CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

(An Autonomous College under JNTUA, Anantapuramu, Approved by AICTE, Accredited by NBA, Accredited by NAAC with 'A' Grade)

Vidya Nagar, Pallavolu (V), Proddatur – 516362 (A.P) India

Department of CSE
(Data Science)

First Year B.Tech
Course Structures and Syllabi under
R22 Regulations

Semester-0

Induction Program: 3 weeks
(Common for All Branches of Engineering)

Mandatory Induction Program	03 weeks duration
Induction program offered before commencement of the I-Semester course work	Physical activity
	Creative Arts
	Universal Human Values
	Literary
	Proficiency Modules
	Lectures by Eminent People
	Visits to local Areas
	Familiarization to Department/Branch and Innovations

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

(An Autonomous College under JNTUA, Ananthapuramu)

PRODDATUR – 516 362 (A.P) INDIA

CSE (DATA SCIENCE)

COURSE STRUCTURE (R22)

I B. Tech – I Semester

Sl. No.	Course Code	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1.	22E00101T	Linear Algebra & Multivariable Calculus	3	-	-	3	3	30	70	100
2.	22E00102T	Engineering Chemistry	3	-	-	3	3	30	70	100
3.	22E00103T	Communicative English	3	-	-	3	3	30	70	100
4.	22E03101T	Engineering Mechanics	3	-	-	3	3	30	70	100
5.	22E05101T	C Programming and Data Structures	3	-	-	3	3	30	70	100
6.	22E00102L	Engineering Chemistry Lab	-	-	3	3	1.5	30	70	100
7.	22E00103L	Communicative English Lab	-	-	3	3	1.5	30	70	100
8.	22E05101L	C Programming and Data Structures Lab	-	-	3	3	1.5	30	70	100
		Total:	**15**	**-**	**09**	**24**	**19.5**	**240**	**560**	**800**

I B. Tech – II Semester

Sl. No.	Course Code	Course Title	Contact Periods per week				Credits	Scheme of Examination Max. Marks		
			L	T	P	Total		Int. Marks	Ext. Marks	Total Marks
1.	22E00201T	Differential Equations & Vector Calculus	3	-	-	3	3	30	70	100
2.	22E00104T	Engineering Physics	3	-	-	3	3	30	70	100
3.	22E03102T	Engineering Drawing	2	-	2	4	3	30	70	100
4.	22E05202T	Advanced Data Structures	3	-	-	3	3	30	70	100
5.	22E02102T	Basic Electrical and Electronics Engineering	3	-	-	3	3	30	70	100
6.	22E00104L	Engineering Physics Lab	-	-	3	3	1.5	30	70	100
7.	22E03201L	Engineering & IT Workshop Lab	-	-	3	3	1.5	30	70	100
8.	22E05202L	Advanced Data Structures Lab	-	-	3	3	1.5	30	70	100
9	22E00101MC	Environmental Science	2	-	-	2	0	30	--	30
		Total:	**14**	**-**	**11**	**25**	**19.5**	**240**	**560**	**800**

I B. Tech. – I Semester

(22E00101T) LINEAR ALGEBRA & MULTIVARIABLE CALCULUS

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: - Differentiation, Integration.

COURSE OBJECTIVES:

1. This course will illuminate the students in the concepts of differential equations and linear algebra.
2. To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Analyze the solution for the system of equations.
CO2: Compute the Eigen values and Eigen Vectors which come across under linear transformations.
CO3: Analyze the behavior of functions by using mean value theorems.
CO4: Familiarize with functions of several variables and analyze, interpret the way a function varies.
CO5: Evaluate the double and triple integrals for functions of several variables.

DETAILED SYLLABUS:

UNIT-I: **(09 Periods)**

Matrices: Elementary transformations-Rank of a matrix, echelon form, normal form. The system of linear non-homogeneous equations and system of linear homogeneous equations, solution of linear system AX=B by LU decomposition method. Linear dependence and independence.

UNIT-II: **(10 Periods)**

Eigen values and Eigen vectors: Eigenvalues and Eigenvectors and their properties (Real matrices). Cayley- Hamilton theorem (without proof), inverse and powers of a matrix by Cayley-Hamilton theorem, diagonalisation of a matrix.

