MATS UNIVERSITY

SCHOOL OF ENGINEERING AND INFORMATION TECHNOLOGY

Department of Computer Science and Engineering

Syllabus

For

(Four-Year Full-Time Degree Programme)

Bachelor of Technology (B .Tech.)

Computer Science and Engineering

(2025-2029)

(Semester Based Course)

MATS University, Raipur C.G.				
School of Engineering and Information Technology, Raipur C.G.				
Model Curriculum of B.Tech. Program Computer Science and Engineering				
(BASED ON AICTE MODEL ALIGNED WITH NEP-2020)				
S. No.	**Subject Code**	**Semester - 1**	**LTP**	**Credits**
1	BTDSCBSC100	Matrices and Calculus	3:0:0	3
2	BTDSCBSC101	Engineering Physics	3:0:0	3
3	BTDSCESC102	Programming for Logic Building	3:1:0	4
4	BTDSCHSC103	Technical English	2:0:0	2
5	BTDSCMC104	Environmental Sciences	1:0:0	0
6	BTDSCBSC105	Engineering Physics Laboratory	0:0:2	1
7	BTDSCESC106	Manufacturing Practices – I Laboratory	0:0:2	1
8	BTDSCESC107	Engineering Graphics & Design Laboratory	0:0:4	2
9	BTSEC108	Programming and Soft Skill Laboratory (SEC)	0:0:2	1
10	BTAEC109	Communication Skills Laboratory (AEC)	0:0:4	2
11	BTVAC110	Universal Human Values	1:0:0	1
12	GEA	Multidisciplinary Elective Course - I (from bucket)	3:0:0	3
Total Credits				**23**
S. No.	**Subject Code**	**Semester - 2**	**LTP**	**Credits**
1	BTDSCBSC200	Analytical Mathematics	3:0:0	3
2	BTDSCBSC201	Engineering Chemistry	3:0:0	3
3	BTDSCESC202	Basic Electrical & Electronics Engineering	3:0:0	3
4	BTMC203	Constitution of India, Professional Ethics and Human Rights.	1:0:0	0
5	BTDSCESC204	Fundamental of Mechanical Engineering. (For Aero./Mech./Mining/Civil Engg.)	3:0:0	3
6	BTDSCESC205	Engineering Chemistry Laboratory	0:0:2	1
7	BTDSCESC206	Basic Electrical & Electronics Engineering Laboratory	0:0:2	1
8	BTDSCESC207	Fundamental of Mechanical Engineering Laboratory (For Aero./Mech./Mining/Civil Engg.)	0:0:2	1
9	BTDSCESC208	Manufacturing Practices - II Laboratory	0:0:2	1
10	BTSEC209	Problem Solving with Python Programming (SEC)	3:0:0	3
11	BTAEC210	Advanced Programming Laboratory (AEC)	0:0:2	1
12	GEA	Multidisciplinary Elective Course - II (from Basket)	3:0:0	3
Total Credits				**23**

S. No.	Subject Code	Semester - 3	LTP	Credits
1	BTDSCBSC300	**Numerical Methods and Statistics**	3:0:0	3
2	BTDSCCSE321	**Data Structures**	3:1:0	4
3	BTDSCCSE322	**Java Programming**	3:1:0	4
4	BTDSCCSE323	**Computer Organization and Design**	3:1:0	4
5	BTDSCCSE324	**Java Programming Laboratory**	0:0:2	1
6	BTAEC325	**Data Structures Laboratory**	0:0:2	1
7	BTSEC326	**WEB TECHNOLOGY LAB**	1:0:2	2
8	BTSEM327	**PROJECT/ SEMINAR**	0:0:2	1
9	GEA20	**Multidisciplinary Elective Course - III (from Basket)**	3:0:0	3
Total Credits				**23**

S. No.	Subject Code	Semester - 4	LTP	Credits
1	BTDSCCSE420	**Discrete Mathematics**	3:0:0	3
2	BTDSCCSE421	**Operating System**	3:0:0	3
3	BTDSCCSE422	**Database Management System**	3:0:0	1
4	BTDSCCSE423	**Database Management System Laboratory**	0:0:2	1
5	BTAEC424	**Analysis and Design of Algorithms Laboratory**	0:0:2	1
6	BTSEC425	**Unix & Shell Programming Laboratory**	0:0:1	1
7	BTPDSE2XX	**Professional Elective Course - I (from Basket)**	3:0:0	3
8	BTSEM426	**Project / Seminar**	0:0:1	1
9	BTINT457	**Internship - I**	0:0:1	**3**
10	GEAXX	**Multidisciplinary Elective Course - IV (from Basket)**	3:0:0	3
Total Credits				**23**

S. No.	Subject Code	Semester – 5	LTP	Credits
1	BTDSCCSE520	Theory of Computation	3:0:0	3
2	BTDSCCSE521	Computer Graphics	3:0:0	3
3	BTDSCCSE522	Microprocessor and Interfacing	3:0:0	3
4	BTDSCCSE523	Artificial Intelligence and Expert System	3:0:0	3
5	BTAEC524	**Computer Graphics Laboratory**	0:0:2	1
6	BTSEC525	**Microprocessor Laboratory**	0:0:2	1
7	BTSEM526	**Artificial Intelligence and Expert System Laboratory**	0:0:2	1
8	BTPDSC2XX	Professional Elective Course - II	3:0:0	3
9	BTINT527	**Internship - II**	0:0:1	3

10	BTSEM528	**Interdisciplinary Project**	0:0:2	1
Total Credits				**22**
S. No.	**Subject Code**	**Semester – 6**	**LTP**	**Credits**
1	BTDSCCSE620	**Compiler Design**	3:0:0	3
2	BTDSCCSE621	**Computer Network**	3:0:0	3
3	BTDSCCSE622	**Software Engineering and Project Management**	3:1:0	4
4	BTDSCCSE623	**Computer Network Laboratory**	3:0:0	3
5	BTSEC624	**Web Application Development Laboratory (PHP & My SQL)**	0:0:2	1
6	BTAEC625	**Android Application Development Laboratory**	0:0:2	1
7	BTPDSE2XX	Professional Elective Course - III	3:0:0	3
8	BTSEM626	**Multidisciplinary Project / Case Study**	0:0:2	1
9	BTINT627	**Internship - III**	0:0:1	**3**
		Total Credits		**22**
S. No.	**Subject Code**	**Semester – 7**	**LTP**	**Credits**
1	BTDSCCSE720	**Internet of Things**	3:0:0	3
2	BTDSCCSE721	**Network Security**	3:0:0	3
3	BTDSCCSE722	**Soft Computing**	3:0:0	3
4	BTDSCCSE723	**Internet of Things Laboratory**	3:0:0	3
5	BTAEC724	**Python Laboratory**	0:0:2	2
6	BTPDSC2XX	**Professional Elective Course - IV**	3:0:0	3
7	BTINT725	**Internship - IV**	0:0:1	3
8	BTSEM726	Project Work Phase - I (Domain Specific)	0:0:2	2
Total Credits				**22**
S. No.	**Subject Code**	**Semester – 8**	**LTP**	**Credits**
1	BTPDSE2XX	Professional Elective Course - V	3:0:0	3
2	BTPDSE2XX	Professional Elective Course - VI	3:0:0	3
3	BTPDSE2XX	Professional Elective Course - VII	3:0:0	3
4	BTPR821	Project Work Phase - II (Domain Specific/live Project)	0:0:12	6
		Total Credits		**15**
Grand Total Credits				**173**

Minors Courses listing:

S. No.	Subject Code	Semester – 5	LTP	Credits
1	xxxx	**Minors (01 Th + 01 Lab)**	3:0:4	3+2
		Total Credits		**5**
S. No.	**Subject Code**	**Semester – 6**	**LTP**	**Credits**
1	xxxx	**Minors (01 Th + 01 Lab)**	3:0:4	3+2
		Total Credits		**5**
S. No.	**Subject Code**	**Semester – 7**	**LTP**	**Credits**
1	xxxx	**Minors (01 Theory + 01 Research Project / Case Study)**	3:0:4	3+2
		Total Credits		**5**
S. No.	**Subject Code**	**Semester – 8**	**LTP**	**Credits**
1	xxxx	**Minors (01 Theory)**	3:0:0	3
Grand Total Credits				**191**

Scheme of Teaching and Evaluation
(As per NEP -2020)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)

Semester - I

S. No.	Course Sub Category	Course Name	Course Code	Teaching Scheme				Evaluation Scheme		Total Marks
				Hours			Credits			
				Theory	Tutorial	Practical		CIA	ESE	
1	DSCC - BSC	Matrices and Calculus	BTDSCBSC100	3	0	-	3	30	70	100
2	DSCC - BSC	Engineering Physics	BTDSCBSC101	3	0	-	3	30	70	100
3	DSCC - ESC	Programming for Logic Building	BTDSCESC102	3	1	-	4	30	70	100
4	DSCC - HSC	Technical English	BTDSCHSC103	2	0	-	2	30	70	100
5	DSCC - MC	Environmental Sciences	BTDSCMC104	1	0	-	0	30	70	100
6	DSCC - BSC	Engineering Physics Laboratory	BTDSCBSC105	-	-	2	1	20	30	50
7	DSCC - ESC	Manufacturing Practices – I Laboratory	BTDSCESC106	-	-	2	1	20	30	50
8	DSCC - ESC	Engineering Graphics & Design Laboratory	BTDSCESC107	-	-	4	2	20	30	50
9	SEC	Programming and Soft Skill Laboratory	BTSEC108	-	-	2	1	20	30	50
10	AEC	Communication Skills Laboratory	BTAEC109	-	-	2	2	20	30	50
11	VAC	Universal Human Values	BTVAC110	1	-	-	1	30	70	100
12	GEC	Multidisciplinary Elective Course - I	GEA	3	0	0	3	30	70	100
			Total	16	1	12	23	310	640	950

L – Lecture, T – Tutorial, ESE – End Semester Examination, P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessments)

Note : Theory Internal Marks (CIA) = 30 (CT-I = 05, CT-II=05, Assignment=05, Mid Term=15)

Practical Internal Marks (CIA) = 20 (Attendance = 05, Lab Viva-Voce = 05, Lab Record Work = 10)

Discipline Specific Core Courses (DSCC) Major				AEC (Ability Enhancement Course) (E)	SEC/Internship (Skill Enhancement Course) (F)	Value Added Course (VAC) (G)	GEC (Generic Elective Course) (H)
Basic Sciences Course (A)	Engineering Sciences Course (B)	Humanities Science (C)	Mandatory Course (D) (Zero Credit Course)				
Engineering Mathematics – I	Programming for Logic Building	Technical English	Environmental Sciences	Communication Skills Laboratory	Programming and Soft Skill Laboratory	Universal Human Values	Multidisciplinary Elective Course - I
Engineering Physics	Engineering Graphics & Design						
Engineering Physics Laboratory	Manufacturing Practices – I Laboratory						
	Engineering Graphics & DesignLaboratory						

Credit Definition:

- 1-hour lecture (L) per week per semester = 1Credit
- 1-hour tutorial (T) per week per semester = 1Credit
- 2-hour Practical/Drawing(P) per week per semester = 1 Credit
- ➢Four credit courses are to be designed for 60 hours of Teaching-Learning process.
- ➢Three credit courses are to be designed for 48 hours of Teaching-Learning process.
- ➢Two credit courses are to be designed for 28 hours of Teaching-Learning process.
- One credit courses are to be designed for 15 hours of Teaching Learning process

Semester: I B. Tech **Branch: All Streams of Engineering**
Subject: Matrices and Calculus **Code: BTDSCBSC100**
Total Theory Periods: 48 **Total Tutorial Periods: 00**
Total Credits: 03

OBJECTIVES:

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT-I

MATRICES

Real vector space, Subspace, Linear span, Linear dependence and linear independence of vectors, Basis, Dimension, Linear transformation, Matrix associated with a linear transformation, Rank and inverse by elementary transformation (Gauss Jordan method), System of linear equations, Eigenvalues and eigenvectors, Cayley-Hamilton theorem, Diagonalization of matrices.

UNIT- II

DIFFERENTIAL CALCULUS

Successive differentiation, Lebnitz theorem, Rolle's Theorem, Taylor's theorem with Lagrange's form of remainder, Expansions of functions in Taylor's and McLaurin's series

UNIT-III

PARTIAL DIFFERENTIATION

Functions of two variables: Limit, continuity and partial derivatives, derivatives of higher order, Euler's theorem on homogeneous functions, Total derivative, Change of variables, Jacobians, Maxima, minima and saddle points of functions of two variables

UNIT-IV

ORDINARY DIFFERENTIAL EQUATION

First order ordinary differential equations: Exact, linear and Bernoulli's equations, Euler's equations, Equations of first order and higher degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Ordinary differential equations of higher order linear differential equations with constant coefficients & variable coefficients, method of variation of parameters, Cauchy-Euler equation,Legendre polynomials and their properties

UNIT-V

MULTIPLE INTEGRAL

Beta and Gamma functions – elementary properties, Double and triple integrals, change of order of integration, Application to area and volume.

OUTCOMES:

- This course equips students to have basic knowledge and understanding in one fields of materials, integral and differential calculus.

NAME OF TEXT BOOKS:

1. Higher Engineering Mathematics by B.S.Grewal (42th edition)-Khanna Publisher.
2. Advanced Engineering Mathematics by Erwin Kreyszig (8th edition)-John Wiley & Sons.

NAME OF REFERENCE BOOKS:

1. Differential Calculus by Gorakh Prasad-Pothisala Private Limited.
2. Advanced Engineering Mathematics by R.K.Jain and S.R.K. Iyengar-Narosa Publishing House.
3. Applied Mathematics by P.N.Wartikar&J.N.Wartikar Vol-ll –Pune VidyarthiGrihaPrakasan, Pune.
4. Integral Calculus by Gorakh Prasad-Pothisala Private Limited.

