements and loops.
3. Develop simple C programs to illustrate the applications of different data types such as arrays, pointers, functions.
4. Develop the programs of searching and sorting techniques using Arrays.

Course Outcomes: After completion of this course, the students will be able to:

1. Illustrate and explain the basic computer concepts, algorithms, flowcharts and programming principles of C Language.
2. Develop C programs to solve simple mathematical and decision making problems.
3. Understand, distinguish and implement arrays, strings and structures to write C programs.
4. Understand the concepts of pointers and files using C programs.
5. Decompose a problem into functions and to develop modular reusable code.
6. Understand the Searching and sorting problems.

UNIT – I: [10 Lectures]

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, types of computer languages, compilers, creating, compiling and executing a program etc., Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart with examples.

Introduction to C Programming Language: History, Basic Structure of a C program, variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, type conversion, Bitwise operations: Bitwise AND, OR, XOR and NOT operators. I/O: Simple input and output with scanf and printf.

UNIT - II: [12 Lectures]

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, go to, Iteration with for, while, do-while loops

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 handling functions available in C .

Structures: Defining structures, initializing structures, Nested structures, Array of structures

Unions: Defining Unions, initializing unions, basic program on union. Enumeration data type.

UNIT - III: [10 Lectures]

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).
Pre-processor: Commonly used Pre-processor 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, Random access using fseek, ftell and rewind functions.

UNIT - IV: [12 Lectures]

Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, categories of functions, passing parameters to functions, call by value, Passing arrays 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, Storage classes (auto, extern, static and register), The main method and command line arguments.

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

UNIT - V: [8 Lectures]

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).

TEXT BOOKS:

1. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, 3rd edition,2006.
2. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson,2006.

REFERENCE BOOKS:

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

Web Links:

1. https://nptel.ac.in/courses/106104074
2. https://onlinecourses.nptel.ac.in/noc21_cs01/preview
3. https://www.includehelp.com/c-programming-examples-solved-c-programs.aspx
4. https://www.programiz.com/c-programming.

Basic Electrical & Electronics Engineering

L T P C

B. Tech. I Semester
Subject Code: 22EC104ES **3 1 0 4**

Prerequisites:
Course Objectives:

1. To introduce the concepts of electrical circuits and its components.
2. To study and understand the different types of DC, AC single & three phase circuits.
3. To study and understand the different types of DC, AC machines and Transformers.
4. To introduce the concepts of diodes & transistors.
5. To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes:

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

1. Identify the basic DC electrical circuits.
2. Evaluate the basic single phase and three phase AC circuits.
3. Analyze the working principles of Electrical Machines.
4. Classify the concepts of diodes & Rectifiers.
5. Compare the knowledge of various transistor configurations, characteristics and applications.

UNIT- I: **[14 Lectures]**

D.C. CIRCUITS: Introduction, Types of elements, Definitions, Ohm's law and its limitations, Passive elements R-L-C, Energy sources-Ideal and practical, Series and Parallel combination of Resistances, Inductances and Capacitances, Star-Delta Transformation, Source transformation, Kirchhoff's Laws, Mesh analysis, Nodal analysis.

UNIT-II: **[12 Lectures]**

A.C. CIRCUITS: Representation of sinusoidal waveforms, Instantaneous value, Peak value, Average and RMS value, Form factor and Peak factor for sinewave, Rectifier output, Saw tooth and Square Waveforms, Phasor representation, Real power, Reactive power, Apparent power, Power factor, Analysis of single- phase ac circuits RL, RC, RLC series combination. Three phase balanced circuits, Voltage and current relationship in star and delta connections.

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UNIT – III: **[14 Lectures]**

TRANSFORMERS: Construction, Types, Working principle of Single-phase transformer, EMF equation, Equivalent circuit, Losses in transformers, Efficiency and Condition for maximum efficiency.
DC& AC Machines: Construction, Working Principle of DC generator, EMF equation, Types, Working principle of DC motor, Torque equation, Three phase induction motor construction and working, Slip and Rotor current frequency.

UNIT – IV: **[10 Lectures]**

DIODES: Principle of Operation, Diode current equation, Volt-Ampere characteristics, Static and dynamic resistances, Diffusion and Transition capacitances. Half Wave Rectifier, Full Wave Rectifier-Center-Tap and Bridge Rectifier, Ripple factor, Rectification efficiency, Peak Inverse Voltage, Transformer Utilisation Factor, Simple problems. Zener diode characteristics, Zener diode as voltage regulator.

UNIT – V: **[10 Lectures]**

Bipolar junction Transistor: Construction, Principle of Operation, Amplifying Action, Common

Emitter, Common Base and Common Collector configurations, Current amplification factor, Relation between α and β, Comparison of CE, CB and CC configurations. SCR Construction, Operation and V-I characteristics.

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TEXT BOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. V.K. Mehta, Rohit Mehta, Principles of Electrical Engineering and Electronics – S.Chand Publications, 2nd Edition,2014.

REFERENCE BOOKS:

1. R. L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits – PEI/PHI, 9th Ed, 2006.
2. J. Millman and C. C. Halkias, SatyabrataJit, Electronic Devices and Circuits – TMH, 2/e, 1998.
3. William Hayt and Jack E. Kemmerly, Engineering circuit analysis- McGraw Hill Company, 6th edition,2012.
4. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
5. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.

Web Links:

1. www.youtube.com/watch?v=vh_aCAHThTQ
2. www.electricaleasy.com/2014/03/electrical-transformer-basic.html
3. www.youtube.com/watch?v=Unh99Qn7CmI
4. www.youtube.com/watch?v=d_LOXUEFA-o
5. www.electricaleasy.com/2022/09/construction-and-working-of-dc-generator.html

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Computer Aided Engineering Graphics

B. Tech. I Semester	**L T P C**
Subject Code: 22ME105ES	**1 0 2 2**

Pre-requisites: Computer Aided Engineering Graphics course of first year of study.
Course Objectives: To learn

1. To provide basic concepts in engineering drawing. To develop the ability of visualization of objects through technical drawings
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw projections of solids and pictorial views of solids and to draw surfaces development
   of solid for prisms, pyramids, cone and cylinder.
4. To draw isometric views of solids and orthographic projections of solids.
5. To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products.

Course outcomes:

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

1. Apply computer aided drafting tools to sketch the conventions and the methods of drawings, engineering curves and scales
2. Identify and draw the projections of points, lines and planes in different types of projections. manually and by using computer aided drafting tools
3. Analyze the need of projections of solids (prisms, pyramids, cone and cylinder) manually and by using computer aided drafting tools.
4. Evaluate and interpret engineering drawings for development of surfaces to Right Regular Solids-prism, manually and by using computer aided drafting tool.
5. Change the conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting tool.

UNIT- I: INTRODUCTION TO ENGINEERING DRAWING [12 Lectures]

Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid. Scales – Plain and Diagonal. Introduction to CAD Software commands and practice.

UNIT -II: ORTHOGRAPHIC PROJECTIONS [12 Lectures]

Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. manually and by using computer aided drafting

UNIT –III: PROJECTIONS OF SOLIDS [12 Lectures]

Projections of Regular Solids – Prism, Cylinder, Pyramid and Cone. manually and by using computer aided drafting.

UNIT- IV: DEVELOPMENT OF SURFACE [12 Lectures]

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone. manually and by using computer aided drafting

UNIT –V: ISOMETRIC PROJECTIONS: [12 Lectures]

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. Conversion of Isometric Views to Orthographic Views and Vice-versa. manually and by using computer aided drafting

Note: - Internal exam and The End Semester Examination will be conducted by using Auto Cad Software.

TEXTBOOKS:

1. N.D. Bhatt / Charotar, Engineering Drawing, Publisher: ***Charotar*** Publishing House · GenreJanuary 2019.
2. T. Jeyapoovan, Vikas: Engineering Drawing and graphics Using AutoCAD Third Edition S. Chand and company Ltd. January 2010.
3. N. S. Parthasarathy and Vela Murali/ Engineering Drawing /Oxford publications. 12th june 2015.
4. K Balaveera Reddy et al –Computer Aided Engineering Drawing, CBS Publishers. 2015.

REFERENCE BOOKS:

1. M. B. Shah, B.C. Rane / Engineering Drawing, Pearson. 2009
2. K Balaveera Reddy et al – Computer Aided Engineering Drawing, CBS Publishers. 2015
3. Basant Agrawal and C M Agrawal, Engineering Drawing, Third Edition McGraw Hil.2019
4. K Balaveera Reddy et al – Computer Aided Engineering Drawing -CBS Publishers. 2015.

WEBLINKS:

1. https://www.youtube.com/watch?v=ANEvQyt3PnU
2. https://www.youtube.com/watch?v=rp3swbAYZJU
3. https://www.youtube.com/watch?v=ga1ud9yQl4I
4. http://www.digimat.in/nptel/courses/video/105104148/L04.html
5. https://engineeringvideolectures.com/course/758

Engineering Chemistry Laboratory

B. Tech. I Semester **L T P C**

Subject Code: 22CH106BS **0 0 2 1**

Pre-requesities : To bring adaptability to new developments in engineering chemistry lab and acquire the knowledge in practical skills

Course Objectives:

The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness of water to check its suitability for drinking purpose.
2. To perform estimations of acids and bases using conductometry and potentiometry methods.
3. To prepare polymers such as Bakelite and nylon-6.6 in the laboratory.
4. Learn skills related to the lubricant properties such as saponification value,surface tension and viscosity of oils.
5. Apply the skills in rate of corrosion to solve engineering problems.

Course Outcomes:After completion of this course, the students will be able to:

1. Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
2. Perform methods such as conductometry and potentiometry in order to find out the concentrations or equivalence points of acids and bases.
3. prepare polymers like bakelite and nylon-6.6
4. Estimations of saponification value, surface tension and viscosity of lubricant oils.
5. Find the rate of corrosion of mild steel in various conditions.

List of Experiments:

I. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.

II. **Conductometry:** Estimation of the concentration of an acid by Conductometry.

III. **Potentiometry:** Estimation of the concentration of an acid by Potentiomentry Estimation of the amount of Fe^{+2} by Potentiomentry.

I. Preparations:

1. Preparation of Bakelite.
2. Preparation Nylon – 6.6

II. Lubricants:

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

III. Corrosion: Determination of rate of corrosion of mild steel in the presenceand absence of inhibitor.

IV. Virtual lab experiments

1. Construction of Fuel cell and it's working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

REFERENCE BOOKS:

1. B. Ramadevi and P. Aparna, Engineering chemistry Lab manual for by S Chand Publications, New Delhi (2022).
2. Vogel's text book of practical organic chemistry 5th edition.
3. A.I. Vogel, Inorganic Quantitative analysis by ELBS Publications.
4. V.K. Ahluwalia, College Practical Chemistry by Narosa Publications Ltd. New Delhi (2007).

Web Links

1. www.youtube.com/watch?v=FCQ26RQBZLg
2. https://www.youtube.com/watch?v=-GS6uoFf3qQ
3. https://www.youtube.com/watch?v=Y48UgKi33Ps
4. https://www.youtube.com/watch?v=TC1M-XDHfDI

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Programming for Problem Solving Laboratory

B. Tech. I Semester **L T P C**

Subject Code: 22CS107ES **0 0 2 1**

Co-requisites: A course on Programming for problem solving.
Pre-requisites: Basic knowledge on mathematics & problem solving skills.