Semester: I B.Tech **Branch: All Streams of Engineering**
Subject: Engineering Physics **Code: BTDSCBSC101**
Total Theory Periods: 48 **Total Tutorial Periods: 00**
Total Credits : 03

OBJECTIVES:

- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

Unit -I

THEORY OF RELATIVITY SPACE

Time and motion, frame of reference, Galilean Transformation Outline of relativity, Michelson-Morley experiment, Special theory of Relativity, transformation of space and time, Time dilation, Doppler effect ,length contraction, addition of velocities, Relativistic mass: variation of mass with velocity, kinetic energy, equivalence of mass and energy, Relation between energy and momentum.

Unit- II

(a) LASERS

Temporal and spatial coherence of light wave Principle of laser, Laser characteristics, components of laser, Principle of Ruby, He-Ne &Nd -YAG lasers, application, basic concepts of Holography (only introductory part, No detail derivation)

(b) FIBRES OPTICS:

Optical fibers: Introduction & advantages, structure & classification, Option of propagation in fiber, attenuation & distortion, acceptance angle and cone, numerical aperture (only introductory part, No detail derivation).

Unit -III

NUCLEAR PHYSICS

Controlled and uncontrolled chain reaction, criteria of critical mass, nuclear reactor and its site selection & numerical ,nuclear forces, Nuclear fusion in stars . Introduction of elementary particles. Electron ballistic: Motion of charged particles in electric and magnetic field. Aston and Bainbridge mass spectrograph.

Unit -IV

WAVE OPTICS

Wedge shaped films, Interferences by division of amplitude: Newton's rings and its applications Interference by division of wave front: Fresnel's bi prism, fringe width, diffraction grating, resolving power of grating,

Unit- V

SOLID STATE DEVICES:

Transistor: Input and Output characteristics in CE mode, Transistor as an amplifier, Hartley Oscillator. FET: Input and output characteristics of J-FETs & MOSFETs, Operational amplifiers (Op-Amp).

OUTCOMES:

The students will have knowledge on the basics of physics related to properties of matter, optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications.

TEXT BOOKS:

1. Gaur and Gupta “Engineering Physics”
2. Avadhanulu and Kshirsagar “Engineering Physics”.
3. Verma H.C.: Concepts of Physics, Part-1 & Part-2, BharatiBhawan (P&D)
4. A.K. Tayal: Engineering Mechanics (Statics and Dynamics)

REFERENCE BOOKS:

• Jenkins and White: “Optics”, MeGrew-Hill Book Company.

• Singh R.B.: “Physics of Oscillations and Waves”

• Ghatak A.K.: “Optics”

• Mani and Mehta: “Modern Physics”, Affiliated East-West Press Pvt. Ltd, 1998.

• Sanjeev Puri: Modern Physics, narosa Pub. Co.2004.

• Azroff: Solid State Physics, Tata McGraw-Hill, 2004.

• Theraja: B.L., Basic Electronics, S.Chand, 2002.

• Puri: Digital Electronics, Tata McGraw-Hill, 2002.

• Millman, J and Halkias: integrated Electronics, Tata MeGraw-Hill, 2004.

• Tyagrajan and Ghatak: Lasers, Macmillan, 2001.

Semester: I B.Tech **Branch: All Streams of Engineering**

Subject: Programming For Logic Building **Subject Code: BTDSCESC102**

Total Theory Periods: 48 **Total Tutorial Periods: 12**

Total Credits: 04

COURSE OBJECTIVE:

- To distinguish and recognize low-level and high-level programming languages
- To know fundamental concepts of structured programming
- To understand logic development
- To design pseudo logic for various programming problems.
- To understand the basic structure of a program including sequence, decisions and looping.
- To design solutions to real world problems using C language.
- To use C language for problem solving and numerical computations.
- To apply computer-programming concepts to new problems or situations.

UNIT – I

ELEMENTS OF C LANGUAGE

Tools for Problem Solving: Problem Analysis, Flowchart, Algorithm Development. Top-Down Program Design, Structured Design Approach, Origin of C, Features & Characteristic of C, C Compiler, Character Set, Keywords, Identifiers, Constants, Variables, Input/ Output Statements, Basic Data Types, Operators and Expressions, Basic structure of C programs, A simple C Program.

UNIT – II

CONTROL FLOW CONSTRUCTION

Decision making and branching: Simple if statement, if else statement, Nesting of if-else statement, else - if Ladder, Switch statement, Operator, goto statement, Decision making and looping, While statement, Do-While statement, For statement, Jumps in loops, Break and Continue statement.

UNIT – III

DEFINING AND MANIPULATING ARRAYS

One Dimensional Arrays: Declaration of Arrays, Initialization of Arrays, Reading and Writing of integer, real and Character arrays, sorting and Searching in Arrays, Multi-Dimensional Arrays, Handling of Character Strings.

UNIT – IV

USER DEFINED FUNCTIONS

Syntax of Function, Calling functions, Actual & Formal Arguments, Categories of Functions, Function prototype, Scope Rules: Local & Global variables, Recursion, Recursion vs. iteration, Passing Arguments: call by values & call by reference, passing array to function.

Structures: Declaration and initialization of Structure, Array of structures, Array within structure, structure within structure, Structures and functions, Introduction to unions.

UNIT – V

POINTER DATA TYPE AND ITS APPLICATION

Pointer Operator, Pointer Expression, Initialization of pointers, Pointer Arithmetic, Pointer and Function Arguments, Pointer to function, Pointer and Arrays, Pointers and String, Arrays of Pointers, Pointers to Pointers, Dynamic memory allocation.

Files in C: Defining and Opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, Random access to files.

COURSE OUTCOME:

After completion of the course study, students are going to be in a position to

1. Analyze issues and style algorithms in pseudo code.
2. Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems
3. Read, perceive and trace the execution of programs written in C language.
4. Develop confidence for self-education and ability for life-long learning needed for Computer language.
5. Write down C program for a given algorithm by means of modular approach.

TEXT BOOKS:

1. The C programming Language, Dennis M Ritchie and Kernighan, PHI.
2. Let us C, YashwantKanetkar, BPB Publication.
3. Programming in C, E. Balaguruswamy, TMH.

REFERENCE BOOKS:

1. Programming in C, Byron Gottfried, Schaum's series outline TMH.
2. Programming in C, Ghosh, PHI.
3. Computer Programming in C, V. Raja Raman, PHI.

Semester: I B. Tech **Branch: All Streams of Engineering**

Subject: Environmental Sciences **Code: BTDSCMC104**

Total Theory Periods: 15 **Total Tutorial Periods: 00**

Total Credits: 00

UNIT-I:

CONCEPTS OF ENVIRONMENTAL SCIENCES AND NATURAL RESOURCES

Environment, Levels of organizations in environment, Structure and functions in an ecosystem; Biosphere, its Origin and distribution on land, in water and in air, Broad nature of chemical composition of plants and animals. Renewable and Non-renewable Resources, Forests, water, minerals, Food and land (with example of one case study); Energy, Growing energy needs, energy sources (conventional and alternative).

UNIT-II:

BIODIVERSITY AND ITS CONSERVATION

Biodiversity at global, national and local levels: India as a mega-diversity nation; Threats to biodiversity (biotic, abiotic stresses), and strategies for conservation.

UNIT-III:

ENVIRONMENTAL POLLUTION

Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear; Pollution prevention; Management of pollution- Rural/Urban/Industrial waste management [with case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management.

UNIT-IV:

ENVIRONMENTAL BIOTECHNOLOGY AND ENVIRONMENTAL MONITORING

Biotechnology for environmental protection- Biological indicators, bio-sensors; Remedial measures- Bio-remediation, phyto-remediation, bio-pesticides, bio-fertilizers; Bio-reactors- Design and application. Monitoring- Identification of environmental problem, tools for monitoring (remote sensing, GIS); Sampling strategies- Air, water, soil sampling techniques.

UNIT-V:

SOCIAL ISSUES AND ENVIRONMENT

Problems relating to urban environment- Population pressure, water scarcity, industrialization; remedial measures; Climate change- Reasons, effects (global warming,

ozone layer depletion, acid rain) with one case study; Legal issues- Environmental legislation (Acts and issues involved), Environmental ethics

TEXTBOOKS:

1. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", 2nd Edition, Pearson Education, 2004.

2. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006.

REFERENCE BOOKS:

1. A. K. Chatterji, "Introduction to Environmental Biotechnology", Prentice Hall of India, New Delhi, 2006.

2. R.K. Trivedi,"Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.

3. Nebel B. J., "Environmental Science", Prentice Hall of India, New Delhi, 1987.

Semester: I B.Tech **Branch: All Streams of Engineering**
Subject: Technical English **Code: BTDSCHSC103**
Total Theory Periods: 28 **Total Tutorial Periods: 00**
Total Credits : 02

OBJECTIVES:

- To enable learners of Engineering and Technology develop their basic communication skills in English.
- To emphasize specially the development of speaking skills amongst learners of Engineering and Technology.
- To ensure that learners use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading and writing leading to effective and efficient communication.

UNIT-I

Technical vocabulary-meaning in context, sequencing words, articles, prepositions, intensive reading and predicting content-reading and interpretation- process description.

UNIT-II

Phrases/structures indicating use/purpose- nonverbal communication- listening- corelating verbal and nonverbal communication-speaking in group discussion- formal letter writing-writing analytical paragraphs.

UNIT III

Cause and effect expressions- different grammatical forms of the same word- speaking stress and intonation- writing using connectives- report writing- types, structures, data collection, content form recommendation.

UNIT –IV

Numerical adjectives- oral instructions- descriptive writings, letter of application-content, format (c.v./biodata)-imperative forms –checklists, yes/no question forms- e mail communication.

UNIT-V

Speaking – discussion of problems and solutions- creative and critical thinking, writing a proposal.

OUTCOMES:

Learners should be able to

- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Read different genres of texts adopting various reading strategies.

Listen/view and comprehend different spoken discourses/excerpts in different accents.

BOOKS AND REFERENCES:

1. P.k. dutta, g. Rajeevan and c.l.n.prakash, ‘a course in communication skills,. Cambridge university press, india2007

2. Krishna mohan and meerabanerjee, ‘developing communication skills’ Macmillan india limited

3. Edger thrope, showickthrope, ‘objective english’ second edition,pearson education,2007

Semester: I B.Tech. **Branch: All Streams of Engineering**

Lab: Engineering Physics Lab **Code: BTDSCBSC105**

Total Practical Periods: 30 **Total Credit: 01**

OBJECTIVES:

- To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter.

OUTCOMES:

- The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.

LIST OF EXPERIMENTS (Any ten experiments can be performed)

1. To determine the surface tension by Capillary/Jager's method.
2. To determine the wave length of light by Newton's rings method.
3. To determine the wave length of light by Fresnel's Biprism.
4. To determine the focal length of combination of two thin lenses by nodal slide assembly and its verification.
5. To determine specific resistance of a wire by Carry Foster's Bridge.
6. To determine the Hall coefficient of semiconductor.
7. To determine e/m by Thomson's method.
8. Study of Photo – Cell and determination of Planck's constant.
9. Determination of wavelength of a spectral line using diffraction grating.
10. Determination of divergence of LASER beam.
11. Determination of grating element of a diffraction grating using LASER beam.
12. To determine the coefficients of viscosity of a liquid by capillary flow/Stoke's method.
13. To determine the frequency of A.C. mains using sonometer.
14. To determine the moment of inertia of flywheel.
15 To determine the forbidden energy gap of semiconductor diode.
16. To determine the mechanical equivalent of heat (J) by Calender&Barne's method.
17. To determine the numerical aperture (NA) of the given fiber cables.
18. To study the characteristics of LDR.

Semester: I B.Tech. **Branch: All Streams of Engineering**
Lab: Programming & soft skills laboratory **Code: BTSEC108**
Total Practical Periods: 30 **Total Credits: 01**

List of Programs:

1 Write a program to take the radius of a sphere as input and print the volume and surface area of that sphere.
2 Write a program to take a 5-digit number as input and calculate the sum of its digits.
3 Write a program to take three sides of a triangle as input and verify whether the triangle is an isosceles, scalene Oran equilateral triangle.
4 Write a program that will take 3 positive integers as input and verify whether or not they form a Pythagorean triplet or not.
5 Write a program to print all the Prime numbers between a given ranges.
6 Write a program to define a function that will take an integer as argument and return the sum of digits of that integer**.**
7 Write a program to define a macro that can calculate the greater of two of its arguments. Use this macro to calculate the greatest of 4 integers.
8 Write a program to define a recursive function that will print the reverse of its integer argument.
9 Write a program to print the sum of first N even numbers using recursive function.
10 Write a program to sort an array using Bubble sort technique.
11 Write a program that will take the elements of two integer arrays of 5 element each, and insert the common elements of both the array into a third array (Set intersection)
12 Write a program to take 5 names as input and print the longest name.
13 Write a program to check whether two given strings are palindrome or not using user defined function.
14 Write a program to find sum of all array elements by passing array as an argument using user define functions.
15 Write a program to convert decimal number to binary number using the function.
16 Write a program to get the largest and smallest element of an array using the function.
17 Write a program to define a structure Student that will contain the roll number, name and total marks of a student. The program will ask the user to input the details of 5 students and print the details of all the students whose total marks is greater than a given value.

18 Write a program to define a union Contact that will contain the members Mobile no and E-mail id. Now define structure Employee that will contain name, roll number, mode of contact (mob/e-mail) and a variable of type Contact as members. The program will ask the user to give the details of two Employees including mode of contact and the contact num/ E-mail. Print the details of both the Employees.

19 Write a program to count vowels and consonants in a string using pointer.

20 Write a program to swap two numbers using pointers.

21 Write a program to find sum of array elements using Dynamic Memory Allocation.

22 Write a program that will ask the user to input a file name and copy the contents of that file into another file.

23 Write a program that will take any number of integers from the command line as argument and print the sum of all those integers.

24 Write a program to process sequential file for payroll data.

25 Write a program to process random file of library data.

Smart Working with MS-Office

MS-Word

a) Creating, editing, saving and printing text documents
b) Font and paragraph formatting
c) Simple character formatting
d) Inserting tables, smart art, page breaks
e) Using lists and styles
f) Working with images
g) Using Spelling and Grammar check
h) Understanding document properties
i) Mail Merge

MS-Excel

a) Spreadsheet basics
b) Creating, editing, saving and printing spreadsheets
c) Working with functions & formulas
d) Modifying worksheets with color &auto formats
e) Graphically representing data : Charts & Graphs
f) Speeding data entry : Using Data Forms
g) Analyzing data : Data Menu, Subtotal, Filtering Data
h) Formatting worksheets
i) Securing & Protecting spreadsheets

MS-PowerPoint

a) Opening, viewing, creating, and printing slides
b) Applying auto layouts
c) Adding custom animation
d) Using slide transitions
e) Graphically representing data : Charts & Graphs
f) Creating Professional Slide for Presentation.

LIST OF EQUIPMENT'S / MACHINE REQUIRED:

PCs, C-Compiler, C Online Compiler, Microsoft Office (version 2007 or above)

REFERENCES:

1. Programming in ANSI C – E. Balaguruswamy Tata Mc-Gcraw Hill.
2. Let us C, YashwantKanetkar, BPB Publication
3. C: The Complete Reference, Herbert Schildt, McGraw Hill.
4. Office 2007 for Dummies, Wallace Wang, Wiley Publishing
5. MS-Office 2010 Training Guide, Satish Jain/M.Geeta/Kratika, BPB Publications

Semester: I B.Tech **Branch: All Streams of Engineering**

Lab: Engineering Graphics and Design Lab **Code: BTDSCESC107**

Total Practical Periods: 48 **Total Credits: 02**

LIST OF EXPERIMENTS

Component-1

Sheet-1: Projection of Solids (4 problems) + Section and Development of solid surfaces (4 problems) Sheet -2: Orthographic projection without section (4 problems).

Sheet -3: Orthographic projection with section (4 problems). Sheet- 4: Isometric Projections (6 problems).

Component -2

One A-3 size sketch book consisting of:-

1) 6 problems each from Projection of Curves, Lines, Planes and Solids.

2) 6 problems from Section and Development of Solids.

3) 4 problems each from the Orthographic Projections (with Section), Reading of orthographic projections and Isometric projections.

Component - 3

1. An introduction of cad software and its utilities in the engineering software.
2. Study of the basic initial setting and viewing of drafting software interface.
3. Study of various tool bar options and exercises to familiarize all the drawing tools.
4. Use of various modify commands of drafting software.
5. Dimensioning in 2d and 3d entities.
6. Draw different types of 3d modeling entities using viewing commands, to view them (isometric projection).
7. Sectioning of solid primitives and rendering in 3d.
8. Intersection of solid primitives.

Semester: I B.Tech **Branch: All Streams of Engineering**
Lab: Communication Skill Lab **Code: BTAEC109**
Total Practical Periods: 30 **Total Credits: 02**

LIST OF TASKS:

1. Listening comprehension – Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English, and American English; intelligent listening in situations such as interview in which one is a candidate.

2. Vocabulary building, Creativity, using Advertisements, Case Studies etc.

3. Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking

4. Cross-Cultural Communication: Role-Play/ Non-Verbal Communication.

5. Meetings- making meeting effective, chairing a meeting, decision making, seeking opinions , interrupting and handling interruptions, clarifications, closure- Agenda, Minute writing.

6. Group Discussion – dynamics of group discussion, Lateral thinking, Brainstorming and Negotiation skills

7. Resume writing – CV – structural differences, structure and presentation, planning, defining the career objective

8. Interview Skills – formal & informal interviews, concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing 9. Writing Skills - Business Communication, Essays for competitive examinations.

10. Technical Report Writing/ Project Proposals – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.- Feasibility, Progress and Project Reports.

Semester: I B.Tech **Branch: All Streams of Engineering**
Lab:Manufacturing Practices -I Laboratory **Code: BTDSCESC106**
Total Practical Periods: 45 (15 Instructional Periods) **Total Credits: 02**

INSTRUCTIONAL SYLLABUS

Carpentry:
Timber, definition, engineering applications, seasoning and preservation, plywood and ply boards.
Foundry:
Moulding sands, constituents and characteristics. Pattern, definition, materials, types, core prints. Role of gate, runner, riser, core and chaplets. Causes and remedies of some common casting defects like blow holes, cavities, inclusions.
Welding:
Definitions of welding, brazing and soldering processes, and their applications, Oxyacetylene gas welding process, equipment and techniques, type of flames and their applications. Manual met an arc Welding technique and equipment, AC and DC welding, electrodes, constituents and functions of electrode coating, Welding positions. Type of weld joint. Common welding defects such ascracks, undercutting slag inclusion, porosity.

LIST OF EXPERIMENTS

1. T-Lap joint and Bridle joint (Carpentry shop)

2. Mould of any pattern (foundry shop)

3. Casting of any simple pattern (foundry shop)

4. (a) Gas welding practice by students on mild steel flat

(b) Lap joint by Gas welding

5. (a) MMA Welding practice by students

(b) Square butt joint by MMA Welding

6. (a) Lap joint by MMA Welding

(b) Demonstration of brazing

Scheme of Teaching and Evaluation
(As per NEP -2020)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
Semester - II

S. No.	Course Sub Category	Course Name	Code	Teaching Scheme				Evaluation Scheme		Total Marks
				Hours			Credits			
				Theory	Tutorial	Practical		CIA	ESE	
1	DSCC	Analytical Mathematics	BTDSCBSC200	3	0	-	3	30	70	100
2	DSCC	Engineering Chemistry	BTDSCBSC201	3	-	-	3	30	70	100
3	DSCC	Basic Electrical & Electronics Engineering	BTDSCESC202	3	0	-	3	30	70	100
4	DSCC	Constitution of India, Professional Ethics and Human Rights.	BTMC203	1	-	-	0	30	70	100
5	DSCC	Fundamental of Mechanical Engineering.	BTDSCESC204	3	0	-	3	30	70	100
6	DSCC	Engineering Chemistry Laboratory	BTDSCESC205	-	-	2	1	20	30	50
7	DSCC	Basic Electrical & Electronics Engineering Laboratory	BTDSCESC206	-	-	2	1	20	30	50
8	DSCC	Fundamental of Mechanical Engineering Laboratory	BTDSCESC207	-	-	2	1	20	30	50
9	DSCC	Manufacturing Practices - II Laboratory	BTDSCESC208	-	-	2	1	20	30	50
10	SEC	Problem Solving with Python Programming	BTSEC209	3	-	0	3	30	70	100
11	AEC	Advanced Programming Laboratory	BTAEC210	-	-	2	1	20	30	50
12	GEC	Multidisciplinary Elective Course - II	GEA	3	0	-	3	30	70	100
			Total	15	0	13	23	310	640	950

Discipline Specific Core Courses (DSCC) Major			AEC (Ability Enhancement Course) (D)	SEC/Internship (Skill Enhancement Course) (E)	Generic Elective Course (GEC) (F)
Basic Sciences (A)	**Engineering Sciences (B)**	**Humanities Science (C)**			
Analytical Mathematics	Basic Electrical & Electronics Engineering	Constitution of India, Professional Ethics and Human Rights.	Advanced Programming Laboratory	Problem Solving with Python Programming	Multidisciplinary Elective Course - II
Engineering Chemistry	Fundamental of Mechanical Engineering.				
	Engineering Chemistry Laboratory				
	Basic Electrical & Electronics Engineering Laboratory				
	Fundamental of Mechanical EngineeringLaboratory				
	Manufacturing Practices - II Laboratory				

Note: 'French Language' is introduced in the even semester as an Add-on Certification Course (Non-credited).

Credit Definition:

- 1-hour lecture (L) per week per semester = 1Credit
- 1-hour tutorial (T) per week per semester = 1Credit
- 2-hour Practical/Drawing(P) per week per semester = 1 Credit
- Four credit courses are to be designed for 60 hours of Teaching-Learning process.
- Three credit courses are to be designed for 48 hours of Teaching-Learning process.
- Two credit courses are to be designed for 28 hours of Teaching-Learning process.
- One credit courses are to be designed for 15 hours of Teaching-Learning process

Semester: 2nd B.Tech **Branch: All Streams of Engineering**

Subject: Analytical Mathematics **Subject Code: BTDSCBSC200**

Total Theory Periods: 48 **Total Credits: 03**

OBJECTIVES:

- To make the scholars perceive the series analysis could be a powerful methodology wherever the formulas square measure integrals and to possess information of increasing periodic functions that explore sort of applications of Fourier series.
- To possess intensive information of PDE those arise in mathematical descriptions of things in engineering. To review a few amount which will take any of a given vary of values that will not be foreseen because it is however can be delineated in terms of their likelihood.
- To acquaint the student with the concepts of vector calculus needed for problems in all engineering disciplines.
- To produce a sound background of advanced analysis to perform an intensive investigation of major theorems of complex analysis and to use these ideas to a large vary of issues that features the analysis of each complex line integrals and real integrals.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I

FOURIER SERIES

Fourier series, Even odd function, Half range sine and cosine series, Parseval's theorem, practical harmonic analysis & Fourier Transform

UNIT II

PARTIAL DIFFERENTIAL EQUATION

Formation, Solution by direct integration method, Linear equation of first order, Homogeneous linear equation with constant coefficients, Non-homogeneous linear equations, Method of separation of variables & application of PDE

UNIT III

COMPLEX ANALYSIS

Derivative, Cauchy-Riemann equations, Analytic functions, Harmonic functions, Flow problems, Complex integration, Cauchy theorem, Cauchy integral formula, Taylor & Laurent series, Singularity, Residue

UNIT IV

LAPLACE TRANSFORMATION

Definition, Transform of elementary functions, Properties of Laplace transform, of derivatives & integrals, Multiplication by tn, Division by t, Evaluation of integrals, Inverse Laplace function,

Convolution theorem, Unit step functions, Unit impulse function, periodic function. Application to solution of ordinary differential equations

UNIT V

VECTOR CALCULUS

Directional derivative, Gradient, Divergence and curl, Line, Surface and Volume integrals, Green's, Gauss's &Stoke's theorem (without proof) and applications

OUTCOMES:

The subject helps the students to develop the fundamentals and basic concepts in vector calculus, PDE, Laplace transform and complex functions. Students will be able to solve problems related to engineering applications by using these techniques.

TEXT BOOKS:

1. Higher Engineering Mathematics by B.S.Grewal (40th edition)-Khanna Publisher.
2. Advanced Engineering Mathematics by Erwin Kreyszig (8th edition)-John Wiley & Sons.

REFERENCE BOOKS:

1. Differential Calculus by Gorakh Prasad-Pothisala Private Limited.
2. Advanced Engineering Mathematics by R.K.Jain and S.R.K. Iyengar-Narosa Publishing House.
3. Applied Mathematics by P.N.Wartikar&J.N.Wartikar Vol-ll –Pune VidyarthiGrihaPrakasan, Pune

Semester : II B. Tech **Branch: All Streams of Engineering**
Subject: Engineering Chemistry **Code: BTDSCBSC201**
Total Theory Periods: 48 **Total Tutorial Periods: 00**
Total Credits: 03

OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
- Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
- Preparation, properties and applications of engineering materials.
- Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels

OUTCOMES:

- The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

UNIT-I:

(a) ELECTROCHEMISTRY AND BATTERY TECHNOLOGY ELECTROCHEMISTRY: Introduction, Derivation of Nernst equation for electrode potential. Reference electrodes: Introduction, construction, working and applications of calomel and Ag / AgCl electrodes. Measurement of electrode potential using calomel electrode. Ion selective electrode: Introduction; Construction and working of glass electrode, determination of pH using glass electrode. Concentration cells: Electrolyte concentration cells, numerical problems.

(b) BATTERY TECHNOLOGY:

Introduction, classification - primary, secondary and reserve batteries. Characteristics - cell potential, current, capacity, electricity storage density, energy efficiency; cycle 10 hours life and shelf life. Construction, working and applications of Zinc Air, Nickel- metal hydride batteries. Lithium batteries: Introduction, construction, working and applications of Li-MnO_2 and Li-ion batteries.

(c) **FUEL CELLS:**

Introduction, difference between conventional cell and fuel cell, limitations & advantages. Construction, working & applications of methanol-oxygen fuel cell with H_2SO_4 electrolyte.

UNIT-II:

(a) CORROSION AND METAL FINISHING CORROSION:

Introduction, electrochemical theory of corrosion, galvanic series. Factors affecting the rate of corrosion: ratio of anodic to cathodic areas, nature of metal, nature of corrosion product, nature of

medium – pH, conductivity, and temperature. Types of corrosion- Differential metal, differential aeration (Pitting and water line) and stress. Corrosion control: Inorganic coatings Anodizing of Al and phosphating; Metal coatings-Galvanization and Tinning. Cathodic protection (sacrificial anodic and impressed current methods).

(b) **METAL FINISHING:**

Introduction, Technological importance. Electroplating: Introduction, principles governing- Polarization, decomposition potential and overvoltage. Factors influencing the nature of electro deposit-current density, concentration of metal ion & electrolyte; pH, temperature & throwing power of plating bath; additives- brighteners, levelers, structure modifiers & wetting agents. Electroplating of Nickel (Watt's Bath) and Chromium (decorative and hard). Electro less plating: Introduction, distinction between electroplating and electro less plating, electro less plating of copper & manufacture of double sided Printed Circuit Board with copper.