Course Objectives: The students will learn the following:

1. To work with an IDE to create, edit, compile, run and debug programs
2. To analyze the various steps in program development.
3. To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
4. To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.

Course Outcomes:

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

1. Develop C programs for simple numerical problems.
2. Apply the knowledge of conditional statements and loops in programs.
3. Implement the programs using the concepts of arrays, structures, pointers and files.
4. Create the programs using functions and recursive functions.
5. Implement searching and sorting algorithms.

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) Writeasimpleprogramthatconvertsonegivendatatypetoanotherusingautoconversionand casting. Take the values from standard input.

Simple numeric problems:

a) Write a program for finding the max and min from the three numbers.

b) Write the program for the simple, compound interest.

c) Write a 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 C program for binary equivalent to a positive number 0 to 255.

Expression Evaluation:

a) 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)
b) Write a program that finds if a given number is a prime number
c) Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
d) 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.
e) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
f) Write a C program to find the roots of a Quadratic equation.

Arrays, Pointers and Functions:

a) Write a C program to find the minimum, maximum and average in an array of integers.
b) Write a function to compute mean, variance, Standard Deviation, sorting of n elements in a single dimension array.
c) Write a C program that uses functions to perform the following:
d) Addition of Two Matrices
e) Multiplication of Two Matrices
f) Transposeofamatrixwithmemorydynamicallyallocatedforthenewmatrixasrowandcolumn counts may not be the same.
g) Write C programs that use both recursive and non-recursive functions
h) To find the factorial of a given integer.
i) To find the GCD (greatest common divisor) of two given integers.
j) To find x^n

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

Strings:

a) Write a C program to implement string handling functions.
b) Write a C Program to find the length of a given string without using strlen() function.
c) Write a C Program to concatenate two string without using a function.

Miscellaneous:

a) 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

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition, Pearson,2013.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition),2006.

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language,PHI
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition,McGraw-Hill.

CMR Technical Campus 7R Kandlakoya (V)

Basic Electrical & Electronics Engineering Lab

B.Tech. I Semester	L	T	P	C
Subject Code 22EC108ES	0	0	2	1

Prerequisites: Mathematics
Corequisites: Basic Electrical and Electronics Engineering

Course Objectives:

1. To Analyze a given network by applying various electrical laws.
2. To Analyze the performance of single phase transformers.
3. To Analyze the performance of transformers, DC and AC machines.
4. To introduce the concepts of diodes and transistors.
5. To impart the knowledge of various types of Rectifiers.

Course Outcomes:

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

1. Verify the Ohms law, KCL, KVL with practical approach.
2. Estimate the performance calculations of single phase transformers.
3. Analyze the Performance characteristics of DC and AC machines through various testing methods.
4. Compare the characteristics of different types of diodes and transistors.
5. Evaluate the performance of Rectifiers with and without filters.

SECTION A: ELECTRICAL ENGINEERING:

1. Verification of Ohm's law.
2. Verification of KCL and KVL.
3. Brake test on DC Shunt motor.
4. Brake test on 3-phase Induction motor.
5. Load Test on Single-Phase Transformer.
6. Measurement of Voltage, Current and Real Power in Primary and Secondary circuits of a Single Phase Transformer.
7. No Load Characteristics of 3 phase Alternator.

SECTION B: ELECTRONICS ENGINEERING:

1. 1. Study and operation of
   (i) Multi-meters (ii) Function Generator (iii) Regulated Power Supplies iv) CRO
2. PN Junction Diode Characteristics A)Forward bias B) Reverse bias
3. Zener Diode CharacteristicsA)Forward bias B) Reverse bias
4. Input and Output characteristics of BJT in CE Configuration.
5. Half wave Rectifier without and with Filters .
6. Full wave Rectifier without and with Filters .
7. Note: Total 10 experiments are to be conducted.

(Minimum Five experiments from PART-A, Five experiments from PART-B)

TEXT BOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill,

2nd Edition, 2008.

REFERENCE BOOKS:

1. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand, 2 nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.

Web links: -

1. .https://www.youtube.com/watch?v=Ki60DB0I3W4&list=PLwymdQ84KI-x0T05PcG6D_2rhbWV_O93B&index=2
2. https://www.youtube.com/watch?v=W-AqhZLm7h4
3. https://www.youtube.com/watch?v=UkH4CaAsG6Q
4. https://www.youtube.com/watch?v=Hfkd7UFSIF0
5. https://www.youtube.com/watch?v=i9wbWYtm2cI
6. https://www.youtube.com/watch?v=UdaATCmDfYU
7. https://www.youtube.com/watch?v=1IZIjIf3NDw
8. https://www.youtube.com/watch?v=X-i1MevYcpM
9. https://www.youtube.com/watch?v=syZgyPLHyp8
10. https://www.youtube.com/watch?v=QGawHsg4NpQ

Technical Campus 7R Kandlakoya (V)

Environmental Science

B. Tech. I Semester **L T P C**

Subject Code: 22CH109MC **3 0 0 0**

Prerequisites: None

Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

Course Outcomes: After completion of this course, the students will be able to:

1. Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
2. Analyze and synthesize scientific data to characterize and evaluate the status of atleast one type of ecological system and apply skills of measurement, spatial orientation, sampling, and data analysis to characterize natural resource phenomena
3. Create awareness on the basic philosophy of science, concepts and scope.
4. Evaluate consequences of human exposure to pollution and its impacts to environmental quality.
5. Comprehending the statutory and regulatory mechanisms pertaining to environment in India and understanding judicial response to environmental issues in India.

UNIT-I **[10 Lectures]**

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function ofan ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

UNIT-II. **[7 Lectures]**

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 andnon-renewable energy sources, use of alternate energy source, case studies.

UNIT-III **[7 Lectures]**

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situconservation. National Biodiversity act.

UNIT-IV **[10 Lectures]**

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambientair 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 Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting

substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and MontréalProtocol. NAPCC-GoI Initiatives.

UNIT-V **[8 Lectures]**

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wildlife 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 Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Footprint, Life Cycle assessment (LCA), Lowcarbon lifestyle.

TEXTBOOKS:

1. Erach Bharucha , Textbook of Environmental Studies for Undergraduate Courses, The Orient Black swan, 2nd edition , 1 January 2015.
2. R. Rajagopalan, Environmental Studies , Oxford University Press,3rd edition, April, 2015

REFERENCE BOOKS:

1. Richard T. Wright, Environmental Science: towards a sustainable future , Benjamin Cummings Pub Co,13th edition, 17 January 2016.
2. Gilbert M. Masters and Wendell P. Ela, Environmental Engineering and science, Pearson, 3rd edition, 15 December 2006.
3. Daniel B. Botkin & Edward A. Keller, Environmental Science , Wiley publishing,8th edition,2012.
4. Anubha Kaushik, Environmental Studies , New age international publishers, 4th Edition, 1 January 2012
5. Dr. M. AnjiReddy , Textbook of Environmental Science and Technology ,BS Publications, 31 october 2014.
6. Y. Anjaneyulu , Introduction to Environmental Science , BS.Publications, 1 January 2004

Web links:

1. https://onlinecourses.nptel.ac.in
2. https://archive.nptel.ac.in
3. https://onlinecourses.swayam2.ac.in
4. https://onlinecourses.nptel.ac.in
5. https://onlinecourses.nptel.ac.in

Ordinary Differential Equations and Vector Calculus

B. Tech. II Semester **L T P C**

Subject Code: 22MA201BS **3 1 0 4**

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

1. Methods of solving the differential equations of first order differential equations.
2. Methods of solving the differential equations of higher order differential equations.
3. Concept, properties of Laplace transforms and Solving ordinary differential equations using Inverse Laplace transforms techniques.
4. The physical quantities of vector valued functions involved in engineering field
5. The basic properties and their applications to line and surface integrals.

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

1. Identify whether the given differential equation of first order is exact or not.
2. Solve higher order differential equations.
3. Use Laplace transforms techniques to find the derivatives and integrals of given functions & inverse Laplace transforms techniques for solving ODE's
4. Analyze vector and scalar point functions.
5. Evaluate the line and surface integrals and converting them from one to another

UNIT-I: First Order ODE **[12 Lectures]**

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates).

Applications: Newton's law of cooling, Law of natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order **[12 Lectures]**

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax},sinax, cosax, polynomials in x, $e^{ax}V(x)$and $xV(x)$, method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III: Laplace transforms **[16 Lectures]**

Laplace Transforms: First shifting theorem and Change of scale property, Multiplication by ' t' and division by 't', Laplace transforms of derivatives and integrals .Laplace transform of periodic functions. Inverse Laplace transforms: First Shifting theorem, Change of Scale Property, Inverse Laplace transforms of derivatives and Integrals, convolution theorem(without proof). Applications: Solving Initial value problems by Laplace Transform method.

UNIT-IV: Vector Differentiation **[10 Lectures]**

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

UNIT-V: Vector Integration **[10 Lectures]**

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Line, Surface &Volume integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S.Grewal, Higher Engineering Mathematics,KhannaPublishers,36th Edition,2021
2. R.K.JAIN, S.R.K.Iyengar,Advanced Engineering Mathematics,.Narosa Publishing House, 4th Edition New Delhi,2020
3. T.K.V.Iyengar, B.Krishna Gandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, S.Chand Publishing

REFERENCE BOOKS:

1. Kreyszing,Advanced Engineering Mathematics,.JohnWiley&Sons, 9th Edition 2006.
2. G.B.Thomas and R.L.Finney, Calculus and Analytic geometry,9th Edition,Pearson,Reprint,2002.
3. H.K.Dass and Er.Rajnish verma,Higher Engineering Mathematics,S Chand and Company Limited,New Delhi.
4. N.P.Bali and Manish Goyal,A text book of Engineering Mathematics, Laxmi Publocations,Reprint,2008

Web Links:

1. https://nptel.ac.in
2. https://onlinecourses.nptel.ac.in

Applied Physics

B. Tech. II Semester **L T P C**

Subjects Code: 22PH202BS **3 1 0 4**

Prerequisites: 10 + 2 physics

Course Objectives: The objectives of this course for the student are to:

1. Understand the basic principles of quantum physics and band theory of solids.
2. Summarize the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric and magnetic materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Explain the characteristics of lasers and optical fibres.

Course Outcomes:

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

1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric and magnetic materials for their applications.
4. Interpret the features and applications of nanomaterials.
5. Relate various aspects of Lasers and Optical fibres and their applications in diverse fields.

UNIT-I: QUANTUM PHYSICS AND SOLIDS **[15 Lectures]**

Quantum Mechanics: Introduction to quantum physics, Blackbody radiation, Planck's radiation law, Wein's and Rayleigh-Jean's law, Stefan-Boltzmann's law, Photo electric effect, De Broglie hypothesis, Davisson and Germer experiment, Heisenberg uncertainty principle, Born interpretation of the wave function, Time independent Schrodinger wave equation, Particle in one dimensional potential box.

Solids: Free electron theory (Drude and Lorentz, Sommerfield - qualitative), Fermi-Dirac distribution, Periodic potentials - Bloch's theorem, Kronig-Penney model (qualitative), E-K diagram, Effective mass of electron, Origin of energy bands- classification of solids.