UNIT-III:

(a) FUELS AND SOLAR ENERGY FUELS:

Introduction, classification, calorific value- gross and net calorific values, determination of calorific value of fuel using bomb calorimeter, numerical problems. Cracking: Introduction fluidized catalytic cracking, synthesis of petrol by Fishcher-Tropsch process, reformation of petrol, octane and cetane numbers. Gasoline and diesel knocking and their mechanism, anti-knocking agents, power alcohol & biodiesel.

(b) SOLAR ENERGY:

Introduction, utilization and conversion, photovoltaic cells- construction and working. Design of PV cells: modules, panels & arrays. Advantages & disadvantages of PV cells. Production of solar grade silicon: Union carbide process, purification of silicon (zone refining), doping of silicon-diffusion technique (N&P types).

UNIT-IV:

POLYMERS:

Introduction, types of polymerization: addition and condensation, mechanism of polymerization- free radical mechanism taking vinyl chloride as an example. Molecular weight of polymers: number average and weight average, numerical problems. Glass transition temperature (Tg): Factors influencing Tg-Flexibility, inter molecular forces, molecular mass, branching & cross linking and stereo regularity. Significance of Tg. Structure property relationship: crystallinity, tensile strength, elasticity & chemical resistivity. Synthesis, properties and applications of PMMA (plexi glass), Polyurethane and polycarbonate. Elastomers: Introduction, synthesis, properties and applications of Silicone rubber. Adhesives: Introduction, synthesis, properties and applications of epoxy resin. Polymer Composites: Introduction, synthesis, properties and applications of Kevlar. Conducting polymers: Introduction, mechanism of conduction in Poly aniline and applications of conducting poly aniline.

UNIT-V:

WATER TECHNOLOGY AND NANOMATERIALS

(a)WATER TECHNOLOGY:

Introduction, boiler troubles with disadvantages & prevention methods-scale and sludge formation, priming and foaming, boiler corrosion (due to dissolved O2, CO2 and MgCl2). Determination of DO, BOD and COD, numerical problems on COD. Sewage treatment: Primary, secondary (activated sludge method) and tertiary methods. Softening of water by ion exchange process. Desalination of seawater by reverse osmosis & electro dialysis (ion selective).

(b)NANO MATERIALS:

Introduction, properties (size dependent). Synthesis-bottom up approach (sol-gel, precipitation, gas condensation & chemical vapour condensation processes). Nano scale materials- carbon nano tubes, nano wires, fullerenes, dendrimers, nano rods, &nano composites.

TEXTBOOKS:

1. B.S.Jai Prakash, R.Venugopal, Sivakumaraiah&PushpaIyengar., "Chemistry for Engineering Students", Subhash Publications, Bangalore.

2. R.V.Gadag&A.Nityananda Shetty., "Engineering Chemistry", I K International Publishing House Private Ltd. New Delhi.

3. P.C.Jain& Monica Jain., "Engineering Chemistry", Dhanpat Rai Publications, New Delhi.

REFERENCE BOOKS:

1. O.G.Palanna,"Engineering Chemistry", Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint.

2. G.A.Ozin& A.C. Arsenault, "Nano chemistry A Chemical Approach to Nanomaterials", RSC publishing, 2005.

3. "Wiley Engineering Chemistry", Wiley India Pvt. Ltd. New Delhi. Second Edition.

4. V.R.Gowariker, N.V.Viswanathan&J.Sreedhar., "Polymer Science", Wiley-Eastern Ltd.

5. M.G.Fontana., "Corrosion Engineering", Tata McGraw Hill Publishing Pvt. Ltd. New Delhi.

Semester: II B.Tech **Branch: All Streams of Engineering**
Subject: Basic Electrical & Electronics Engineering **Code: BTDSCESC202**
Total Theory Periods: 48 **Total Tutorial Periods: 00**
Total Credits: 03

Unit – I

D.C. Networks:

Elementary idea about power generation, transmission and distribution. Node voltage and mesh current method. Superposition, Thevenin's and Norton's theorems. Star- delta and Delta- star conversions.

Unit – II

Single Phase A.C. Circuits:

Single phase EMF generation, Effective & Average values of sinusoids and determination of form-factor, Analysis of simple series R-L, R-C and RLC circuits, power and power factor

Unit – III

(a) Three Phase AC circuits:

Introduction, Generation of Three-phase EMF, Phase sequence, Connection of Three-phase Windings - Delta and Star connection: Line and Phase quantities, phasor diagrams, Power equations in balanced conditions.

(b) Magnetic Circuits:

Introduction, Magneto motive force (MMF), Magnetic field strength, Reluctance, B-H curve, Comparison of the Electric and Magnetic Circuits, Series-Parallel Magnetic Circuit, Leakage flux and fringing, Magnetic Hysteresis, Eddy currents.

Unit – IV

(a) Single phase Transformers:

Introduction, Principles of operation, Constructional details, Ideal Transformer and Practical Transformer, EMF equation, Rating, Phasor diagram on no load, Losses, Efficiency calculations.

(b) Direct current machines:

Basic concepts and elementary idea of AC and DC machines, construction and working principal of DC Generator, emf and torque equation dc machine and types of dc motor.

Unit – V

(a) Semiconductor Devices and Applications

Introduction - Characteristics of PN Junction Diode – Zener Effect - Zener Diode and its Characteristics - Half wave and Full wave Rectifiers - Voltage Regulation. Bipolar Junction Transistor - CB, CE, CC Configurations and Characteristics - Elementary Treatment of Small Signal Amplifier

(b) Digital Electronics

Binary Number System – Boolean algebra theorems, Digital circuits - Introduction to sequential Circuits,

Flip-Flops - Registers and Counters – A/D and D/A Conversion.

TEXT BOOKS:

1. V.N. Mittle and Arvind Mittal, "Basic Electrical Engineering", Second Edition, Tata McGraw Hill.
2. 2 Del Torro, Vincent "Electrical Engineering Fundamentals", Second Edition Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS:

1. Fitzrald and Higgonbothom, "Basic Electrical Engineering", Fifth Edition, McGraw Hill.
2. D.P. Kothari and I.J. Nagrath, "Theory and Problems of Basic Electrical Engineering", PHI.
3. I.J. Nagrath and D.P. Kothari, "Electrical Machines", Tata McGraw Hill.
4. Ashfaq Hussain, "Fundamentals of Electrical Engineering", Third Edition, Dhanpat Rai and Co.
5. H. Cotton, "Advance Electrical Technology," ISSAC Pitman, London. 6. Parker Smith S. (Ed.Parker Smith N.N.), "Problems in Electrical Engineering", Tenth edition, Asia publication.

Semester: II B.Tech. **Branch: All Streams of Engineering**
Subject : Problem Solving with Python Programming **Code: BTSEC209**
Total Theory Periods: 45 **Total Tutorial Periods: 00**
Total Credits: 03

COURSE OBJECTIVE:

1. To learn the object-oriented programming concepts using C++.
2. To design and implement C++ programs with the concept of OOP.
3. To understand implementation issues related to object-oriented techniques.
4. To learn how to build good quality software using object-oriented programming technique.

UNIT-I

INTRODUCTION TO OOP AND C++

Concept of Object Oriented Programming, Procedural programming Vs. Object oriented programming (OOP), Features and Benefits of OOPs, Object Oriented Languages, Introduction to C++, C++ Compiler, C++ Standard library, Basics of a typical C++ environment and C++ program, Pre-processors directives, and illustrative simple C++ programs. Header files and namespaces, library files, Data Types, Keywords, Operators and Expressions, Control Structure, Loops, Arrays, Structures, Functions.

UNIT-II

CLASSES & OBJECT, CONSTRUCTORS&DESTRUCTORS

Introduction to class, class object creation, Access of class members, Scope of class and its member, Nested class, Data hiding & encapsulation, Friend function, Array within a class, Array of object as function argument, Function returning object, Static member. Constructor function, Parameterized multiple constructor, Default constructor, Dynamic memory allocation with new and delete, Copy constructor, Constant and class, Data conversion between objects of different classes, Destructor function.

UNIT- III

INHERITANCE, POINTER, VIRTUAL FUNCTIONS & POLYMORPHISM

Fundamentals of operator overloading, restrictions on operators overloading, operator functions as class members vs. as Friend functions, Overloading, <<, >> Overloading unary operators, overloading binary operators. Introduction to inheritance, Base classes and derived classes, protected members, Casting base class pointers to derived class pointers, Using member functions, Overriding base class members in a derived class, public, protected and private inheritance, Using constructors and destructors in derived classes, Implicit derived class object to base class object conversion, Composition Vs. Inheritance. Introduction to virtual functions, Abstract base classes and concrete classes, new classes and dynamic binding, virtual destructors, polymorphism, dynamic binding.

UNIT-IV

FILE I/O, TEMPLATES& EXCEPTION HANDLING

Files and streams, Creating a sequential access file, Reading data from a sequential access file, Updating sequential access files, Random access files, creating a random access file, Writing data randomly to a random access file, reading data sequentially from a random access file. Stream Input/output classes and objects, Stream output, Stream input, Unformatted I/O (with read and write),

Stream manipulators. Function templates, Overloading template functions, Class template, Class templates and non-type parameters, Templates and inheritance, Templates and friends, Templates and static members. Basics of C++ Exception handling: Try Throw, Catch, Throwing an exception, catching an exception, rethrowing an exception, Exception specifications, processing unexpected exceptions.

UNIT-V

OOPS CONCEPTS WITH PYTHON

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

COURSE OUTCOME:

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

1. Explain the basics of Object Oriented Programming concepts.
2. Design and develop a C++ program with concept of Object Oriented Programming.
3. Apply the object initialization and destroy concept using constructors and destructors.
4. Apply the concept of polymorphism to implement compile time polymorphism in programs by using overloading methods and operators.
5. Use the concept of inheritance to reduce the length of code and evaluate the usefulness.
6. Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.
7. Use I/O operations and file streams in programs.
8. Make an application/project using C++.

TEXT BOOKS:

1. Object Oriented Programming in C++, Robert Lafore, CourseSams Publishing.
2. Object Oriented Programming with C++, E. Balagurusamy, McGraw Hill Education.
3. Python 3 Object-Oriented Programming - Third Edition

REFERENCE BOOKS:

1. The Complete Reference C++, Herbert Schildt, McGraw Hill Education.
2. Let Us C++, YashavantKanetkar, BPB Publication.
3. Programming with C++, John R. Hubbard, Schaum's Outlines, McGraw Hill Education.
4. Programming with C++, D. Ravichandran, McGraw Hill Education.
5. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

Semester:II B.Tech **Branch: All Streams of Engineering**
Subject: Constitution of India, Professional Ethics and Human Rights **Code: BTMC203**
Total Theory Periods: 15 **Total Tutorial Periods: 00**
Total Credits: 00

UNIT-I: CONSTITUTION OF INDIA

Introduction to the Constitution of India, The Making of the Constitution and Salient features of the Constitution, Preamble to the Indian Constitution Fundamental Rights & its limitations.

UNIT-II: FUNDAMENTAL DUTIES AND UNION EXECUTIVES

Directive Principles of State Policy & Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India

UNIT-III: STATE LEGISLATURE AND ELECTORAL PROCESS

State Executives – Governor Chief Minister, State Legislature High Court of State, Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th &91st Amendments.

UNIT-IV: HUMAN RIGHTS

Special Provision for SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. Human Rights –Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India ,Powers and functions of Municipalities, Panchyats and Co - Operative Societies..

UNIT-V: PROFESIONAL ETHICS

Scope & Aims of Engineering Ethics, Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering.

TEXTBOOKS:

1. Durga Das Basu: “Introduction to the Constitution on India”, (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001

2. Charles E. Haries, Michael S Pritchard and Michael J. Robins “Engineering Ethics” Thompson Asia, 2003-08-05.

REFERENCE BOOKS:

1. M.V.Pylee, “An Introduction to Constitution of India”, Vikas Publishing, 2002.

2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, “Engineering Ethics”, Prentice –Hall of India Pvt. Ltd. New Delhi, 2004

3. Brij Kishore Sharma,“Introduction to the Constitution of India”, PHI Learning Pvt. Ltd., New Delhi, 2011.

Semester : II B.Tech
Subject: Fundamental of Mechanical Engineering **Code: BTDSCESC204**
Total Theory Periods: 48 **Total Tutorial Periods: 00**
Total Credits: 03

OBJECTIVES:

- To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering.

UNIT – I :

RESULTANT AND EQUILIBRIUM ANALYSIS:

Basic concepts and laws of mechanics, system of forces, free body diagram, Resultant and equilibrium of concurrent, parallel and non-concurrent co-planar force system.
General numerical applications.

UNIT – II :

(a) ANALYSIS OF PLANE TRUSSES Perfect truss, basic assumptions for perfect truss, analysis of axial forces in the members by method of joint and method of sections. General numerical applications.

(b) FRICTION Static, dynamic and limiting friction, Law of limiting friction, Angle of friction, Angle of Repose, Cone of Friction, Wedge friction. General numerical applications

UNIT –III :

PROPERTIES OF SURFACES Centre of Gravity, Second moment of area, determination of second moment of area by integration, polar moment of inertia, radius of gyration of area, Parallel axis theorem, Moment of inertia of composite areas, and determination of Product of inertia by integration.

UNIT –IV :

KINETICS OF PARTICLES

(a) D'Alembert's principle applied to bodies having rectilinear motion.