UNIT-II: SEMICONDUCTORS AND DEVICES **[15 Lectures]**

Introduction to semiconductors, Intrinsic and extrinsic semiconductors - carrier concentration, Direct and indirect band gap semiconductors, Hall effect, Construction, Principle of operation and characteristics of P-N Junction diode, Zener diode, Bipolar junction transistor (BJT), LED, PIN diode, Avalanche photodiode (APD) and Solar cells.

UNIT-III: DIELECTRIC AND MAGNETIC MATERIALS **[10 Lectures]**

Dielectric Materials: Basic definitions, Electronic and ionic polarizations, Ferroelectric, Piezoelectric and Pyroelectric materials - applications.

Magnetic Materials: Hysteresis - soft and hard magnetic materials, Magnetostriction, Magneto resistance, Bubble memory devices, Magnetic field sensors and Multiferroics, Applications of magnetic materials.

UNIT-IV: NANO TECHNOLOGY **[10 Lectures]**

Nanoscale, Quantum confinement, Surface to volume ratio, Bottom-up fabrication: Sol-Gel, Precipitation, Combustion methods, Top-down fabrication: Ball milling, Physical vapor deposition

(PVD), Chemical vapor deposition (CVD), XRD, SEM & TEM, Applications of nanomaterials.

UNIT-V: LASER AND FIBER OPTICS **[15 Lectures]**

Lasers: Laser beam characteristics, three quantum processes, Einstein coefficients and their relations, Lasing action, Pumping methods, Ruby laser, Nd-YAG laser, He-Ne laser, Semiconductor laser, Applications of laser.

Fiber Optics: Introduction to optical fibers, Total internal reflection, Construction of optical fiber, Numerical aperture, Acceptance angle, Classification of optical fibers, Losses in optical fiber, Optical fiber for communication system, Applications of optical fibers.

TEXT BOOKS:

1. M.N.Avadhanulu, P.G.Kshirsagar & TVS. Arun Murthy" A Textbook of Engineering Physics"- S.Chand Publications, 11th Edition, 2019.
2. Shatendra Sharma and Jyotsna Sharma, Engineering Physics, Pearson Publication, 2019.
3. Donald A, Neamen, Semiconductor Physics and Devices-Basic Principle–Mc Graw Hill, 4th Edition, 2021.
4. B.K.Pandey and S.Chaturvedi, Engineering Physics, Cengage Learning, 2nd Edition, 2022.
5. Narasimha Reddy Katta, Essentials of Nanoscience & Nanotechnology, Typical Creatives NANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. H.C.Verma, Quantum Physics, TBS Publication, 2ndEdition2012.
2. Halliday, Resnick and Walker, John Wiley & Sons, Fundamentals of Physics 11th Edition, 2018.
3. Charles Kittel, Introduction to Solid State Physics, Wiley Eastern, 2019.
4. S.L.Gupta and V.Kumar, Elementary Solid State Physics, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya – Nano Materials, New Age International, 1stEdition, 2007.

Web Links:

1. https://youtu.be/TcmGYe39XG0
2. https://youtu.be/JA3sCmrv11M
3. https://youtu.be/qUEbxTkPIWI

Data Structures

B. Tech. II Semester **L T P C**

Subject Code: 22CS203ES **3 0 0 3**

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

Course Objectives:

1. Exploring basic data structures such as stacks and queues.
2. Introduces a variety of data structures such as hash tables.
3. Discussion of search trees.
4. Understand the sorting algorithms.
5. Introduces pattern matching algorithms

Course Outcomes:

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

1. Explain the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures.
2. Discuss hashing and different collision resolve techniques.
3. Design programs using a variety of data structures including binary search trees, heaps trees and AVL-trees.
4. Design programs on sorting and graphs.
5. Apply different searching techniques on Non linear data structure

UNIT–I **[10 Lectures]**

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 **[6 Lectures]**

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 **[8 Lectures]**

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 **[8 Lectures]**

Graphs: Graph Implementation Methods. Graph Traversal Methods.

Sorting: Heap Sort, External Sorting- Model for external sorting, Merge Sort.

UNIT–V **[8 Lectures]**

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. E. Horowitz, S. Sahni and Susan Anderson Freed, *Universities Press*. Fundamentals of Data Structures in C, 2nd Edition,2008.
2. A. S. Tanenbaum, Y. Langsam, and M. J.Augenstein,PHI/Pearson Education. Data Structures using C ,2004.

REFERENCE BOOKS:

1. R. F. Gilberg and B.A. Forouzan, Cengage *Learning.* Data Structures: A Pseudocode Approach with C, 2nd Edition,2016.

Web Links:

1. https://nptel.ac.in/courses/106102064
2. https://www.programiz.com/dsa/data-structure-types
3. https://www.coursera.org/learn/data-structures

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English for Skill Enhancement

B. Tech. II Semester	L	T	P	C
Subject Code: 22EN204HS	3	0	0	3

Prerequisites: Basic knowledge in Grammar as well as in prose

Course Objectives:

This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary,Grammar, Reading and Writing skills
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes:

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

1. Understand the importance of vocabulary and sentence structures.
2. Demonstrate their understanding of the rules of functional grammar.
3. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
4. Develop comprehension skills from the known and unknown passages.
5. Acquire basic proficiency in reading and writing modules of English.

UNIT – I **[8 Lectures]**

Chapter entitled '*Toasted English*' by R.K. Narayan from *"English: Language, Context and Culture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes -Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives- Synonyms and Antonyms
Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.
Reading: Reading and Its Importance- Techniques for Effective Reading.
Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing precisely – Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT – II **[7 Lectures]**

Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language, Context and Culture"published*** by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs
Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.
Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice
Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

UNIT – III **[8 Lectures]**

Chapter entitled 'Lessons from Online Learning' by F. Haider Alvi, Deborah Hurst et al from *"English: Language, Context and Culture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

UNIT – IV **[8 Lectures]**

Chapter entitled 'Art and Literature' by Abdul Kalam from *"English: Language, Context and Culture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations and Acronyms in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

UNIT – V **[7 Lectures]**

Chapter entitled 'Go, Kiss the World' by Subroto Bagchi from *"English: Language, Context and Culture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Note: Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum arecovered in the syllabus of ELCS Lab Course.

- **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for B. Tech. First Year is* ***Open-ended***, besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.
- **Note**: **2**. Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents. They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:

1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. Interchange Series. Introduction, 1,2,3. Cambridge University Press. (2022)
3. Wood, F.T. Remedial English Grammar. Macmillan. (2007).
4. Chaudhuri, Santanu Sinha. Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd. (2018).

5. Technical Communication. Wiley India Pvt. Ltd. (2019).
6. Vishwamohan, Aysha. English for Technical Communication for Engineering Students.

Mc Graw-Hill Education India Pvt. Ltd. (2013).
7. Swan, Michael. Practical English Usage. Oxford University Press. Fourth Edition. (2016).

Web Links:

UNIT I

Vocabulary - Prefixes and Suffixes
WL1:https://nptel.ac.in/courses/109106094/23
WL2:http://teacher.scholastic.com/reading/bestpractices/vocabulary/pdf/prefixes_suffixes.pdf

Synonyms and Antonyms
WL3:https://www.google.com/search?q=Synonyms+an+Antonyms+-+nptel+videos&nfpr=1&sa=X&ved=0ahUKEwi7pbzfluXfAhXBEbwKHXOqC4oQvgUILCgB&biw=1024&bih=657
WL4:https://scoop.eduncle.com/synonyms-antonyms-for-competitive-exams

GRAMMAR - Common errors in Prepositions
WL5:https://nptel.ac.in/courses/109104030/Module12/Lecture39.pdf
WL6:https://nptel.ac.in/courses/109104030/Module12/Lecture38.pdf
WL7:https://www.englishpractice.com/common-mistakes/common-errors-prepositions-3

Techniques of Effective reading
WL8:https://nptel.ac.in/courses/109106129/5
WL9:https://nptel.ac.in/courses/109106129/15
WL10:https://www.howtolearn.com/2012/08/different-reading-techniques-and-when-to-use-them/

UNIT II

GRAMMAR - Common errors in Noun and Pronoun agreement
WL11:https://nptel.ac.in/courses/109104030/Module12/Lecture39.pdf

common errors and Rules of Subject-verb agreement
WL12:https://nptel.ac.in/courses/109106094/8
https://www.grammarbook.com/grammar/subjectVerbAgree.asp

Techniques for improving comprehension skills
WL13:**https://nptel.ac.in/courses/109106129/5**
WL14:**https://joshkaufman.net/3-simple-techniques-to-optimize-your-reading-comprehension-and-retention/**

UNIT III

English Language
Vocabulary - Affixes
WL15:http://www.prefixsuffix.com/rootchart.php
English words from Foreign languages
WL16:https://www.fluentu.com/blog/english/english-words-from-other-languages/
WL17:https://en.oxforddictionaries.com/explore/foreign-words-and-phrases/
Misplaced modifiers
WL18:https://www.grammar-monster.com/glossary/misplaced_modifier.htm

Reading
WL19:http://www.bbc.co.uk/skillswise/topic/skimming-and-scanning
WL20:http://www.bbc.co.uk/skillswise/video/skimming-and-scanning

Writing
WL21:https://writeshop.com/choosing-vocabulary-to-describe-a-place/

Writing formal letters
WL22:https://nptel.ac.in/courses/109104031/14

UNIT IV
Vocabulary
WL23:https://www-pub.iaea.org/MTCD/DSS/OASISGlossary.pdf
WL24:https://nptel.ac.in/courses/Webcourse-contents/IISc-BANG/Composite%20Materials/pdf/Glossory.pdf
WL25:https://nptel.ac.in/courses/117105083/pdf/ssg_m2l2.pdf

Reading
WL26:https://nptel.ac.in/courses/109106066/module6/lecture12/lecture12.pdf

Writing
WL27:https://nptel.ac.in/courses/109106094/29
WL28:https://nptel.ac.in/courses/109106066/module3/lecture6/lecture6.pdf

UNIT - V
Vocabulary
WL29:https://nptel.ac.in/courses/109106066/module1/lecture1/lecture1.pdf

Grammar - Common errors
WL30:https://www.engvid.com/english-resource/50-common-grammar-mistakes-in-english/

Reading
WL31:https://nptel.ac.in/courses/109106066/module6/lecture12/lecture12.pdf

Writing
WL32:https://nptel.ac.in/courses/109104031/17
WL33:https://nptel.ac.in/courses/109107121/31

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IT Workshop

B. Tech. II SEM **L T P C**

Subject Code: 22CS205ES **0 0 3 1.5**

Course Objectives:

1. The IT Workshop is a training lab course to get training on PC Hardware, Internet &Worldwide Web and Productivity tools for documentation, Spreadsheet computations andPresentation.
2. To introduce 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, hardware and software level troubleshooting process.
3. To introduce connecting 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.
4. To get knowledge in awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks.
5. To introduce the usage of Productivitytools in crafting professional word documents, excel spreadsheets and power point presentations using open office tools.

Course Outcomes:

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

1. Apply knowledge for PC hardware and computer parts.
2. Apply knowledge for computer assembling and software installation.
3. Ability how to solve the trouble shooting problems.
4. Apply the tools for preparation of project certificate, Creating a Newsletter.
5. Apply the tools for preparation of PPT, Documentation and budget sheet etc.

PC Hardware: The students should work on working PC to disassemble and assemble to working condition and install operating system like Linux or any other on the same PC. Students are suggested to work similar tasks in the laptop scenario wherever possible.

Problem 1: Every student should identify the peripherals of a computer, components in a CPUand its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

Problem 2: Every student should individually install operating system like Linux or MS windows on the personal computer. The system should be configured as dual boot with both windows and Linux.

Problem 3: Hardware Troubleshooting: Students have to be given a PC which does not bootdue to improper assembly or defective peripherals. They should identify the problem and fixit to get the computer back to working condition.

Problem 4: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. Internet & World Wide Web.

Problem 5: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate how to access the websites and email.

Problem 6: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and popup blockers. Also, plug- ins like

Macro media Flash and JRE for applets should be configured

Problem 7: Search Engines & Netiquette: Students should know what search engines are and howto use the search engines. Usage of search engines like Google, Yahoo, ask.com and others should be demonstrated by student.

Problem 8: Cyber Hygiene: Students should learn about viruses on the internet and install antivirus software. Student should learn to customize the browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Problem 9: Develop home page: Student should learn to develop his/her home page using HTMLconsisting of his/her photo, name, address and education details as a table and his/her skill set as a list. Productivity tools: Word Orientation: An overview of Microsoft (MS) office /equivalent (FOSS) tool word should be learned: Importance of MS office / equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that should be covered in each, using and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Problem 10: Using and Word to create project certificate. Features to be covered: - Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.

Creating a Newsletter: Features to be covered: - Table of Content, Newspaper columns, Images from files and clipart, drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs in word.

Problem 11-Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. Creating a Scheduler: - Gridlines, Format Cells, Summation, auto fill, Formatting Text.

Calculating GPA - Features to be covered: - Cell Referencing, Formulae in spread sheet – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyperlinking, Count function, Sorting, Conditional formatting.

Problem 12: Creating Power Point: Student should work on basic power point utilities and tools in Latex and MS Office/equivalent (FOSS) which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and Charts.

REFERENCEBOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education. LaTeX Companion – Leslie Lamport, PHI/Pearson.
2. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
3. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.

   PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

Applied Physics Laboratory

B. Tech II Semester **L T P C**

Subject Code: 22PH206BS **0 0 3 1.5**

Prerequisites: Practical physics at basic level.
Co-Prerequisite: A course on 'Applied physics laboratory'.

Course Objectives: The objectives of this course for the student to

1. Capable of handling instruments related to photoelectric effect experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, BJT, LED, solar cell, Hall effect and measurement of energy gap and resistivity of semiconductor materials.
3. To understand the characteristics of dielectric constant of a given material and study the behavior
   of B-H curve of ferromagnetic materials.
4. Understand the Characteristics of Laser and optical fiber measurements.
5. Understanding the method of Mechanical oscillator (Torsional) and electrical oscillator (LCR).

Course Outcomes:

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

1. Know the determination of the Planck's constant using Photoelectric effect.
2. Appreciate quantum physics in semiconductor devices, optoelectronics and identify the material whether it is n-type or p-type by Hall experiment.
3. Gain the knowledge of applications of dielectric constant and understand the variation of magnetic field and behavior of hysteresis curve.
4. Gain the knowledge of Characteristics of Laser and optical fiber measurements.
5. Carried out data analysis.

LIST OF EXPERIMENTS:

1. Determination of work function and Planck's constant using photoelectric effect.
2. To study the resonant frequency, bandwidth and quality factor of series and parallel LCR circuits.
3. To study the V-I characteristics of a p-n junction diode.
4. a. To study the V-I characteristics of solar cell.
   b. To study the V-I characteristics of light emitting diode (LED).
5. Determination of energy gap of a semiconductor.
6. a. Determination of the V-I characteristics of the given LASER beam.
   b. Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
7. Determination of dielectric constant of a given material.
8. Study B-H curve of a magnetic material.
9. Determination of the resistivity of semiconductor by two probe method.
10. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
11. Input and output characteristics of BJT(CE,CB & CC configurations).
12. Understanding the method of least squares torsional pendulum as an example.

Note: *Any 8 experiments are to be performed.*

REFERENCE BOOK:

1. S. Balasubramanian, M.N.Srinivasan "A Textbook of Practical Physics"- S Chand Publishers, 2017.

Data Structure Laboratory

B. Tech. II Semester **L T P C**

Subject Code: 22CS207ES **0 0 2 1**

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

Course Objectives:

1. It provides an understanding of linear data structures such as stacks and queues.
2. It provides an understanding of non linear data structures like tress and graphs.
3. It provides an understanding of linear and binary search algorithms.
4. It provides an understanding of sorting algorithms.

Course Outcomes:

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

1. Implement various linear data structures.
2. Implement various non linear data structures.
3. Compare various searching and sorting algorithms.
4. Ability to implement trees and graphs traversals.

LIST OF EXPERIMENTS

1. Write a program that uses functions to perform the following operations on single linked list.
   i) Creation ii) Insertion iii) Deletion iv) Traversal

2. Write a program that uses functions to perform the following operations on double 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.

TEXT BOOKS:

1. E. Horowitz, S. Sahni and Susan Anderson Freed, *Universities Press*. Fundamentals of Data Structures in C, 2nd Edition,2008.
2. A. S. Tanenbaum, Y. Langsam, and M. J.Augenstein,PHI/Pearson Education. Data Structures using C ,2004.

REFERENCE BOOKS:

1. R. F. Gilberg and B.A. Forouzan, Cengage *Learning.* Data Structures: A Pseudocode Approach with C, 2nd Edition,2016.

WEB LINKS:

1. https://nptel.ac.in/courses/106102064
2. https://www.programiz.com/dsa/data-structure-types
3. https://www.coursera.org/learn/data-structures

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English Language and Communication Skills Lab

B. Tech. II Semester **L T P C**

Subject Code: 22EN208HS **0 0 2 1**

Prerequisites: Basic Knowledge in speech sounds as well as formal and informal communication

The **English Language and Communication Skills (ELCS) 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:

1. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
2. To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize the impact of dialects.
5. To train students to use language appropriately for public speaking, group discussions and interviews.

Course Outcomes:

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

1. Pronounce English sounds according to standard pronunciation
2. Understand the nuances of English language through audio- visual experience and practice
3. Speak with clarity and confidence which in turn enhances their employability skills
4. Neutralize their accent for intelligibility
5. Participate in discussion and presentation effectively and confidently

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 to develop their listening skills so that they may appreciate the 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

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

The following course content is prescribed for the **English Language and communication Skills Lab**.

Exercise – I

CALL Lab:

Understand*:* Listening Skill- Its importance – Purpose- Process- Types

Practice**:** Introduction to Phonetics – Speech Sounds – Vowels and Consonants

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English**.**

Practice: **Ice-**Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave –Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Listening Skills: Barriers- Effective Listening.

Practice: Minimal Pairs-Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

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

Exercise-III

CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - *Testing Exercises*

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab:

Understand: Errors in Pronunciation-Neutralization of Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -*Testing Exercises*

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V

CALL Lab:

Understand: Listening for General and Specific Details.

Practice: Listening Comprehension Tests -*Testing Exercises*

ICS Lab:

Understand: Introduction to Group Discussion

Practice: Group Discussion

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 T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

- *Exercises in Spoken English. Part 1,2,3*. CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:

1. *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd. (2022).
2. Shobha, KN & Rayen, J. Lourdes. *Communicative English – A workbook.* Cambridge University Press. (2019).
3. Kumar, Sanjay & Lata, Pushp. *Communication Skills: A Workbook.* Oxford University Press. (2019).
4. Board of Editors.*ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.* Orient Black Swan Pvt. Ltd. (2016).
5. Mishra, Veerendra et al. *English Language Skills: A Practical Approach.* Cambridge University Press. (2020).

WEB LINKS:

Listening Skills Lecture nptel
WL1:https://www.youtube.com/watch?v=JIKU_WT0Bls

NPTEL on role-play and conversation skills
WL2:https://www.youtube.com/watch?v=0AM35Nu5McY&list=PLbMVogVj5nJT3a24lj4KOkQCOElxcDQrs

NPTEL on syllables
WL3:https://www.youtube.com/watch?v=4V2CwQJ8pgc

NPTEL on listening for general details
WL4:https://www.youtube.com/watch?v=xY7z3nZOHqk&list=PLzJaFd3A7DZtnTdtOxvjO3GLPd1WVe6oq&index=17

NPTEL on stress shifts
WL 5: https://www.youtube.com/watch?v=_KHtfvob4j4

NPTEL on weak forms and strong forms
WL6:https://www.youtube.com/watch?v=VM0cNDxBySc&list=PL0P6HKIuShRnJeZjhAOy-2NejNjeC2_x2

WL7:NPTEL on Intonation
https://www.youtube.com/watch?v=A6aE4nceJt8

Basic Elements of Engineering Technology

B. Tech. II Semester **L T P C**

Subject Code: 22CS209ES **0 0 2 1**

Objectives:

- Exploring different engineering technologies and their applications.
- Students should able to learn various 3d printing technologies.
- Knowledge towards Assembling and testing of robots.
- Understanding functionality of 3Dprinters and their application.
- Developing team work and in sight towards different disciplines of Engineering.

Module I: Internet of Things

Overview of IoT and Architecture: Brief History, evolution of IoT, Architecture, trends in the Adoption of IoT, Societal Benefits of IoT, Risks, Privacy, Security, Embedded Systems Components, Micro-controller Architecture and Properties and Installing and Setting up the Arduino and Raspberry Pi (RPi) development environment. Build Simple IoT Applications by using Arduino or RPi.

Module II: Robotics

Introduction, Different types of robots, Components of a Robot, Working principle of robots, Applications of robots in various fields, Innovation challenges, Scope of robotics research & its current trends, assembling and testing of Robot.

ModuleIII:3D Printing

Introduction, Product Design & Development, 3D Scanning & Printing using different types of materials. Components of 3D Printer, Applications of 3D printed products in various fields, Hands on Experience on 3D printing Machine.

Module IV: Software and Post Processing

Cura, Flash print, 3dslicer, Tinkercad, Meshmixer. 3d printing parameters, print Speed, Layer Height, Infill density.Acetone bathing, Support Structure Removing.

Module V: Case Studies

Students has to submit a report by doing a study on various Engineering applications related to Manufacturing, Retail, Automotive, Logistics, Healthcare, Entertainment and E-Governance.

REFERENCE BOOKS:

1. PC Hardware-A Handbook –KateJ. Chase PHI(Microsoft)
2. ITEssentialsPCHardwareandSoftwareCompanionGuideThirdEditionbyDavid Anfinsonand Ken Quamme.– CISCO Press, Pearson Education.
3. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015,ISBN: 9788173719547.

4. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace,O'Reilly (SPD),2014,ISBN: 9789350239759
5. Ashitava Ghoshal, Robotics-Fundamental Concepts and Analysis', Oxford University Press, Sixth impression,2010.
6. DebSR.andDebS.,—RoboticsTechnologyandFlexibleAutomation‖,TataMcGrawHill Education Pvt.Ltd,2010.
7. MikellP Groover,—Automation, Production Systems,and computerintegratedManufacturing‖,PrenticeHall, 2001.
8. CheeKaiChua,KahFaiLeong,3DPrintingandAdditiveManufacturing:Principles andApplications: Fourth Edition of Rapid Prototyping.
9. Andreas Gebhardt, Understanding Additive Manufacturing: RapidPrototyping, Rapid Tooling, Rapid Manufacturing.