(b) Principle of work and Energy: General numerical applications

(c) Principle of Impulse and momentum: General numerical applications

UNIT – V :

LAWS OF THERMODYNAMICS

(a) Thermodynamic System, properties, process, cycle, thermodynamic equilibrium, Quasi-static Process, Zeroth Law of thermodynamics, Work and Heat transfer, flow work, general numerical application.

(b) First Law of thermodynamics, internal energy, proof of internal energy as a point function, general numerical application of first law to non-flow process and steady flow process.

OUTCOMES:

(a) Ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration.
(b) Ability to analyses the forces in any structures.
(c) Ability to solve rigid body subjected to dynamic forces.

TEXT BOOKS:

1. Engineering Mechanics (Statics and Dynamics) ; A. K. Tayal ,Umesh Pub., Delhi .

2. Engineering Mechanics : S. Timoshenko and D.H. Young,TMH

3. Engineering Thermodynamics: P.K.Nag, TMH

4. Engineering Thermodynamics: C.P.Arora, TMH

REFERENCE BOOKS:

1. Engineering Mechanics (Statics and Dynamics): R.C.Hibbeler, Pearson

2. Engineering Mechanics:Meriam and Kreige ,John Wiley and sons

3. Thermodynamics: Cengel and Boles, TMH

4. Essentials of Engg Mechanics: S.Rajasekharan&G.ShankaraSubramaniyam, Vikas Publications

5. Engineering Mechanics: BasudebBhatytacharya , Oxford

Semester: II B.Tech **Branch : All Streams of Engineering**

Subject : Engineering Chemistry Lab **Code: BTDSCESC205**

Total Theory Periods: 30 **Total Tutorial Periods: 00**

Total Credits: 01

COURSE OBJECTIVE:

1. To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of hardness, alkalinity, metal ion content, corrosion in metals and cement analysis.

LIST OF EXPERIMENTS

1. Acid-base titration (estimation of commercial caustic soda)

2. Redox titration (estimation of iron using permanganometry)

3. Complexometric titration (estimation of hardness of water using EDTA titration).

4. Preparation and analysis of metal complex (for example thiourea/copper sulfate or nickel chloride/ammonia complexes).

5. Chemical kinetics (determination of relative rates of reaction of iodide with H2O2 at room temperature (Clock reaction).

6. Viscosity of solutions (determination of percentage composition of sugar solution from viscosity).

7. Detection of functional groups in organic compounds.

8. Utilization of paper/thin layer/column chromatographic techniques in the separation of organic compounds

9. Conduct metric titration (determination of the strength of a given HCl solution by titration against a standard NaOH solution).

10. Determine the amount of oxalic Acid and sulphuric Acid/Hydrochloric Acid in one liter of solution given standard Sodium Hydroxide and Potassium Permangate.

11. To determine the Carbonate, Bicarbonate and Chloride contents in irrigation water.

12. Determination of dissolved Oxygen in given sample of water.

13. Determination of calorific value of fuel by Bomb Calorimeter.

14. Determination of Flash Point and Fine Point of Lubricant by Abels and Pensky Martin apparatus.

COURSE OUTCOME:

1. The students will be conversant with hands-on knowledge in the quantitative chemical analysis of water quality related parameters, corrosion measurement and cement analysis.

Semester: II B.Tech **Branch: All Streams of Engineering**
Subject: Basic Electrical & Electronics Engineering Lab **Code: BTDSCESC206**
Total Theory Periods: 30 **Total Tutorial Periods: 00**
Total Credits: 01

List of Experiments (To perform minimum 10 experiments)

1. To verify Thevenin's theorem and Norton's theorem.
2. To verify Superposition theorem.
3. To verify Kirchhoff's Current Law and Kirchhoff's Voltage Law.
4. To verify Maximum Power Transfer theorem
5. To determine V– I characteristics of Incandescent lamp.
6. To study B-H curve.
7. To measure current, power, voltage and power factor of series RLC circuit.
8. To measure current, power, voltage of parallel RLC circuit.
9. To measure current, power, voltage of series parallel RLC circuit.
10. To measure R and L of choke coil.
11. To study construction of transformer.
12. To perform ratio test and polarity test of single phase transformer.
13. To calculate efficiency of single phase transformer by direct loading.
14. To study construction of D.C. machine.
15. To study charging and discharging of a capacitor.
16. To study the Wattmeter and Energy meter.

Semester : II B.Tech **Branch: All Streams of Engineering**
Subject : Advance Programming Laboratory **Code: BT 208**
Total Theory Periods: 30 **Total Tutorial Periods: 00**
Total Credits: 01

1 Write a program to check whether a given number is Prime or not.

2 Write a program to read number and to display the largest value between two, three or four numbers by using switch-Case statements.

3 Write a program to find sum of first natural numbers : sum= 1+2+3+4+……. 100 by using
a. for loop b. while loop c. do-while loop

4 Write a program to find sum of the following series using function:
Sum= $x-(x)^3/3!+(x)^5/5!$ ..... $(x)^n/n!$

5 Write a program to read the elements of two matrices & to perform the matrix multiplication.

6 Write a program to swap the contents of two variable by using
a. call by value b. Call by reference

7 Write a program to perform the following arithmetic operations on complex numbers using structure
a. Addition of the two complex numbers b. Subtraction of two complex numbers
c. Multiplication of two complex numbers d. Division of two complex numbers

8 Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

9 Write an object-oriented program (OOP) using C++ to exchange the private data members of two different functions using friend functions.

10 Write an OOP using C++ to count how many times a particular member function of a class is called by:
a. A particular object b. Any objects

11 Write an OOP using C++ to define a constructor for a “Date” class that initializes the Date objects with initial values. In case initial values are not provided, it should initialize the objects with default values.

12 Write an OOP using C++ to overload:
a. + Operator b. = operator c. >> operator d. ++ operator

13 Write a C++ program to demonstrate how ambiguity is avoided using scope resolution operator in the following:
a. Single Inheritance b. Multiple Inheritance

14 Write a C++ Program to demonstrate function overloading for swapping of two variables of the various data types (integer, floating-point number and character type).

15 Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

16 Write a C++ program to access the private data of a class by non-member function through friend function where the friend function is declared:

a. in the location of public category
b. in the location of private category
c. within the scope of a class definition itself
d. defined with inline code subtraction

17 Write a C++ program to demonstrate how a pure virtual function is defined, declared and invoked from the object of derived class through the pointer of the base class.

18 Write a C++ program to open a file and count the number of characters, number of vowels and number of newline characters present in the file.

19 Write a program to copy the contents of one text file to another and display both the files using a text Menu.

20 Create a database of 10 students. The database should contain the name, marks of 5 subjects, aggregate marks, aggregate percentage and division according to the following conditions:

a. Percentage greater or equal to 60 – First division
b. Percentage between 50 and less than 60 – Second division
c. Percentage between 40 and less than 50 – Third division
d. Percentage below 40 – Improvement required

Display the above database of every student in a tabulated form. Implement the above program using Structures, Text-Menu and File I/O operations.

21 Write an OOP using a class template to read any five parameterized data type such as float and integer, and print the average.

22 Write a program for sorting of numbers with Bubble Sort using template function.

23 Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

24 Write a C++ program to read two numbers and find the division of these two numbers using exception handling.

25 Write a C++ program to create a function which take a parameter, if the value of parameter is > 0 then throw integer type, if parameter is = 0, then throw character type, if parameter is < 0 then throws float type exception but for all design use only one catch block.

26 Write a python program for finding biggest number among 3 numbers.

27 Implement Python Script to generate prime numbers series up to n

28 Implement python script to read person's age from keyboard and display whether he is eligible for voting or not.

29 Write a python program to work with classes and objects.

30 Write a python program that makes use of function to display all such numbers, which are divisible by 7 but are not a multiple of 5, between 1000 and 2000.

LIST OF EQUIPMENT/ MACHINE REQUIRED

PCs, Turbo C++ compiler, Online C++ Compiler, Python 3/Python IDE, Online python compiler

REFERENCES:

1. Programming with C++, D. Ravichandran, McGraw Hill Education.
2. Object Oriented Programming with C++, E. Balagurusamy, McGraw Hill Education.
3. Mastering C++, K. R. Venugopal, Mcgraw Hill Education.
4. The Complete Reference C++, Herbert Schildt, McGraw Hill Education.
5. Object Oriented Programming in C++, Robert Lafore, CourseSams Publishing.
6. Let Us C++, YashavantKanetkar, BPB Publication.
7. Head-First Python: A Brain-Friendly Guide (2nd Edition), Paul Barry, Oreilly.
8. Python Programming: An Introduction to Computer Science (3rd Edition), John Zelle,

Semester : II B. Tech
Lab: Fundamental of Mechanical Engineering Lab **Code: BTDSCESC207**
Total Practical Periods: 30 **Total Credits: 01**

Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED

LIST OF EXPERIMENTS

1. To verify law of triangle of forces.
2. To verify the Lami's theorem.
3. To verify the law of polygon of forces.
4. To verify the law of lever. 5. To determine the support reactions of a simply supported beam subjected to point loads.
6. To draw the variation of bending moment at a given section in a simply supported beam under a moving point load.
7. To find the coefficient of friction between surfaces of wooden plane and following blocks: i) Aluminum ii) Tin iii) Glass iv) Asbestos v) Teak ply vi) Sand paper vii) card board .
8. To determine the coefficient of friction between (i) Belt and pulley (ii) Rope and pulley.
9. To study simple jib crane and to determine the internal forces in members of jib crane.
10. To determine the stiffness of helical compression spring.
11. To study lifting machine.
12. To study the lifting machine "second order pulley system" and to draw the following characteristic diagram: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.
13 To study the lifting machine "Wheel and Differential axle" and to draw the following characteristic diagram: (i). Load-effort diagram (ii) Load- ideal effort diagram (iii). Load-efficiency diagram. Also to determine the law of machine and the maximum efficiency of machine.
14. To study the lifting machine "Worm and worm wheel" and to draw the following characteristic diagram: (i). Load-effort diagram (ii). Load- ideal effort diagram (iii). Load-efficiency diagram. Also to determine the law of machine and the maximum efficiency of machine.
15. To study the lifting machine "Simple screw jack" and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii). Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.
16. To study the lifting machine "Modified screw jack" and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

17. To study the lifting machine “Geared Jib crane” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

18. To study the lifting machine “Single Purchase Winch crab” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram

(iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

19. To study the lifting machine “Double Purchase Winch crab” and to draw the following characteristic diagrams of the machine: (i) Load-effort diagram (ii) Load- ideal effort diagram (iii) Load-efficiency diagram Also to determine the law of machine and the maximum efficiency of machine.

Semester: II B . Tech **Branch: All Streams of Engineering**
Manufacturing Practices– II Lab **Code: BTDSCESC208**
Total Practical Periods: 45(15 Instructional Periods) **Total Credits: 01**

Note: MINIMUM TEN NUMBERS OF EXPERIMENTS IS TO BE PERFORMED

Course Objective:

1. To make the student acquire practical skills in the machining, fitting and forging operations.

Instructional Syllabus

Machining:

Introduction to machining and common machining operations. Cutting tool materials. Definition of machine tools, specification and block diagram of lathe, shaper, drilling machine and grinder. Common lathe operations such as turning parting, chamfering and facing. Quick return mechanism of shaper. Difference between drilling and boring. Files-material and classification.

Fitting:

Need of fitting, different types of instruments used in fitting shop.

Forging:

Forging principle, materials, operations like drawing, upsetting, bending and forge welding, use of forged parts.

List of Experiments

1. Job on lathe with one step turning and chamfering operations
2. Job on shaper for finishing two sides of a job
3. (a) Drilling two holes of size 5 and 12 mm diameter on job used/to be used for shaping.

(b) Grinding a corner of above job on bench grinder

4. Finishing of two sides of a square piece of filling
5. Tin smithy for making mechanical joint and soldering of joints
6. Perform step cutting on mild steel plate.

Course Outcome:

1. The students will be conversant with hands-on knowledge in the machining, fitting and forging operations.

Scheme of Teaching and Evaluation (As per NEP -2020)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
B. TECH. III Semester

S. No.	Course Sub Category	Course Name	Code	Teaching Scheme				Evaluation Scheme		Total Marks
				Hours			Credits			
				Theory	Tutorial	Practical		CIA	ESE	
1	DSCC - BSC	BTDSCBSE300	Numerical Methods and Statistics	3	0	-	3	30	70	100
2	DSCC - PCC	BTDSCCSE321	Data Structures	3	1	-	4	30	70	100
3	DSCC - PCC	BTDSCCSE322	Java Programming	3	1	-	4	30	70	100
4	DSCC - PCC	BTDSCCSE323	Computer Organization and Design	3	1	-	4	30	70	100
5	DSCC - PCC	BTDSCCSE324	Java Programming Laboratory	-	-	2	1	20	30	50
6	AEC	BTAEC325	Data Structures Laboratory	-	-	2	1	20	30	50
7	SEC	BTSEC326	WEB TECHNOLOGY LAB	1	-	2	2	20	30	50
8	RP	BTSEM327	PROJECT/ SEMINAR	-	-	2	1	20	30	50
9	GEC	GEA20	Multidisciplinary Elective Course - III (from Basket)	3	-	0	3	30	70	100
			Total	16	03	08	23	230	470	700

L – Lecture, T – Tutorial, ESE – End Semester Examination, P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessments)

Note : Theory Internal Marks (CIA) = 30 (CT-I = 05, CT-II=05, Assignment=05, Mid Term=15)

Practical Internal Marks (CIA) = 20 (Attendance = 05, Lab Viva-Voce = 05, Lab Record Work = 10)

Discipline Specific Core Courses (DSCC) Major		Generic Elective (C)	AEC (Ability Enhancement Course) (D)	SEC/Internship (Skill Enhancement Course) (E)	RP/SEMINAR	Value Added Course (VAC)/Indian Knowledge System (IKS)/IKS (Core) (F)
Basic Sciences (A)	Engineering Sciences (B)					
Numerical Methods and Statics	Data Structures	Multidisciplinary Elective Course - III	Data Structures Laboratory	WEB TECHNOLOGY LAB	Project / Seminar	-
	Java Programming					
	Computer Organization and Design					
	Java Programming Laboratory					

Credit Definition:

- 1-hour lecture (L) per week per semester = 1Credit
- 1-hour tutorial (T) per week per semester = 1Credit
- 2-hour Practical/Drawing(P) per week per semester = 1 Credit
- One credit courses are to be designed for 15 hours of Teaching Learning process.
- Four credit courses are to be designed for 60 hours of Teaching-Learning process.
- Three credit courses are to be designed for 48 hours of Teaching-Learning process.
- Two credit courses are to be designed for 28 hours of Teaching-Learning process.