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Computer Oriented Statistical Methods

B. Tech III Semester **L T P C**

3 1 0 4

Subject Code: 22MA301BS
Course Objectives:

Pre-requisites: Mathematical Courses of first year of study
Course Objectives: To learn

1. The concept of Probability and Random variables
2. The Probability distributions of discrete and continuous random variables
3. The sampling theory, testing of hypothesis and making statistical inferences.

Course outcomes: After completion of this course, the student will be able to:

1. Apply the concepts of probability and Random variables
2. Analyse the concept of Probability distributions to some case studies
3. Formulate and solve problems by apply statistical methods for analyzing experimental data.
4. Demonstrate the concept of estimation and distinguish regression analysis and to compute and interpret the coefficient of correlation.
5. Examine the given statistical hypothesis

UNIT - I: Probability and Random Variable **10 Lectures**

Review of Probability, Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions. Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables

UNIT-II : Discrete and Continuous Distributions **10 Lectures**

Discrete Probability Distributions: Binomial Distribution, Poisson distribution.Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions.

UNIT-III: Sampling Distribution **10 Lectures**

Fundamentals of Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t - Distribution, F-Distribution and Chi-square Distribution.

UNIT-IV: Estimation, Simple Linear Regression and Correlation **10 Lectures**

Estimation: Point and interval estimations, criteria of good estimator, estimations for means and properties.

Simple Linear Regression and Correlation: Introduction of linear regression, the simple Linear Regression Model, least squares and fitted model, Inferences concerning the regression coefficients, Prediction, Simple Linear regression case study.

UNIT-V: Tests of Hypothesis **10 Lectures**

Statistical Hypothesis: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions.

Small Sample tests: Student-t-test for single mean, difference of means and F-test for equality of two variances, Chi-Square test for goodness of fit and independence of attributes.

TEXT BOOKS:

1. Dr.T.K.V. Iyengar, B.Krishna Gandhi, S. RanganathamandDr.M.V.S.S.N.Prasad, Probability and statistics , S.Chand, EigthRevisesed edition ,2020.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, S.Chand publications, 12th revised edition ,2020 .
3. S.D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi,2014.

REFERENCE BOOKS:

1. Sheldon M Ross, Probability and statistics for Engineers and scientists, 6th edition, academic press, 2020.
2. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations, 2015.

WEBLINKS:

1. **https://youtu.be/r1s**
2. **https://youtu.be/enDYkFxJE9W**
3. **https://youtu.be/VVYLpmKRfQ8**

Digital Electronics

B.Tech. III Semester

L	T	P	C
3	0	0	3

Subject Code: 22EC302ES

Pre-requisite: Basic Electrical and Electronics Engineering

Course Objectives:

1. To Compare common forms of number representation in logic circuits.
2. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
3. To understand the concepts of combinational logic circuits.
4. To design sequential logiccircuits.
5. To know various memories and logic families.

Course Outcomes: Upon completing this course, the student will be able to

1. Compare the numerical information in different forms and Boolean Algebra theorems.
2. Apply the various simplification methods to simplify the given Boolean function.
3. Analyze and design various combinational logic circuits.
4. Learn the concepts of sequential circuits.
5. Illustrate various memories and logic families.

UNIT – I: [10 Lectures]

NUMBER SYSTEMS: Number Systems, Number base conversions, Binary, Octal, Decimal, and Hexadecimal Numbers, Complements of Numbers, Binary codes: Weighted and Non weighted codes.

BOOLEAN ALGEBRA: Basic Theorems and Properties, Switching Functions- Canonical and Standard Form, Algebraic Simplification, Digital Logic Gates, Universal Gates.

UNIT – II: [8 Lectures]

GATE – LEVEL MINIMIZATION: The map method, Three-variable map, Four-variable map, product of sums simplification and Sum of Products Simplification using K-map, Don't-care conditions, NAND and NOR implementation.

UNIT – III: [10 Lectures]

COMBINATIONAL LOGIC: Combinational Circuits, Design procedure, Design of Half Adder, Full Adder, Half Subtractor, Full Subtractor, BCD Adder, Magnitude Ccomparator, Decoders, Encoders, Multiplexers, and Demultiplexers.

UNIT – IV: [8 Lectures]

SEQUENTIAL LOGIC: Sequential circuits, latches, Flip-Flops, Design Procedure**,** state Reduction and Assignment, Registers, shift Registers, synchronous counters, Asynchronous Counters, Ring Counter, Johnson Counter.

UNIT – V: **[8 Lectures]**

MEMORIES AND LOGIC FAMILIES

Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array, Programmable Array logic. AND, OR and NOT Gates using Diodes, Classification of Integrated circuits, comparison of various logic families.

TEXT BOOKS:

1. M. Morris Mano, Digital Design, 3rd Edition, Pearson Education/PHI, 2021.
2. Albert Paul Malvino Donald P. Leach, Digital Principles and Applications, 2nd Edition, TATA McGraw Hill, 1976.
3. A. Anand Kumar, Pulse and Digital Circuits, 2nd Edition, PHI Publications,2012.

REFERENCE BOOKS:

1. Zvi. Kohavi, Switching and Finite Automata Theory, 3rd Edition,Tata McGraw Hill, 2009.
2. C.V.S. Rao, Switching and Logic Design, 1st Edition, Pearson Education, 2005.
3. Donald D.Givone, Digital Principles and Design, Tata McGraw Hill, Edition, 2017.

WEBLINKS:

1. http://nptel.ac.in/courses/117/106/117106086/ (By Prof. Goutam Saha, Electronics & Electrical Communication Engineering Dept, IIT Kharagpur).
2. www.nptelvideos.in/2012/12/digital-circuits-and-systems.html(By Prof. Santanu
3. Chattopadhyay, Electronics & Electrical Communication Engineering Dept, IIT Kharagpur).
4. https://www.smartzworld.com/notes/switching-theory-and-logic-design-stld/.

Programming with Python

B. Tech. III Semester **L T P C**
3 0 0 3

Subject Code: 22IT303PC

Prerequisites: Students should install Python on the Linux platform.

Course Objectives:

1. Learn Syntax and Semantics in Python.
2. Explore the arrays and strings in Python.
3. Understand Lists, Dictionaries and Regular expressions in Python.
4. Handle Files, Modules and exceptions in Python.
5. Implement Object Oriented Programming concepts in Python.

Course Outcomes: After completion of this course, the students will be able to:

1. Examine Python syntax and semantics, flow control.
2. Demonstrate proficiency in handling Strings and arrays.
3. Relate Python Programs using core data structures like Lists, Dictionaries anduse Regular Expressions.
4. Correlate experiments on file handling, exception handling, and modules.
5. Develop the concepts of Object-Oriented Programming as used in Python.

UNIT–I **[10 Lectures]**

Introduction to Python: History, Features, Applications, First Python Program,Variables, Data Types, Numbers, Operators, Input and Output statements.

Control Statements: Conditional Statements, A Word on Indentation, LoopingStatements, the else Suite, break, continue, pass, assert, return.

UNIT–II **[08 Lectures]**

Arrays in Python: Arrays, Types of Arrays, Working with Arrays using numpy, Creating Arrays, Operations on Arrays, Attributes of an Array, The reshape() Method, The flatten() Method, Matrices in numpy, Matrix Addition and Multiplication.

Strings and Characters: Creating Strings, Operations on Strings, Working with Characters, Sorting Strings, Searching Strings.

UNIT–II **[10 Lectures]**

Functions in Python: Defining a Function, Calling a Function, Parameters, Recursive Functions.

List: Creating Lists using range() Function, Operations on Lists, Methods to Process List, Sorting the List Elements.

Tuple: Creating Tuples, Accessing the Tuple Elements, Operations on Tuple, Functions to Process Tuples.

Dictionaries: Operations on Dictionaries, Dictionary Methods, Sorting the Elements of a Dictionary using Lambdas, Converting Lists into Dictionary, Converting Strings into Dictionary, Passing Dictionaries to Functions.

UNIT–IV **[10 Lectures]**

Files in Python: 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–V **[08 Lectures]**

OOPS using Python: Classes and Objects, Inheritance and Polymorphism, Abstract Classes and Interfaces.

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.

TEXTBOOKS:

1. Wesley J. Chun, Core Python Programming, Second Edition, Pearson, 2006.
2. R. Nageswara Rao Core Python Programming, DreamTechPress, 2018.

REFERENCE BOOKS:

1. Python Programming using problem solving approach,Reemathareja,Oxford University Press, 2019.
2. Dietel and Dietel, Python How to Program, 2002.

WEB LINKS:

1. https://nptel.ac.in/courses/106106145
2. https://onlinecourses.nptel.ac.in/noc20_cs83/preview
3. https://www.visualpathedu.com/home/course/core-python/1
4. https://www.visualpathedu.com/home/course/advanced-python/3
5. https://www.udemy.com/topic/python/free/
6. https://www.coursera.org/specializations/python

Computer Organization and Architecture

B. Tech. III Semester

L	T	P	C
3	0	0	3

Subject Code: 22IT304PC

Prerequisite:

1. A Course on "Digital Logic Design and Microprocessors".

Course Objectives:

1. Introduce principles of computer organization and the basic architectural concepts.
2. Explore the basic organization, design, and programming of a simple digital computer.
3. Introduces simple register transfer language to specify various computer operations.
4. Describing memory organization and I/O systems.
5. Topics include pipelining and vector processing.

Course Outcomes: After completion of this course, the students will be able to:

1. Identityof computer organization architecture.
2. Interpret the basics of instruction sets and their functionality.
3. Relate arithmetical operations byusing data.
4. Correlate the functional units of the computer.
5. Design a pipeline for consistent execution of instructions.

UNIT–I **[10 Lectures]**

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logicmicro operations, shift micro operations, Arithmetic logic shift unit.

UNIT–II **[8 Lectures]**

Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

Micro programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

UNIT–III **[8 Lectures]**

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations.

UNIT–IV **[10 Lectures]**

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

UNIT–V **[10 Lectures]**

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, Cache Coherence.

TEXTBOOKS:

1. M. Moris Mano, Computer System Architecture, Third Edition, Pearson/PHI, 2016.
2. William Stallings, Computer Organization and Architecture, 6th ed, Pearson/PHI, 2010.

REFERENCE BOOKS:

1. Car Hamacher, ZvonksVranesic, SafeaZaky, Computer Organization, Vth Edition, McGrawHill, 2002.
2. AndrewS.Tanenbaum, StructuredComputerOrganization,4th Edition,PHI/Pearson, 2003.
3. B. Ram, Computer Fundamentals Architecture and Organization, 5th ed., New Age International Publications, 2000.

WEB LINKS:

1. https://nptel.ac.in/courses/106105163
2. https://onlinecourses.nptel.ac.in/noc20_cs64/preview
3. https://www.udemy.com/topic/computer-architecture/

Object Oriented Programming through Java

B.Tech. III Semester **L T P C**

3 0 0 3

Subject Code: 22IT305PC

Prerequisites: A course on Programming for problem solving and C++ through oops.

Course Objectives:

1. To introduce object-oriented programming principles and apply them in solving problems.
2. To introduce the concepts of exception handling
3. To introduce the implementation of packages and interfaces.
4. To demonstrate how the multitasking is performed by using threads
5. To introduce the design of Graphical User Interface using swing controls.

Course Outcomes: After completion of this course, the students will be able to:

1. Describe to solve real world problems using OOPS techniques.
2. Extract to develop programs for various applications using exceptional handling.
3. Use to solve problems using java collection framework and I/O classes.
4. Illustrate to learn how to reduce the wastage of CPU time with multithreading concepts.
5. Develop to design GUI based applications.