Semester	:	III B.Tech
Branch	:	Civil/Mech./Aero./Min./CSE
Subject	:	Numerical Methods and Statistics
Total Theory Periods	:	48
Total Tutorial Periods	:	00
Total Credits	:	03
Code	:	BTDSCBSC300

COURSE OBJECTIVE:

- To provide required skills to apply different statistical tools to analyze Engineering problems
- To provide the necessary basic concepts of a few numerical methods
- To provide procedures for solving numerically different kinds of problems occurring in the field of Engineering and Technology.

UNIT-I Statistics

Random variables, Discrete and continuous probability distributions, Expectation, Mean and Standard Deviation, Moments and moment generating function, Distributions binomial, Poissoin and normal distributions.

UNIT-II Numerical Solution of Algebraic, Transcendental & Simultaneous Linear Equation

Bisection method, Regula–Falsi Method, Secant Method, Newton Raphson Method, Direct Methods: Gauss Elimination, Gauss-Jordan & Crout's Triangularisation method, Iterative methods: Jacobi, Gauss-Seidel & relaxation methods.

UNIT-III Interpolation

Interpolation with equal intervals, Finite differences, Forward, Backward & Central difference interpolation, Interpolation with unequal intervals, Lagrange's method and Newton's divided difference method.

UNIT-IV Numerical Differentiation & Integration

Derivatives using forward, Backward and central difference methods, Derivatives using unequally spaced values, Numerical integration using Newton-Cote's quadrature method, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Weddle's rule.

UNIT-V Numerical Solution of ODE

Numerical solution of ODE's by Taylor's series method, Picard's method, Euler's method, Euler's modified method, Runge–Kutta methods, Predictor corrector methods, Milne's method, Adams, Bash forth method.

COURSE OUTCOME:

On completion of course students will be able to:

- Solve statistics problems that arise during the study of Engineering
- Use various interpolation techniques for solving problems in Engineering.
- Use numerical methods to solve problems involving numerical differentiation and integration.
- Solve initial value problems numerically that arise in Science and Engineering.
- Solve boundary value problems that encounter in different fields of engineering study.

TEXT BOOK

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publications (2007)

REFERENCES

1. Glyn James, "Advanced Modern Engineering Mathematics, Pearson Education (2007)
2. B. V. Ramana, "Higher Engineering Mathematics" Tata McGraw Hill 2007.
3. N. P. Bali, and Manish Goyal, "A Text Book of Engineering 7th Edition (2007) Lakshmi Publications (P) Limited, New Delhi.

Semester	:	III B. Tech
Branch	:	Computer Science and Engineering
Subject	:	Data Structure
Total Theory Periods	:	48
Total Tutorial Periods	:	12
Total Credits	:	04
Code	:	BTDSCCSE321

Course Objective:

1. To understand the data organization and basic concepts of data structure.
2. To study the classifications of data structures.
3. To study the memory representation of all types of data structures.
4. To develop skills to apply appropriate data structures in problem solving.

UNIT – I INTRODUCTION and ARRAY

Introduction: Basic Terminology, Elementary Data Organization, Data Structure Operations, Algorithm, Algorithmic Notations, Time and Space Complexity, Mathematical Notations and Functions. Array: Linear Array (LA), Representation of LA in Memory, Address calculation, Traversing, Insertion and Deletion in Array, Bubble Sort, Linear (Sequential) Search, Binary Search, Insertion Sort, Selection Sort, Merge Sort, Multidimension Array. Application of Array: Pointers, Record Structure, Matrices in Data Structures, Algebra in Matrices, Sparse Matrices.

UNIT – II LINKED LIST

Linked List (LL): Introduction, Representation of LL in memory, Traversing, Searching, Memory Allocation and Garbage Collection, Overflow and Underflow, Insertion into LL, Deletion from LL. Header Linked List: Grounded Header List and Circular Header List, Traversing a Header List, Insertion and Deletion, Polynomials. Two-Way List: Traversing, Searching, Insertion and Deletion, Two-Way Header List.

UNIT – III STACK, RECURSION and QUEUE

Stack: Introduction, PUSH and POP operations on Stack, Array representation of Stack, Linked representation of Stack. Application of Stacks: POLISH Notation, Evaluation of Postfix Notation, Transforming Infix expression into Postfix expression, Quicksort. Recursion: Introduction, Factorial and Fibonacci Function, Divide and Conquer Algorithms: Tower of Hanoi, Tail recursion, Removal of recursion. Queue: Array representation of Queues, Linked representation of queue, DEQUE, Priority Queue, Array and One way list representation of Priority queue.

UNIT – IV TREE

Binary Tree: Complete Binary Tree, Extended Binary Tree, 2-Tree, Array and Linked representation of Binary Tree in memory, Traversing Binary Tree: Pre-order, In-order, Post-order traversal using Stacks, Header Nodes, Threads, Binary Search Tree (BST), Searching in BST, Insertion and Deletion in BST, AVL Tree. Heaps: Heapsort, Max and Min Heap, Insertion and deletion in Heap, Huffman Algorithm.

UNIT – V GRAPH and HASHING

Graphs: Terminology, Multigraphs, Directed Graphs, Sequential representation of Graphs, Adjacency Matrix, Path Matrix, Warshall Algorithm for finding shortest path, Linked representation of Graph, Searching a Graph, Traversing a Graph: Depth-first and Breadth-first search, Insertion and Deletion in a Graph, POSETS, Topological Sorting, Spanning Tree, Minimum Spanning Tree. Hashing: Hash Functions, Hash Table, Collision Resolution, Open Addressing, Hash Table Implementation.

Course Outcome:

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

1. Have a comprehensive knowledge of the data structures and algorithms.
2. Understand the importance of data and identify the data requirements for an application.
3. Have in depth understanding and practical experience of algorithmic design and implementation.
4. Understand the issues involved in algorithm complexity and performance.

TEXT BOOKS

1. Data Structures using C, A. M. Tenenbaum, Prentice Hall.
2. Data Structures, Seymour Lipschutz, Schaum's Outlines, McGraw – Hill Education India Pvt. Ltd.

REFERENCE

1. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson Freed, University Press.
2. Data Structures and Program Design in C, Robert Kruse, Cl Tondo, Pearson Education India.
3. Data Structures and Algorithm Analysis in C, Mak Allen Weiss, Pearson Education India.

Semester	:	III B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Java Programming
Total Theory Periods	:	48
Total Tutorial Periods	:	12
Total Credits	:	04
Code	:	BTDSCCSE322

COURSE OBJECTIVES:

1. To learn the fundamentals of JAVA programming.
2. To understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3. To learn the concepts of graphical user interfaces, basic data structures.

UNIT- I INTRODUCTION

Concept of OOPs, Introduction to Java: Data types, Variables, Literals, Expressions, Operators, Arrays and Programming Constructs, Garbage Collection, Comparison with C++, Java Virtual Machine, Java Class Libraries, JIT, Overview of Java Technology, Applets, Beans, RMI, Servlets, JSP, JSF, CORBA.

UNIT – II CLASSES AND OBJECTS

Classes and Objects, Objects and References, Method: Defining, Calling & Passing Arguments to Method, This keyword, Overloading Method, Static, Access Specifiers: Public, Default, Private & Protected, Command Line Arguments, Constructors and Finalizers, Overloading Constructors, Inner Classes. Introduction to Inheritance: Definition and Advantages, Overriding, Super, Final and Abstract Classes, Interface, Package.

UNIT- III EXCEPTIONS, STRING AND VECTOR

Exception Handling: Basics, Default Exception Handling, Try and Catch, Multiple Catch Statements, Try-Catch- Finally, Use of throw and throws.

Strings: String Constructor, String Arithmetic, String Methods, String Buffer and Methods, Introduction and Programming using Vector, Iterator and Enumeration.

UNIT -IV MULTITHREADING

Thread Concepts, Thread lifecycle, Runnable Vs Thread Class, Thread Priority, Thread Methods, Thread Synchronization, Concept of Monitor, Synchronized Methods & Synchronized Blocks. Internet Programming with Java: AWT, Applets and its Application, User Interfacing Components, Events and Event Handling, Overview of Swing Components, Java Database Connectivity: JDBC, ODBC, Executing DDL, DML Commands, Statement, Prepared Statement and Callable Statement, Java Stored Procedures.

UNIT- V INTRODUCTION TO SERVLETS

Lifecycle of a Servlet, JSDK, Servlet API, Java X Servlet Package, Reading Servlet Parameters, Reading Initialization Parameters, Java X Servlet HTTP package, Handling http Request & Response, Use of Cookies, Session Tracking, Security Issues, Java Servlet API, Some Important Servlet Method.

COURSE OUTCOMES:

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

1. Implement, compile, test and run Java programs with concept of Object-Oriented Programming.
2. Develop solutions for a range of problems using object-oriented programming.
3. Use simple data structures in a problem.
4. Develop graphical user interface using JAVA.

TEXT BOOK

1. Java Complete Reference, Herbert Schildt, Tata McGraw Hill.
2. Java: How to Program, Dietel H. M. and Dietel P. J., Pearson Prentice Hall.

REFERENCES:

1. Programming with Java, John Hubbard, Schaum's Out Line.
2. Java 2 Black Book, Steven Holzner.
3. Java Examples: In a Nutshell, David Flanagan, O'Reilly Media.
4. Core Java, Cay S. Horstmann.

Semester	:	III B. Tech.
Branch	:	Computer Science and Engineering
Subject	:	Computer Organization and Design
Total Theory Periods	:	48
Total Tutorial Periods	:	12
Total Credits	:	04
Code	:	BTDSCCSE323

COURSE OBJECTIVES:

1. The overall objective with the course is to know basic operating principles of computer hardware units and provides knowledge and insights into the design of recent computers, above all the processor design together with parallel computational pipelines and memory hierarchies.

UNIT I: CENTRAL PROCESSOR ORGANIZATIONS

Basic building blocks, Bus organized computer memory, Address structure, Memory data register, Program Counter, Accumulator, Instruction register, Instruction field, Address field, Micro-operations, Register Transfer Languages, Instruction fetch, Decoding and Execution, Instruction formats and Addressing modes.

UNIT II: CONTROL UNIT ORGANIZATION

Instruction Sequencing, Instruction interpretation, Hardwired control & micro-programmed control organization, Control memory, Address sequencing micro-instruction formats, Micro-program sequencer, Micro-programming, Bit slicing in AHPL, Emulation.

UNIT III: ARITHMETIC PROCESSOR:

Arithmetic Processor Design, Addition and Subtraction Algorithm, Multiplication algorithm, Division algorithm, Processor configuration, Design of control unit and floating-point arithmetic.

UNIT IV: INPUT-OUTPUT ORGANIZATION

Programmed I/O, I/O addressing, I/O instruction, Synchronization, I/O interfacing, Standard I/O interfaces interrupt mechanism, DMA, I/O processors and data communication.

UNIT V: MEMORY ORGANIZATION AND MULTIPROCESSING

Basic concepts and terminology, Memory hierarchy, Semiconductor memories (RAM, ROM), Virtual memory, Associative memory, Cache memory, Cache mapping techniques, Memory allocation and management policies, Structure of Multiprocessors, Parallel processing, Pipeline processing.

COURSE OUTCOMES:

1. To be all set to describe the essential hardware parts of a computing system.
2. To be acquainted with the binary and hex number systems together with computer arithmetic.
3. To be acquainted with the functional units of the processor like the register file and arithmetic-logical unit.
4. Students will be accustomed to the fundamentals of systems topics: parallel, pipelined, superscalar, and RISC/CISC architectures.

5. To be acquainted with the representation of data, addressing modes, an instruction sets.

TEXT BOOKS

1. Computer Organization and architecture- William Stallings, Macmillan Publishing Company, Fourth Edition.
2. Computer Architecture – Morris Mano, PHI Publication.

REFERENCE BOOKS

1. Computer Systems Organization & Architecture – John D Carpinelli, Addison-Wesley.
2. Computer Organization, John P. Hayes (McGraw Hill)

Semester	:	III B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Java Programming Laboratory
Total Practical Periods	:	28
Total Credits	:	01
Code	:	BTDSCCSE324

List of Practical*:*

1. Write a program to perform multiplication of two matrices.
2. Develop a program to illustrate a copy constructor so that a string may be duplicated into another variable either by assignment or copying.
3. Write a program to demonstrate concept of abstract class.
4. Write a program to implement concept of overloading.
5. Write a program to implement concept of overriding.
6. Write a program to implement concept of
   i. Packages
   ii. Inheritance
   iii. Interfaces
7. Write a program, which throws Arithmetic Exception. Write another class that handles the Exception.
8. Create an applet with a button and a text field. Write a Focus Event ( ) so that if the button has the focus, characters typed into it will appear in the text field.
9. Write a program to implement multithreading.
10. Write a program which illustrates the concept of Synchronization.
11. Create an applet with a text field and three buttons. When you press each button, make some different text appear in the text field. Add a check box to the applet created, capture the event and insert different text in the text field.
12. Write a program to implement JDBC/ODBC connectivity to data base using java program.
13. Write a program to connect MYSQL database to a java program.
14. Write a program to create a socket for client and server.
15. Write a program to set a connection between client and server using TCP/UDP.
16. Develop a servlet that gets invoked when a form on a web page in HTML is submitted. Create a cookie object and enter/display value for that cookie.
17. Write a Program to demonstrate various methods to input from keyboard.
18. Write a program, which illustrates capturing of Mouse Events. Use Applet class for this.
19. Design a text editor, which is having some of the features of notepad.
20. Develop a front end for a contact management program using a flat file database. DB needs to be distributed or centralized.

Semester	:	III B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Data Structures Laboratory
Total Practical Periods	:	28
Total Credits	:	01
Code	:	BTAEC325

List of Practical*:*

1 Write a program to perform following operations in one dimensional array:

a. Insertion b. Deletion c. Searching (Linear & Binary)

2 Write a program to implement push and pop operations in a stack.

3 Write a program to convert infix to postfix expression using stack.

4 Write a program to perform following operations in a linear queue:

a. Addition b. Deletion c. Traversing

5 Write a program to perform following operations on circular queue:

a. Addition b. Deletion c. Traversing

6 Write a program to perform following operations on double ended queue:

a. Addition b. Deletion c. Traversing

1. Write a program to perform following operation on single link list

a. Creation b. Inversion c. Deletion

7 Write a program to perform following operation on doubly linked list:

a. Creation b. Insertion c. Deletion

8 Write a program to implement polynomial in linked list and perform following:

a. Polynomial arithmetic b. Evaluation of polynomial

9 Write programs to implement linked stack and linked queue.

10 Write programs to perform Insertion, Selection, and Bubble Sort.

11 Write a program to perform quick sort.

12 Write a program to perform merge sort.

13 Write a program to perform heap sort.

14 Write a program to create a Binary search tree and perform following operations:

a. Insertion b. Deletion c. Traversal.

15 Write a program for traversal of graph (B.F.S, D.F.S)

List of Equipment/

Machine Required PCs,

Turbo C/C++ compiler

References:

1. Data Structures using C, A. M. Tenenbaum, Prentice Hall.
2. Data Structures, Seymour Lipschutz, Schaum's Outlines, McGraw – Hill Education India Pvt. Ltd.
3. Fundamentals of Data Structures in C, Horowitz, Sahni, Anderson Freed, University Press.
4. Data Structures and Program Design in C, Robert Kruse, Cl Tondo, Pearson Education India.
5. Data Structures and Algorithm Analysis in C, Mak Allen Weiss, Pearson Education India.

Semester	:	III B.Tech
Branch	:	Computer Science and Engineering
Subject	:	WEB TECHNOLOGY LAB
Total Practical Periods	:	28
Total Credits	:	02
Code	:	BTSEC326

List of Practical:

1. Design a HTML page describing your profile in one paragraph. Design in such a way that it has a heading, a horizontal rule, three links and your photo also write three HTML documents for the links.
2. Design HTML page describing your academic career. The page will tell about the degrees, Institutions and your hobbies. Add some lists too**.**
3. Design HTML page demonstrating Concept of Internal Hyper-link
4. Design HTML page which gives the list of grocery Items by using Ordered List, List consist of Roman no, A, B…. and so on.
5. Design HTML page which gives the list of grocery Items by using Unordered List bullets are of form disc, square and circle.
6. Design a HTML page for partitioning browser window in frames display the different pages in partitioned windows.
7. Design HTML page to partition window, Design in such a way that link clicked in on page can display the corresponding pages in other window.
8. Design a HTML page on your native place.
9. Design a HTML page on your friends. List your friends; each friend's name is a link. Prepare separate HTML document on each friend and call them in appropriate link.
10. Design HTML page listing popular car companies. For each company prepare a sub list showing various brands of cars it offers.
11. Design a HTML page for reserving a room in a hotel.
12. Design a HTML form to reserve a Railway ticket.
13. Design a HTML form to see the result for a candidate when the results are published on the web.
14. Design a HTML form to find the railway fare from one place to another.
15. Design a HTML form to find out the balance for a mobile phone customer as on today.

References:

1. HTML Complete Reference- Tata McGraw hil**l**
2. HTML and XML: An Introduction NIIT, Prentice-Hall of India
3. Building Enhanced HTML Help with DHTML and CSS by Jeannine M. E. Klien. Pearson Education
4. HTML for the World Wide Web, Fifth Edition, with XHTML and CSS
5. Visual QuickStart Guide 5th Edition Elizabeth Castro, Pearson Education, Sam's Teach Yourself HTML & XHTML in 24 Hours 6th Edition Dick Oliver, Michael Morrison, Pearson Education.

Semester	:	III B.Tech
Branch	:	Aeronautical Engineering
Subject	:	Project/Seminar
Total Practical Periods	:	28
Total Credits	:	01
Code	:	BTSEM357

COURSE OBJECTIVE:

- To introduce students to independent technical exploration through seminar or project work in emerging domains of Computer Science and Engineering.
- To develop competency in literature survey, problem identification, data acquisition, experimentation, and scientific interpretation of results.
- To enhance technical communication skills for preparing well-structured technical reports and delivering effective presentations.
- To cultivate professionalism, teamwork, time management, and ethical practices while conducting and presenting technical or research-oriented work.

DESCRIPTION

his course provides students with an opportunity to explore **emerging areas in Computer Science and Engineering** through guided project work or technical seminar presentations. Students identify a relevant topic, conduct a detailed literature review, evaluate current research and technologies, and present their findings through a structured technical report and seminar session.
The course strengthens **technical understanding, research aptitude, documentation skills, and communication abilities** essential for computer science professionals. Students work individually or in small groups under faculty supervision, demonstrating analytical thinking, clarity of concepts, and effective presentation capabilities.

COURSE OUTCOME:

- Identify, select, and justify a relevant Computer Science and Engineering topic for seminar or project work.
- Conduct a systematic literature review and critically analyze existing research, tools, or technologies related to the chosen topic.
- Apply engineering reasoning to interpret data, propose methodologies, or outline feasible technical solutions.
- Prepare a well-organized technical report adhering to professional documentation and formatting standards.
- Deliver an effective oral presentation demonstrating clarity, confidence, and in-depth understanding of the topic.

Scheme of Teaching and Evaluation (As per NEP -2020)

Choice Based Credit System (CBCS) and Outcome Based Education (OBE)

B. TECH. IV Semester

S. No.	Course Sub Category	Course Name	Code	Teaching Scheme				Evaluation Scheme		Total Marks
				Hours			Credits			
				Theory	Tutorial	Practical		CIA	ESE	
1	DSCC - PCC	Discrete Structures	BTDSCCSE420	3	1	-	4	30	70	100
2	DSCC - PCC	Operating System	BTDSCCSE421	3	0	-	3	30	70	100
3	DSCC - PCC	Database Management System	BTDSCCSE422	3	0	-	3	30	70	100
4	DSCC - PCC	Database Management System Laboratory	BTDSCCSE423	-	-	2	1	20	30	50
5	AEC	Analysis and Design of Algorithms Laboratory	BTAEC424	-	-	2	1	20	30	50
6	SEC	Unix & Shell Programming Laboratory	BTSEC425	-	-	2	1	20	30	50
7	RP	Project / Seminar	BTSEM426	-	-	1	1	20	30	50
8	INT	Internship - I	BTINT427	-	-	1	3	50	00	50
9	DSEC-PCC	Professional Elective Course - I (from Basket)	BTPDSE2XX	3	0	-	3	30	70	100
10	GEC	Multidisciplinary Elective Course - IV (from Basket)	GEAXX	3	0	-	3	30	70	100
			Total	15	01	08	23	280	470	750

L – Lecture, T – Tutorial, ESE – End Semester Examination, P – Practical, IM – Internal Marks (Include Class Test & Teacher's Assessments)

Note : Theory Internal Marks (CIA) = 30 (CT-I = 05, CT-II=05, Assignment=05, Mid Term=15)

Practical Internal Marks (CIA) = 20 (Attendance = 05, Lab Viva-Voce = 05, Lab Record Work = 10)

Discipline Specific Core Courses (DSCC) Major		Discipline Specific Core Courses (DSEC)	Generic Elective (C)	AEC (Ability Enhancement Course) (D)	SEC/Internship (Skill Enhancement Course) (E)	RP/SEMINAR	Internship/Vocational Training
Basic Sciences (A)	Engineering Sciences (B)						
	Discrete Structures	Professional Elective Course - I (from Basket)	Multidisciplinary Elective Course - IV	Analysis and Design of Algorithms Laboratory	Unix & Shell Programming Laboratory	Project / Seminar	Internship-I
	Operating System						
	Database Management System						
	Database Management System Laboratory						

Credit Definition:

- 1-hour lecture (L) per week per semester = 1Credit
- 1-hour tutorial (T) per week per semester = 1Credit
- 2-hour Practical/Drawing(P) per week per semester = 1 Credit
- One credit courses are to be designed for 15 hours of Teaching Learning process.
- Four credit courses are to be designed for 60 hours of Teaching-Learning process.
- Three credit courses are to be designed for 48 hours of Teaching-Learning process.
- Two credit courses are to be designed for 28 hours of Teaching-Learning process.

Semester	:	IV B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Discrete Structures
Total Theory Periods	:	48
Total Tutorial Periods	:	01
Total Credits	:	04
Code	:	BTDSCCSE420

COURSE OBJECTIVE:

- To study discrete mathematical structures as tools in the development of theoretical computer science.
- To study how discrete structures actually helped computer engineers to solve problems occurred in the development of programming languages.

UNIT I SET THEORY, RELATIONS & FUNCTIONS

Basic concept of set theory, Combination of sets, Finite and Infinite sets, Uncountable infinite sets, Principles of inclusion and exclusion, multi-sets. Introduction to Relations and Functions, Properties of Binary Relation, Equivalence relation and partitions, Partial ordering and total ordering, lattices, Chains and anti-chains, Functions & composition of function, pigeonhole Principle, Mathematical induction.

UNIT II COMBINATORICS

Introduction to discrete numeric functions and generating functions, Manipulation of Numeric functions, asymptotic behavior of numeric function, combinatorial problems, Introduction to recurrence relation and recursive algorithm, Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solution, Solution by method of generating functions.

UNIT III MATHEMATICAL LOGIC & BOOLEAN ALGEBRA

Basic concept of mathematical logic, statements, connectives, conditional & biconditional statements, logical equivalence logical implication & quantifiers. Introduction to Boolean algebra, Lattices and Algebraic systems, Principles of Duality, Relation between Algebraic system and Lattices, Distributive and Complemented lattices, Boolean lattices and Boolean algebra, Uniqueness of finite Boolean algebra's, application of Boolean algebra in switching circuits and logic circuits.

UNIT IV ALGEBRAIC STRUCTURES

Introduction to groups and rings, Subgroups, Generators and Evaluation of powers, Cosets and Lagrange's theorem, Permutation Groups and Burnicide's theorem, Codes and Group codes, Isomorphism and Automorphism, Homomorphism and Normal subgroups, Rings, Internal Domains and fields, Ring homomorphism, Polynomial Rings and Cyclic codes.

UNIT V GRAPH THEORY

Introduction to graph theory, Walks, Paths & Circuits, Types of graphs, Eulerian and Hamiltonian graphs, Basic concept of tree, spanning tree, search tree, rooted tree, binary tree, Cut sets, Network flow, Matrix representation of graphs.

COURSE OUTCOMES:

After completion of the course study, students will be

1. Able to apply mathematical logic and Boolean algebra in switching circuits & logic circuits.
2. Familiar with set theory, relation and functions related to theoretical computer science.
3. Familiar with algebraic structures, graph theory and combinatorics.

Able to solve problems in various fields in computer science

TEXT BOOKS

1. Discrete Mathematical Structure, Dr. H. K. Pathak
2. Discrete Mathematical Structure, Swapan Kumar Sarkar
3. Discrete Mathematical Structure, Tremblay & Manohar

REFERENCES

1. Element of Discrete Mathematics, C. L. Liu
2. Discrete Mathematics and its Application, Rosen, TMH
3. Graph Theory, N. Deo

Semester	:	IV B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Operating System
Total Theory Periods	:	48
Total Tutorial Periods	:	00
Total Credits	:	03
Code	:	BTDSCCSE421

COURSE OBJECTIVES:

1. To study the fundamental concepts related to operating systems.
2. To study and apply concepts related concurrency control of asynchronous processes, deadlocks, memory management, processor and disk scheduling, parallel processing, and file system organization.

UNIT I INTRODUCTION

Operation System Overview: Objectives, Services and Functions, System Components, Operating System Structure, Evolution of Operating Systems: Batch, Interactive, Multi-Programming, Time Sharing and Real Time Systems, Distributed Computing, Key Architecture Trends, Parallel Computation, Input-Output Trends, Operating system Design issues.

UNIT II PROCESS MANAGEMENT

Process concept: Introduction, Process States, Process State Transitions, Process Control Block, Process Scheduling, Operations on Processes, Interrupt Handling, Inter Process Communication, Process Synchronization: Introduction, Mutual Exclusion, Producer/Consumer Problem, Critical section problem, Semaphores, Classical problems in concurrency, Asynchronous Concurrent Process: Introduction, Parallel Processing, Control Structure for indicating Parallelism, CPU scheduling: Concepts, Performance Criteria, Scheduling Algorithms: FCFS, SJF, Priority, RR, Algorithm evaluation, Multiprocessor Scheduling.