UNIT – I **[10 Lectures]**

Foundations of Java: History of Java, Java Features, Variables, Data Types, Operators, Expressions,Control Statements. Elements of Java - Class, Object, Methods, Constructors and Access Modifiers, Generics, Inner classes, String class and Annotations.

OOP Principles: Encapsulation – concept, setter and getter method usage, this keyword. Inheritance concept, Inheritance Types, super keyword. Polymorphism – concept, Method Overriding usage and Type Casting. Abstraction – concept, abstract keyword and Interface.

UNIT – II **[8 Lectures]**

Exception Handling: Exception and Error, Exception Types, Exception Handler, Exception Handling Clauses – try, catch, finally, throws and the throw statement, Built- in-Exceptions and Custom Exceptions.

Files and I/O Streams: The file class, Streams, The Byte Streams, Filtered Byte Streams, The RandomAccess File class.

UNIT – III **[10 Lectures]**

Packages- Defining a Package, CLASSPATH, Access Specifiers, importing packages. Few Utility Classes - String Tokenizer, BitSet, Date, Calendar, Random, Formatter,Scanner.

Collections: Collections overview, Collection Interfaces, Collections Implementation Classes, Sorting in Collections, Comparable and Comparator Interfaces.

UNIT – IV **[10 Lectures]**

Multithreading: Process and Thread, Differences between thread-based multitasking and process- based multitasking, Java thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication.

Java Database Connectivity: Types of Drivers, JDBC architecture, JDBC Classes and Interfaces, Basic steps in Developing JDBC Application, Creating a New Database and Table with JDBC.

UNIT – V **[08 Lectures]**

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers, Layout Manager Classes, Simple Applications using AWT and Swing.
Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes,Handling mouse and keyboard events, Adapter classes.

TEXT BOOKS:

1. Herbert Schildt, Java The complete reference, 9th edition, McGraw Hill Education (India) Pvt.Ltd, 2014.
2. T. Budd, Understanding Object-Oriented Programming with Java, updated edition, Pearson Education, 2000.

REFERENCE BOOKS:

1. J. Nino and F.A. Hosch, An Introduction to programming and OO design using Java,John Wiley &sons, 2007.
2. Y. Daniel Liang, Introduction to Java programming, Pearson Education, 1998.
3. P. RadhaKrishna, Object Oriented Programming through Java, University Press, 2007.
4. S.Malhotra,S.Chudhary,ProgramminginJava,2ndedition,OxfordUniversity Press, 2018.
5. R. A. Johnson, An Introduction to Java Programming and Object-oriented Application Development, Cengage Learning, 2012.

WEB LINKS:

1. **https://nptel.ac.in/courses/106105191**
2. **https://www.visualpathedu.com/home/course/core-java-training/175**
3. **https://www.visualpathedu.com/home/course/advanced-java-training/176**
4. **https://www.coursera.org/specializations/object-oriented-programming**
5. **https://www.upgrad.com/blog/java-free-online-course/**
6. **https://www.edx.org/course/java-programming-fundamentals**
7. **https://education.oracle.com/java/java/pFamily_48**

Python Lab

B. Tech III Semester

L	T	P	C
0	0	3	1.5

Subject Code: 22IT306PC

Prerequisites: Students should install any Python IDEs such as IDLE, Anaconda etc.

Co-requisite: A course on "Programming with Python"

Course Objectives:

1. To be able to introduce core programming basics and program design withfunctions using Python programming language.
2. To understand a range of Object-Oriented Programming, as well as in-depthdata and information processing techniques.

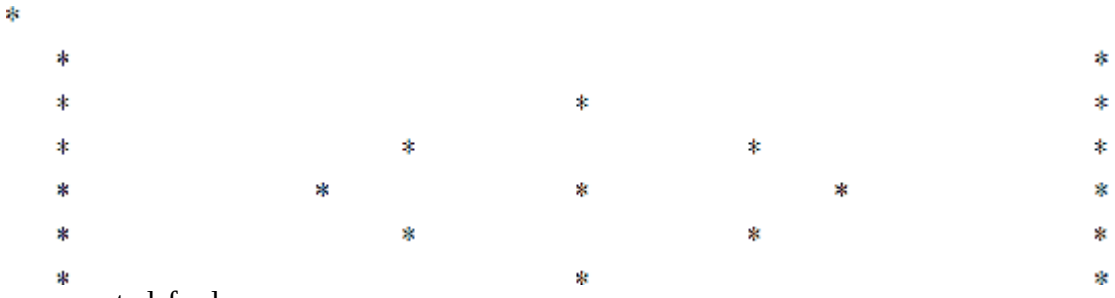
Course Outcomes: After completion of this course, the students will be able to:

1. Illustrate Python Programs using core data structures like Lists, Dictionaries anduse Regular Expressions.
2. Compare to conduct experiments on file handling, exception handling, and modules.
3. Interpret the concepts of Object-Oriented Programming as used in Python.
4. Use to explore python especially the object-oriented concepts, and the built- in objects of Python.
5. Design 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 a python script to print the current date in the following format "Sun May 29 02:26:23 IST2017"
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9]

10. Write a Python program to construct the following pattern, using a nested for loop



11. Write a Python script that prints prime numbers less than20.
12. Write a python program to find factorial of a number using Recursion.
13. 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).
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15. Write a python program to define a module and import a specific function in that module to another program.
16. 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.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement pow (x,n)
20. Write a Python class to reverse a string word by word.

TEXTBOOKS:

1. Wesley J. Chun, Core Python Programming, Second Edition, Pearson, 2006.
2. R. Nageswara Rao Core Python Programming, Dream Tech Press, 2018.

REFERENCE BOOKS:

1. Python Programming using problem solving approach, Reemathareja, Oxford University Press, 2019.
2. Dietel and Dietel, Python How to Program, 2002.

WEB LINKS:

1. https://nptel.ac.in/courses/106106145
2. https://onlinecourses.nptel.ac.in/noc20_cs83/preview
3. https://www.visualpathedu.com/home/course/core-python/1
4. https://www.visualpathedu.com/home/course/advanced-python/3
5. https://www.udemy.com/topic/python/free/
6. https://www.coursera.org/specializations/python

Object Oriented Programming through Java Lab

B. Tech. III Semester **L T P C**
0 0 3 1.5

Subject Code: 22IT307PC:

Prerequisites: A course on "Programming for problem solving"

Co-requisites: A course on "OOPS Through Java".

Course Objectives:

1. To introduce java compiler and eclipse platform and Net Beans ID
2. To write programs using abstract classes and Exception Handling mechanism
3. To write programs for solving real world Problems using java collection frame work
4. To write multithreaded programming.
5. To write GUI programs using swing controls in java

Course Outcomes: After completion of this course, the students will be able to:

1. Define and to develop application programs using oops concepts
2. Extract to write programs using Exceptional Handling approach.
3. Articulate to write programs for solving real world problems using java collection frame work.
4. Illustrate to develop java application to interact with database by using JDBC
5. Prioritize 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 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.
3. 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.
4. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order
5. 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.

6. Write a Java program to list all the files in a directory including the files present in all its subdirectories.
7. 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.
8. 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.
9. Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.
10. 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
11. 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. 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 Grid Layout.
12. Write a Java program that simulates a traffic light. The program lets the users elect 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.
13. 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).
14. 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 are cord are separated by at ab(\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
15. 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 Grid Layout.

TEXT BOOKS:

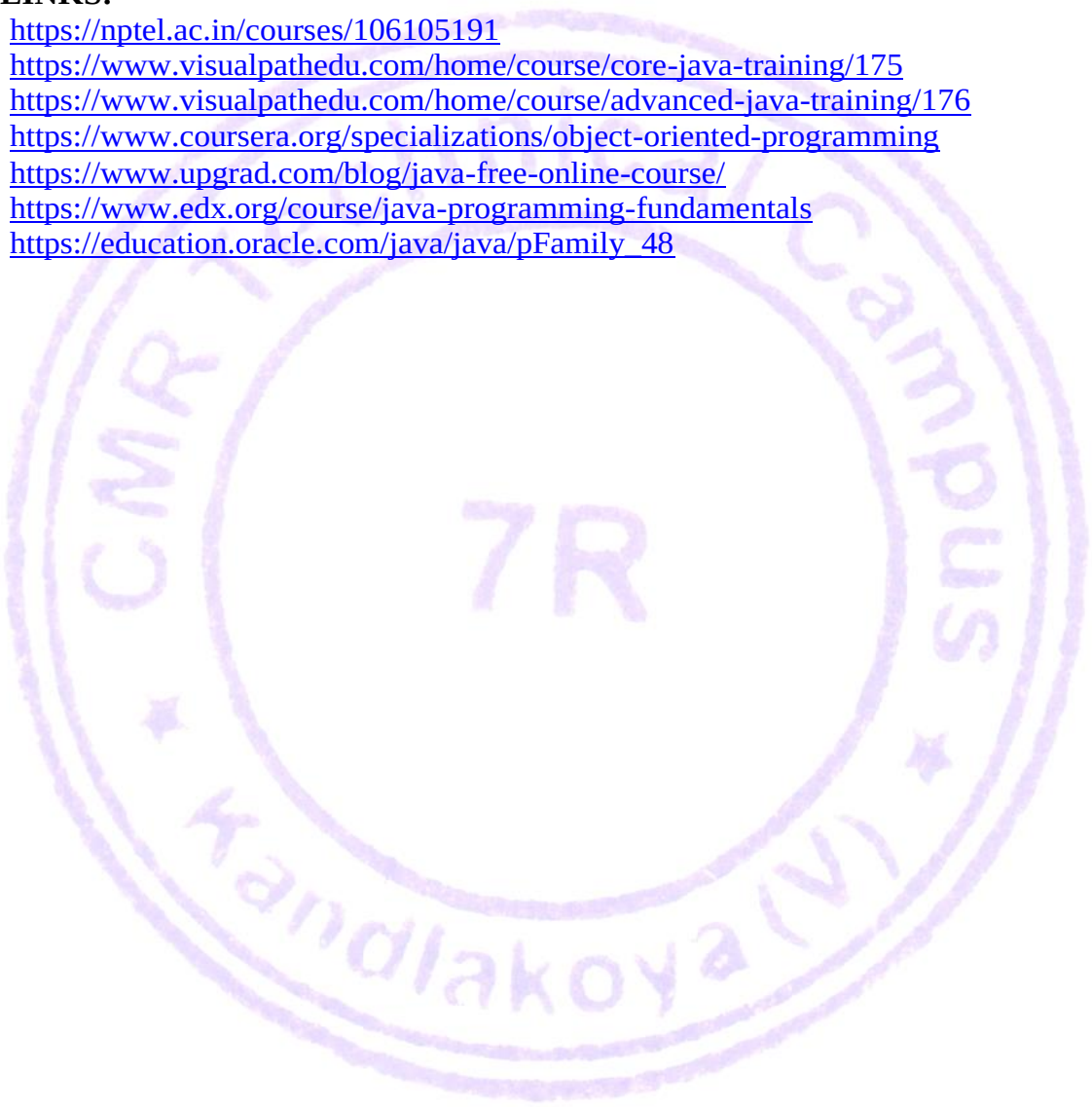
1. Herbert Schildt, Java The complete reference, 9th edition, McGraw Hill Education (India) Pvt.Ltd, 2014.
2. T. Budd, Understanding Object-Oriented Programming with Java, updated edition, Pearson Education, 2000.

REFERENCE BOOKS:

1. J. Nino and F.A. Hosch, An Introduction to programming and OO design using Java, John Wiley &sons, 2007.
2. Y. DanielLiang, Introduction to Java programming, Pearson Education, 1998.
3. S. Malhotra, S. Chudhary, Programming in Java, 2nd edition, Oxford University Press, 2018.
4. R. A. Johnson, An Introduction to Java Programming and Object-oriented Application Development, Cengage Learning, 2012.

WEB LINKS:

1. https://nptel.ac.in/courses/106105191
2. https://www.visualpathedu.com/home/course/core-java-training/175
3. https://www.visualpathedu.com/home/course/advanced-java-training/176
4. https://www.coursera.org/specializations/object-oriented-programming
5. https://www.upgrad.com/blog/java-free-online-course/
6. https://www.edx.org/course/java-programming-fundamentals
7. https://education.oracle.com/java/java/pFamily_48



NODE JS/ REACT JS/DJANGO

B. Tech. III Semester

L	T	P	C
0	0	2	1

Subject Code: 22IT308PC

Prerequisites: Object Oriented Programming through Java, HTML Basics

Course Objectives:

1. To implement the static web pages using HTML and do client side validation using JavaScript.
2. To design and work with databases using Java
3. To develop an end to end application using java full stack.
4. To introduce Node JS implementation for server side programming.
5. To experiment with single page application development using React.

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

1. Illustrate a custom website with HTML, CSS, and Bootstrap and little JavaScript.
2. Extract advanced features of JavaScript and learn about JDBC
3. Use Server – side implementation using Java technologies like
4. Correlate the server – side implementation using Node JS.
5. Design a Single Page Application using React.

Exercises:

1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 and experiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async / await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java stand alone application that connects with the database (Oracle / mySql) and perform the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.
7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism (Cookies, HTTP Session)
9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
11. For the above application create authorized end points using JWT (JSON Web Token).
12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation usingchart.js
14. Create a TODO application in react with necessary components and deploy it into github.

REFERENCE BOOKS:

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2ndEdition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo,Express, React, and Node, 2nd Edition, A Press.

GENDER SENSITIZATION LAB

B.Tech. III Semester **L T P C**
0 0 2 0

Subject Code: 22EN309MC

Course Objectives:

1. To develop students' sensibility with regard to issues of gender in contemporary India.
2. To introduce students to information about some key biological aspects of genders.
3. To expose the students to debates on the politics and economics of work.
4. To help students reflect critically on gender violence.
5. To expose students to more egalitarian interactions between men and women

Course outcomes: After completion of this course the student will be able to :

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
3. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
4. Men and women students and professionals will be better equipped to work and live together as equals.
5. Students will develop a sense of appreciation of women in all walks of life.

UNIT-I: UNDERSTANDING GENDER [4 Lectures]

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 [4 Lectures]

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

UNIT-III: GENDER AND LABOUR [4 Letures]

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 [4 Lectures]

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 [4 Lectures]

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 ParksThe Brave Heart

TEXT BOOKS:

Writers: A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu
Published by : Telugu Academy, Telangana Government
Year: 2015

REFERENCE BOOKS:

1. Dr Rajpal Singh, Dr Anupama Sihag, Gender Sensization: Issues and Challenges, Raj Publications 2019.

WEB LINKS:

1. http://ncw.nic.in/sites/default/files/Booklet-%20Gender%20Sensitization_0.pdf
2. 2.http://gmmrcg.in/Content/284_464_7.1.1%20weblink%20annual%20gender%20sensitization%20action%20plan.pdf

CMR Technical Campus 7R Kandlakoya (V)

DISCRETE MATHEMATICS

B.Tech. IV Semester

L	T	P	C
3	0	0	3

Subject Code: 22IT401PC

Course Objectives:

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

Course Outcomes: After completion of this course, the students will be able to

1. Understand and construct precise mathematical proofs
2. Applylogic and set theory to formulate precise statements
3. Analyze and solve counting problems on finite and discrete structures
4. Describe and manipulate sequences
5. Apply graph theory in solving computing problems

UNIT - I [**10 Lectures]**

Mathematical logic: Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

UNIT – II **[8 Lectures]**

Set theory: Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

UNIT – III **[8 Lectures]**

Algebraic Structures: Introduction, Algebraic Systems, Semi groups and Monoids, Lattices as PartiallyOrdered Sets, Boolean Algebra.

UNIT – IV **[10 Lectures]**

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutation with Constrained Repetitions, Binomial Coefficient, The Binomial and Multinomial Theorems, The Principle of Exclusion.

UNIT – V **[10 Lectures]**

Graph Theory: Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi-graphs and Euler Circuits,Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science: J.P. Tremblay, R. Manohar, McGraw-Hill, 1st ed.
2. Discrete Mathematics for Computer Scientists & Mathematicians: Joe l. Mott, Abraham Kandel,Teodore P. Baker, Prentis Hall of India, 2nd ed.

REFERENCE BOOKS:

1. Discrete and Combinatorial Mathematics - an applied introduction: Ralph.P. Grimald, Pearsoneducation, 5th edition.
2. Discrete Mathematical Structures: Thomas Kosy, Tata McGraw Hill publishing co.

CMR Technical Campus 7R Kandlakoya (V)

DATABASE MANAGEMENT SYSTEMS

B.Tech. IV Semester

L	T	P	C
3	0	0	3

Subject Code: 22IT402PC
Prerequisites: A course on "Data Structures".

Course Objectives:

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

Course Outcomes: After completion of this course, the students will be able to:

1. Define fundamentals of DBMS, database design and normal forms
2. Compare the basics of Relational Model and Relational Algebra
3. Use the basics of SQL for retrieval and management of data.
4. Illustrate the basics of transaction processing and concurrency control.
5. Collaborate familiarity with database storage structures and access techniques.

UNIT – I **[10 Lectures]**

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 **[8 Lectures]**

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical database design, introduction to views, destroying/alteringtables and views. Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT – III **[10 Lectures]**

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 databases.

Schema Refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, First, Second, Third normal forms, BCNF, lossless join decomposition, multivalued dependencies, Fourth normal form, Fifth normal form.

UNIT – IV **[8 Lectures]**

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 **[10 Lectures]**

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexes- Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM),

B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, Tata Mc GrawHill3rd Edition, 2002.
2. Silberschatz,Korth,Database SystemConcepts,McGrawhill,Vedition, 1980.

REFERENCE BOOKS:

1. Peter Rob & Carlos Corone, Database Systems design, Implementation, and Management, l7th Edition, 1993.
2. ElmasriNavrate, Fundamentals of Database Systems, Pearson Education, 2011.
3. C.J. Date, An Introduction to Database Systems, Pearson Education, 2004.
4. S. Shah and V. Shah, Oracle for Professionals, The XTeam, SPD, 2008.
5. Shah, Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, PHI, 2004.
6. M. L. Gillenson, Fundamentals of Database Management Systems, Wiley Student Edition, 2011.

WEB LINKS:

1. https://nptel.ac.in/courses/106105175
2. https://onlinecourses.nptel.ac.in/noc21_cs04/preview
3. https://onlinecourses.nptel.ac.in/noc22_cs91/preview
4. https://www.visualpathedu.com/home/course/oracle-database-development/113
5. https://www.mygreatlearning.com/database-management-system/free-courses
6. https://www.coursera.org/learn/database-management
7. https://www.coursera.org/learn/sql-practical-introduction-for-querying-databases

OPERATING SYSTEMS

B.Tech. IV Semester **L T P C**
3 0 0 3

Subject Code: 22IT403PC

Prerequisites:

1. A course on "Computer Programming and Data Structures".
2. A course on "Computer Organization and Architecture".

Course Objectives:

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

Course Outcomes: After completion of this course, the students will be able to

1. Illustrate the operating system concepts.
2. The role of computing in CPU scheduling and its management.
3. Use to resolve user problems in the standard environment.
4. Correlate the data storage and retrieval.
5. Design files system inter phase and operations.

UNIT – I **[10 Lectures]**

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

Process - Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads

UNIT – II **[10 Lectures]**

CPU Scheduling - Scheduling Criteria, Scheduling Algorithms, Multiple -Processor Scheduling. System call interface for process management-fork, exit, wait, waitpid, exec **Deadlocks** - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

UNIT – III **[08 Lectures]**

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 ona single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

UNIT – IV **[08 Lectures]**

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 **[08 Lectures]**

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. Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Operating System Principles, 7th Edition, JohnWiley, 2006.
2. W.R.Stevens,AdvancedprogrammingintheUNIXenvironment,Pearsoneducation, 1992.

REFERENCE BOOKS:

1. Stallings,Operating Systems – Internals and Design Principles, Fifth Edition, PearsonEducation/PHI, 2005.
2. Crowley,Operating System A Design-oriented Approach, TMH, 1996.
3. AndrewS.Tanenbaum, ModernOperatingSystems,2nd edition,Pearson/PHI, 1992.
4. KernighanandPike,UNIXprogrammingenvironment,PHI/PearsonEducation, 1983.
5. U. Vahalia, UNIX Internals -The New Frontiers, PearsonEducation, 1995.

WEB LINKS:

1. https://nptel.ac.in/courses/106105214
2. https://onlinecourses.nptel.ac.in/noc21_cs88/preview
3. https://www.coursera.org/specializations/codio-introduction-operating-systems
4. https://www.coursera.org/learn/os-power-user
5. https://www.codecademy.com/learn/fundamentals-of-operating-systems
6. https://www.nesoacademy.org/cs/03-operating-system

WEB TECHNOLOGIES

B. Tech IV Semester **L T P C**
3 0 0 3

Subject Code: 22IT404PC

Prerequisites

1. A course on "Java Programming"

Course Objectives:

1. To introduce PHP language for server-side scripting.
2. To introduce XML and processing of XML Data with Java.
3. To introduce Server-side programming with Java Servlets.
4. Understand the JSP.
5. To introduce Client-side scripting with JavaScript and AJAX.

Course Outcomes: After completion of this course, the students will be able to

1. Defineserver-side scripting with PHP language.
2. Compare XML and how to parse and use XML Data with Java.
3. Relate to introduce Server-side programming with Java Servlets.
4. Illustrate JSP pages using Cookies and Session tracking.
5. Design client-side scripting, validation of forms and AJAX programming.

UNIT- I **[10 Lectures]**

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

UNIT- II **[08 Lectures]**

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java.

UNIT – III **[10 Lectures]**

Introduction to Servlets: Common Gateway Interface (CGI), Life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

UNIT – IV **[08 Lectures]**

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

UNIT – V **[08 Lectures]**

Client-side Scripting: Introduction to JavaScript, JavaScript language – declaring variables, scope of variables, functions. Event handlers (onclick, on submit etc.), Document Object Model, Form validation.

TEXTBOOKS:

1. Uttam K Roy, Web Technologies, Oxford University Press, 2010.
2. Steven Holzner, The Complete Reference PHP, Tata McGraw-Hill, 2007.

REFERENCEBOOKS:

1. Chris Bates, Web Programming, building internet applications, 2edition, Wiley Dream tech, 2002.
2. Hans Bergsten, Java Server Pages, SPDO'Reilly, 2003.
3. D. Flanagan, JavaScript, O'Reilly Media, Inc., 2011.
4. Jon Duckett WROX, Beginning Web Programming with HTML, XHTML, and CSS, 2004.