UNIT III DEADLOCKS

System Model, Deadlock Characterization, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlocks, Combined Approach.

UNIT IV MEMORY MANAGEMENT

Base Machine, Resident Monitor, Multiprogramming with Fixed Partition, Multiprogramming with Variable Partitions, Paging, Thrashing, Segmentation, Paged - Segmentation, Segmented Paging, Virtual Memory Concepts: Demand Paging, Performance, Page Replacement Algorithms, Allocation of frames, Cache memory organization impact on performance.

UNIT V I/O MANAGEMENT & DISK SCHEDULING

I/O Device and the organization of the I/O function, I/O Buffering, Disk I/O, File system: Concepts of File, File organization and Access mechanism, File Directories, File sharing, Implementation issues. Case Studies: UNIX system, A Virtual Machine Operating Systems.

COURSE OUTCOMES:

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

- Analyze the structure of Operating System and basic architectural components involved in Operating System design.
- Analyze and design the applications to run in an Operating System.
- Analyze the various device and resource management techniques.
- Understand the Mutual exclusion, Deadlock detection and agreement protocols.
- Interpret the mechanisms adopted for file sharing in distributed applications.

TEXT BOOKS

1. Operating System concepts, Silberschatz, Galvin, Gagne, Wiley Publication.
2. Operating System Concepts, James L. Peterson, Abraham Silberschatz, Addison Wesley Publication.

REFERENCES

1. Operating System Design and Implementation, Andrew S. Tanenbaum, PHI.
2. Operating Systems, H. M. Deitel, Paul J. Deitel, David R. Choffnes.
3. Operating Systems, J. Archer Harris, John Cordani, Schaum's Outline, McGraw Hill Education.
4. Operating Systems: Internals 7 Design Principles, William Stallings, Pearson Education.

Semester	:	IV B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Database Management System
Total Theory Periods	:	48
Total Tutorial Periods	:	00
Total Credits	:	03
Code	:	BTDSCCSE422

COURSE OBJECTIVES:

1. To study the basic concept of Database Management System.
2. To construct simple and moderately advanced database queries using Structured Query Language (SQL).
3. To study data representation technique and database normalization.
4. To understand database concepts, including the structure and operation of the relational data model.
5. To understand the role of a database management system and its users in an organization.

UNIT I INTRODUCTION TO DATA BASE

File System Vs. Database System, Advantages of DBMS, DBMS Applications, View of Data, Data Abstraction, Schema and Instances, DBMS Architecture and Data Independence, Data Models: Entity- Relationship Model, Relational Data Model, Other Models, Enhanced E–R Modeling, Specialization and Generalization, Database Users and Administrator. Record Storage and Primary File Organizations: Introduction, Secondary Storage Devices, Buffering of Blocks, Structure of Files: Types of Single Level ordered indexes, Multilevel indexes, Dynamics Multilevel indexes using B-trees and B+- Trees.

UNIT II RELATIONAL DATA MODEL

Relational data model: Concept, Constraints and its types, Relational Algebra: Unary and Binary Operations (select, project, rename, union, intersection, minus, join & division etc.), Relational Calculus: Tuple Relational Calculus, Domain Relational Calculus, SQL: DDL, DML, DCL, DQL etc., Defining different constraints on a table, Defining & Dropping integrity constraints in the alter table command, View, Index.

UNIT III DATABASE DESIGN

Functional Dependencies: Informal design guidelines for relation schemes, Functional Dependencies, Inference Rule, Equivalence Set, Minimal Set, Normalization: 1NF, 2NF, 3NF, BCNF, Problem related with normal forms & solutions, Multivalued & Join Dependencies, 4NF & 5NF.

UNIT IV QUERY & TRANSACTION PROCESSING

Query Processing: Query processing stages, Query interpretation, Query execution plan, Table scans, Fill factor, Multiple index access, Methods for join tables scans, Structure of a query optimizer. Transaction Processing**:** Types of failures, ACID Property, Schedules and Recoverability, Serializability & its Types, Levels of Transaction Consistency, Deadlocks, Nested transaction, Transaction benchmarking.

UNIT V CRASH RECOVERY

Failure classification, Different type of Recovery techniques & their comparative analysis, Deferred update, Immediate update, Shadow paging, Check points, On-line backup during Database updates, Concurrency Control: Different type of concurrency control techniques & their comparative analysis, Locking techniques, Time- stamp ordering, Multi-version techniques, Optimistic techniques, Multiple granularities.

COURSE OUTCOMES:

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

2. Explain relational database theory, RDMBS and relational data model.
3. Implement queries by using SQL.
4. Write relational algebra expressions for queries.
5. Familiar with the basic issues of transaction, its processing and concurrency control.

TEXT BOOKS

1. Database System Concepts, A. Silberschatz, Henry F. Korth & S. Sudarshan, McGraw Hill Education.
2. Fundamentals of Database Systems, Ramez Elmasri, Shamkant B. Navathe, Pearson Education.

REFERENCES

1. Introduction to Database Systems, C. J. Date, Addison Wesley Publication Company.
2. Fundamentals of Relational Databases, Ramon A., Pauline K. Cushman, Schaum's Outlines, Mcgraw Hill.
3. Principles of Database Systems, Jeffrey D. Ullman, Galgotia Publications

Semester	:	IV B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Database Management System Laboratory
Total Practical Periods	:	28
Total Credits	:	01
Code	:	BTDSCCSE423

List of Practical:

1. Creating and renaming tables.
2. Data constraints (Primary key, Foreign key, Not Null), Data insertion into a table.
3. Viewing data from tables.
4. Filtering table data.
5. Creating table from another table.
6. Inserting data into a table from another table.
7. Delete, alter, and update operations.
8. Grouping data, aggregate functions
9. Oracle functions (mathematical, character functions)
10. Sub-queries.
11. Set operations.
12. Joins.
13. PL/SQL (Anonymous block, control structure)
14. PL/SQL (Procedures)
15. Triggers
16. Cursors

Note: Student can consider the schema of student relation or employee relation for implementing above commands.

References:

1. SQL & PL/SQL, Ivan Bayross, SPD.
2. Database Design Fundamentals, Rishe, PHI.
3. Principles of Database Systems", 2nd Edn., Ullman, J.O, Galgotia Publications.
4. Introduction to Database Systems, C.J.Date, Pearson Education.
5. Fundamentals of Database Systems, Elmasri & Navathe, Pearson Education.

Semester	:	IV B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Analysis and Design of Algorithms Laboratory
Total Practical Periods	:	28
Total Credits	:	01
Code	:	BTAEC424

List of Practical:

1. Write a program to perform Bubble sort for any given list of numbers.
2. Write a program to perform Insertion sort for any given list of numbers.
3. Write a program to perform Selection sort for any given list of numbers.
4. Sort a given set of elements using the Quicksort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
5. Implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.
6. Write a program to find Maximum and Minimum Heap Sort of the given set of integer values.
7. Write a program to perform Sequential or linear Search technique for any given list of numbers.
8. Write a program to perform Binary Search technique for any given list of numbers.
9. Obtain the Topological ordering of vertices in a given digraph.
10. Print all the nodes reachable from a given starting node in a digraph using BFS method.
11. Check whether a given graph is connected or not using DFS method.
12. Find Minimum Cost Spanning Tree of a given undirected graph using Prim’s algorithm.
13. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
14. Write a program to find solution for knapsack problem using greedy method.
15. Implement N Queen's problem using Back Tracking.

References:

1. Data Structures and Algorithms by G.A.V. Pai, 2017, TMH.
2. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, 2nd edition, University Press

Semester	:	IV B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Unix & Shell Programming Laboratory Total
Practical Periods	:	28
Total Credits	:	01
Code	:	BTSEC425

List of Practical:

1. a) Write a shell script to list all of the directory files in a directory.
   b) Write a shell script to find the number of files in a directory.

2. a) Write a shell script to check whether a file exists or not.
   b) Write a shell script to find the mode of a file in a directory.
   c) Write a shell script to copy the source file to the target file.
3. a) Write a shell script to accept three numbers and display the largest.
   b) Write a shell script to display first ten positive numbers using until loop.
   c) Write a shell script to print the first 10 odd numbers using the while loop.
   d) Write a shell script which will accept different numbers and find their sum.
4. a) Write a shell script to find factorial of a given integer.
   b) Write a shell script to generate Fibonacci series.
5. a) Write a shell script to reverse the digits of a given number.
   b) A five digit number is input through the keyboard. Write a shell script to calculate the sum of its digits.
6. a) Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
   b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
7. a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
   b) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
8. a) Write an awk script to count the number of lines in a file that do not contain vowels.
   b) Write an awk script to find the number of characters, words, and lines in a file.
9. Write a shell script to check if a particular user has logged in or not. If not, continue the loop till he/she logins. Once the required user logins display a message.
10. Write a program that takes one or more file/directory names as command line input and reports the following information on the file:
    a) File type
    b) Number of links
    c) Time of last access

d) Read, write, and execute permissions.

11. a) Write a shell script to accept the name, grade, and basic salary from the user. Write the details into a file called employee, separating the fields with a colon (,) continue the process till the user wants.
    b) Write a menu driven program to display a menu of options and depending upon the user's choice executes the associated command.
    c) Write a shell script to calculate the total salary payable to all the employees from the employee file. The salary should be taken from the 8^{th} field of the employee file.
12. a) Write a C program that makes a copy of a file using standard I/O and system calls.
    b) Write a C program to emulate the UNIX ls –l command.
13. a) Write a C program to list for every file in a directory, its inode number and file name.
    a) Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
14. a) Write a C program that demonstrates redirection of standard output to a file. E.g. ls –l > out.
    b) Write a C program that illustrates how to execute two commands concurrently with a command pipe. E.g.: ls –l | sort.
15. a) Write a C program to create a Zombie process.
    b) Write a C program that illustrates how an orphan is created.
16. a) Write a C program that illustrate communication between two unrelated processes using named pipe.
    b) Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
    c) Write a C program (receiver.c) that receives the messages (from the above message queue) and displays them.

References:

1. Unix Shell programming, Yashwanth Kanitkar, 1st Edition, BPB Publisher
2. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson education.
3. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
4. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.
5. Unix Concepts and Applications, Sumitabha Das.

Semester	:	IV B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Project/Seminar
Total Practical Periods	:	28
Total Credits	:	01
Code	:	BTSEM426

COURSE OBJECTIVES

- To introduce students to independent technical exploration through seminar or project work in emerging computer science and engineering domains.
- To develop skills in literature survey, problem identification, data collection, critical analysis, and scientific interpretation of findings.
- To enhance technical communication abilities, enabling students to prepare well-structured reports and deliver effective presentations.
- To cultivate professionalism, teamwork, time management, and ethical practices in conducting and presenting technical work.

COURSE DESCRIPTION

This course provides students with an opportunity to explore emerging areas in Computer Science & Engineering through guided project work or technical seminar presentations. Students will identify a relevant topic, conduct a comprehensive literature survey, analyze existing research or technologies, and present their findings through a structured written report and seminar. The course strengthens technical understanding, research aptitude, documentation skills, and communication abilities essential for professional engineering practice. Students work individually or in small groups under faculty supervision to demonstrate clarity of thought, analytical skills, and effective presentation capabilities. Topics may include—but are not limited to—artificial intelligence, machine learning, cybersecurity, cloud computing, data science, IoT, blockchain, and software engineering innovations.

COURSE OUTCOMES

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

- Identify, select, and justify a relevant computer science and engineering topic for seminar or project work.
- Conduct a systematic literature review and analyze existing research, methodologies, or technologies in the chosen area.
- Apply engineering reasoning to interpret data, propose methods, or outline feasible technical solutions related to the selected topic.
- Prepare a well-organized technical report following professional documentation standards with appropriate technical depth and clarity.
- Deliver an effective oral presentation demonstrating confidence, clarity, and deep understanding of the subject matter, including responding to questions from the audience.

Semester	:	IV B.Tech
Branch	:	Computer Science and Engineering
Subject	:	Internship - I
Total Practical Periods	:	28
Total Credits	:	01
Code	:	BTINT427

COURSE DESCRIPTION

The internship/vocational training course in Computer Science & Engineering is designed to provide students with *real-world exposure to professional computing environments, industrial practices, and hands-on experience in software and IT-related domains*. Through supervised industrial training or internships, students gain practical understanding of software development processes, system design methodologies, testing and quality assurance practices, networking and security fundamentals, and emerging technologies used in the computing industry.

During the internship, students observe and engage in *organizational workflows, team-based software engineering practices, version control systems, agile methodologies, and professional communication workflows*. This experience helps bridge the gap between classroom-based theoretical learning and real-world engineering application, enabling students to apply computing concepts to solve practical problems. Students also develop essential professional competencies such as teamwork, discipline, workplace communication, documentation practices, and ethical behavior in a professional setting.

The course culminates in the submission of a well-structured internship report and a presentation summarizing tasks performed, skills acquired, tools and technologies used, and knowledge gained during the training. Evaluation is based on industrial feedback, report quality, and the effectiveness of the presentation. Educational internship programs like this are widely recognized for enhancing students' readiness for industry roles and helping them meet employer expectations.

COURSE OUTCOMES (CSE Internship)

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

• Demonstrate an understanding of industrial practices, workplace processes, and professional workflows in software development, IT operations, or related engineering sectors.

• Apply classroom concepts to real-world engineering problems, including software design, coding, debugging, testing, maintenance, and deployment.

• Analyze practical challenges encountered during the internship and propose realistic, industry-oriented solutions or improvements grounded in engineering reasoning.

• Prepare a professionally structured internship report documenting tasks performed, observations made, tools and technologies used, insights gained, and learning outcomes, following academic and industry documentation standards.

• Deliver an effective oral presentation summarizing the internship experience with clarity, confidence, and technical understanding.