WEB LINKS:

1. https://www.visualpathedu.com/home/course/ui-development/9
2. https://www.visualpathedu.com/home/course/javascript-training/10
3. https://www.visualpathedu.com/home/course/ui-ux-design-training/199
4. https://www.coursera.org/learn/django-database-web-apps
5. https://extension.harvard.edu/academics/programs/web-technologies-certificate/#outcomes
6. https://www.coursera.org/learn/html-css-javascript-for-web-developers
7. https://www.coursera.org/specializations/web-design
8. https://www.coursera.org/learn/web-development
9. https://www.udemy.com/course/web-developer-course-on-creating-a-business-website/

SOFTWARE ENGINEERING

B. Tech IV Semester **L T P C**
3 0 0 3

Subject Code: 22IT405PC
Prerequisites: A course on "Programming for Problem Solving"

Course Objectives

1. Understanding the end-user requirements.
2. Build system models based on the requirements.
3. Design architectural process.
4. Strategic approach for testing methodologies.
5. Understanding software qualitymanagement.

Course Outcomes: After completion of this course, the students will be able to:

1. Describe to translate end-user requirements into the system.
2. Identifyand applythe process model based on software requirements.
3. Articulate to build the design of systematic models.
4. Contrast to test strategies and generate a report.
5. Develop quantifythe metrics for process and products.

UNIT – I **[10 Lectures]**

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 **[08 Lectures]**

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 **[10 Lectures]**

Design Engineering: The design process and design quality, design concepts, the design model. **Creating an architectural design:** software architecture**,** data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT – IV **[08 Lectures]**

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 **[06 Lectures]**

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.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 qualitystandards.

TEXTBOOKS:

1. Roger S. Pressman, Software Engineering, Apractitioner's Approach, 6th edition, McGraw Hill International Edition, 2015.
2. Sommerville, Software Engineering, 7th edition, Pearson Education, 2004.
3. Grady Booch, James Rambaugh, Ivar Jacobson,The unified modeling language user guide, Pearson Education, 1999.

REFERENCE BOOKS:

1. James F. Peters, Witold Pedrycz, Software Engineering: an Engineering approach, John Wiley, 2000.
2. Waman S Jawadekar, Software Engineering principles and practice, The Mc Graw-Hill Companies, 2004.
3. Meilerpage-Jones, Fundamentals of object-oriented designusing UML, Pearson Education, 2000.

WEB LINKS:

1. https://nptel.ac.in/courses/106105182
2. https://www.coursera.org/learn/introduction-to-software-engineering
3. https://www.coursera.org/specializations/software-engineering
4. https://www.edx.org/course/software-engineering-introduction

WEB TECHNOLOGIES LAB

B. Tech IV Semester **L T P C**
0 0 2 1

Subject Code: 22IT406PC
Prerequisites: A course on "Java Programming"
Co-requisites: "WEB TECHNOLOGIES"

Course Objectives

1. Understand the working principle of various communication protocols.
2. Analyze the traffic flow and the contents of protocol frames.
3. Explore the concepts of PHP concepts using HTML.
4. Know the XML documents for server side scripting.

Course Outcomes: After completion of this course, the students will be able to:

1. Define data link layer farming methods
2. Compare routing and congestion issues in network design.
3. Relate PHP concepts in HTML.
4. Correlate server side scripting using XML.
5. Pivot the JSP and Servlet.

Web Technologies Experiments

1. Write a PHP script to print prime numbers between1-50.
2. PHP script to
   a) Find the length of a string.
   b) Count no of words in a string.
   c) Reverse a string.
   d) Search for a specific string.
3. Write a PHP script to merge two arrays and sort them as numbers, in descending order.
4. Write a PHP script that reads data from one file and write into another file.
5. Develop static pages (using Only HTML) of an online book store.

The pages should resemble:_____
www.amazon.com. The website should consist the following pages.

a) Home page
a) Registration and user Login
b) User Profile Page
c) Books catalog
d) Shopping Cart
e) Payment Bycredit card
f) Order Conformation

1. Validate the Registration, user login, user profile and payment by credit card pages usingJava Script.
2. Create and save an XML document on the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XMLdocument.
3. Install TOMCAT web server. Convert the static web pages of assignment 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.
4. Redo the previous task using JSP by converting the static web pages of assignment 2 into dynamic web pages. Create a database with user information and books information. The books catalogue
   Should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

TEXTBOOKS:

1. Uttam K Roy, Web Technologies, Oxford University Press, 2010.
2. Steven Holzner, The Complete Reference PHP, Tata McGraw-Hill, 2007.

REFERENCEBOOKS:

1. Chris Bates, Web Programming, building internet applications, 2edition, Wiley Dream tech, 2002.
2. Hans Bergsten, Java Server Pages, SPDO' Reilly, 2003.
3. D. Flanagan, JavaScript, O'Reilly Media, Inc., 2011.
4. Jon Duckett WROX, Beginning Web Programming with HTML, XHTML, and CSS, 2004.

WEB LINKS:

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2. https://www.visualpathedu.com/home/course/javascript-training/10
3. https://www.visualpathedu.com/home/course/ui-ux-design-training/199
4. https://www.coursera.org/learn/django-database-web-apps
5. https://extension.harvard.edu/academics/programs/web-technologies-certificate/#outcomes
6. https://www.coursera.org/learn/html-css-javascript-for-web-developers
7. https://www.coursera.org/specializations/web-design
8. https://www.coursera.org/learn/web-development
9. https://www.udemy.com/course/web-developer-course-on-creating-a-business-website/

DATABASE MANAGEMENT SYSTEMS LAB

B. Tech. IV Semester **L T P C**
0 0 2 1

Subject Code: 22IT407PC
Prerequisites: A course on "Data Structures".
Co-requisites: "Database Management Systems"

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

Course Outcomes: After completion of this course, the students will be able to:
1. Define database schema for a given application and apply normalization
2. Compare the skills in using SQL commands for data definition and data manipulation.
3. Relate the solutions for database applications using procedures
4. Correlate solutions for database applications using cursors
5. Develop solutions for database applications using 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. A. Querying (using ANY, ALL, UNION, INTERSECT, JOIN, Constraints etc.)
7. B. Nested, Correlated subqueries
8. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
9. Triggers (Creation of insert trigger, delete trigger, update trigger)
10. Procedures
11. Usage of Cursors

TEXT BOOKS:

1. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, Tata Mc GrawHill3rd Edition, 2002.
2. Silberschatz, Korth, Database System Concepts, McGrawhill, Vedition, 1980.

REFERENCE BOOKS:

1. Peter Rob & Carlos Corone, Database Systems design, Implementation, and Management, l7th Edition, 1993.
2. Elmasri Navrate, Fundamentals of Database Systems, Pearson Education, 2011.
3. C.J. Date, An Introduction to Database Systems, Pearson Education, 2004.
4. S. Shah and V. Shah, Oracle for Professionals, The X Team, SPD, 2008.
5. Shah, Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, PHI, 2004.
6. M. L. Gillenson, Fundamentals of Database Management Systems, Wiley Student Edition, 2011.

WEB LINKS:

1. https://nptel.ac.in/courses/106105175
2. https://onlinecourses.nptel.ac.in/noc21_cs04/preview
3. https://onlinecourses.nptel.ac.in/noc22_cs91/preview
4. https://www.visualpathedu.com/home/course/oracle-database-development/113
5. https://www.mygreatlearning.com/database-management-system/free-courses
6. https://www.coursera.org/learn/database-management
7. https://www.coursera.org/learn/sql-practical-introduction-for-querying-databases

DATA VISUALIZATION – R PROGRAMMING/ POWER BI

B.Tech. IV Semester

L	T	P	C
0	0	2	1

Subject Code: 22DS308PC

Course Objectives:

1. Effective use of Business Intelligence (BI) technology (Tableau) to apply data visualization
2. To discern patterns and relationships in the data.
3. To build Dashboard applications.
4. To communicate the results clearly and concisely.
5. To be able to work with different formats of data sets.

Course Outcomes: After completion of this course, the students will be able to:

1. Understand How to import data into Tableau.
2. Understand Tableau concepts of Dimensions and Measures.
3. Develop Programs and understand how to map Visual Layouts and Graphical Properties.
4. Create a Dashboard that links multiple visualizations.
5. Use graphical user interfaces to create Frames for providing solutions to real world problems.

Lab Problems:

1. Understanding Data, what is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?
2. Getting started with Tableau Software using Data file formats, connecting your Data to Tableau, creating basic charts (line, bar charts, Tree maps), Using the Show me panel.
3. Tableau Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.
4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.
5. Editing and Formatting Axes, Manipulating Data in Tableau data, Pivoting Tableau data.
6. Structuring your data, Sorting and filtering Tableau data, Pivoting Tableau data.
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards & Storytelling, creating your first dashboard and Story, Design for different displays, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.
9. Tableau file types, publishing to Tableau Online, Sharing your visualizations, printing, and Exporting.
10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

REFERENCE BOOKS:

1. Brett Powell, Microsoft Power BI cookbook, 2nd edition.
2. Roger D. Peng, R Programming for Data Science.
3. The Art of R Programming by Norman *Matloff Cengage Learning India.*

CONSTITUTION OF INDIA

B.Tech. IV Semester **L T P C**
3 0 0 0

Subject Code:22EN410MC
Prerequisites: None
Course Objectives:

1. Introduction of constitution and it's evolution.
2. To know the fundamentals of Constitution
3. To analyse the fundamental rights and duties of Indian constitution
4. To know the governance of government and administration
5. To appraise the role organs of government.

Course Outcomes: After Completion of this course, the students will be able to:

1. Outline the evolution of Constitution.
2. Relate constitutional fundamentals with the present Era.
3. Analyse Liberalism Federalism and Socialism.
4. Infer the knowledge of Administration and Governance.
5. Appraise and address the role of governments.

UNIT-1 **[5 Lectures]**
History of Making of the Indian Constitution-History of Drafting Committee.

UNIT- 2 **[5 Lectures]**
Philosophy of the Indian Constitution-Preamble Salient Features

UNIT- 3 **[3 Lectures]**
Contours of Constitutional Rights&Duties-FundamentalRights

- Rightto Equality
- RighttoFreedom
- Rightagainst Exploitation
- RighttoFreedomofReligion
- CulturalandEducationalRights
- RighttoConstitutionalRemedies
- DirectivePrinciplesofStatePolicy
- FundamentalDuties

.

UNIT-4 **[6 Lectures]**

Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powersand Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications , Powers and Functions

UNIT -5 **[6 Lectures]**

Local Administration: District's Administration head: Role and Importance, Municipalities:Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position androle. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grassroot democracy, Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

1. Dr. M.V. Pylee India's Constitution, 16th Edition, S. Chand 2016.
2. Dr. S. N.Busi, Dr.B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P.Jain, Indian Constitutional Law, 7thEdn., Lexis Nexis, 2018.
4. D.D. Basu, Introduction to the Constitution of India, 23rd Edn Lexis Nexis,2018.

Web Links:

https://youtu.be/4tI4QXhzqNU

https://youtu.be/TXhSrKJ1ahk

https://www.youtube.com/live/0FAdfh6NVtA?feature=share

https://youtu.be/vq2Q1_v6TNU