UNIT-III: **(10 Periods)**

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin's theorem with remainders (without proof) and the related problems. Expansions of functions: Maclaurin's series and Taylor's series.

UNIT-IV: **(09 Periods)**

Multivariable Calculus: Partial derivative, total derivative, chain rule, change of variables, Jacobian and their properties, maxima and minima of functions of two variables, Lagranges method of undetermined multipliers.

UNIT-V: **(10 Periods)**

Multiple Integrals: Double integrals, change of order of integration, double integrals in polar Coordinates, Area enclosed by plane curves using double integrals, triple integrals, and change of variables in double and triple integrals, volume of solid by triple integral.

Total Periods: 48

TEXT BOOKS:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education
3. R.K.Jain & S.R.K.Iyengar, Advanced Engineering mathematics by Narosa Publications.

REFERENCE BOOKS:

1. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
2. N.Bali, M. Goyal, C.Watkins, Advanced Engineering Mathematics, Infinity Science press.
3. Erwin kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th edition, 2006.

WEB RESOURSES:

1. http://www.digimat.in/nptel/courses/video/111108098/L42.html
2. https://www.digimat.in/nptel/courses/video/109104124/L14.html
3. https://archive.nptel.ac.in/courses/111/107/111107108/
4. https://www.digimat.in/nptel/courses/video/111105121/L33.html

I B. Tech. – I Semester

(22E00102T) ENGINEERING CHEMISTRY

(Common to CE, ME, EEE, ECE, CSE, CSE(AI), CSE(DS), CSE(AI&ML))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: - Students should know about fundamentals and basic principles in chemistry.

COURSE OBJECTIVES: *This course will enable students:*

1. To familiarize engineering chemistry and its applications.
2. To train the students on the principles and applications of electrochemistry and polymers.
3. To introduce instrumental methods.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Apply the knowledge of light waves to interpret the concepts of Interference, Diffraction and Polarization.
CO2: Demonstrate the concepts of electromagnetic wave propagation in Optical fibers.
CO3: Apply the basic knowledge of semiconductors to understand the functioning of various optoelectronic devices.
CO4: Demonstrate the basic knowledge of dielectric and magnetic properties to understand the various dielectric polarizations and magnetic materials.
CO5: Understand the concepts of superconductors and nanomaterial's to familiarize their applications in relevant fields.

DETAILED SYLLABUS:

UNIT-I: INORGANIC MATERIALS (10 Periods)

Coordination compounds: Crystal field theory–salient features, splitting in octahedral and tetrahedral geometry d-d transitions, Magnetic properties. Basic concept, band diagrams for conductors, semiconductors and insulators, effect of doping on band structures.

UNIT-II: ENGINEERING MATERIALS (10 Periods)

a. Introduction - hardness of water - causes of hardness - types of hardness: temporary and permanent -expression and units of hardness-Estimation of hardness of water by EDTA method.

b. Cement - Composition, classification, preparation (Dry and Wet processes), setting and hardening of Portland cement.

c. Nano chemistry - Introduction, classification, properties, preparation of nanomaterials and applications of nano chemistry.

UNIT- III: ELECTRO CHEMISTRY **(10 Periods)**

Electrodes – concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode) electrochemical cell, Nernst equation, cell (Daniel cell), conductometric titrations (acid-base titrations). Primary cells - Zinc-air battery, Secondary cells –Lithium – ion cells, Nickel-cadmium cells, Fuel cells - hydrogen-oxygen.

UNIT-IV: POLYMER CHEMISRY **(10 Periods)**

Introduction to polymers, functionality of monomers, tacticity, types of polymerization (chain growth (addition), step growth (condensation), copolymerization with specific examples and mechanisms of polymerization.

Plastics-Thermoplastics and thermosetting plastics, Preparation, properties and applications of–PTFE, Bakelite, Nylon 6, 6. Elastomers– preparation, properties and applications Buna-S, Buna-N.

UNIT-V: INSTRUMENTAL METHODS OF ANALYSIS **(08 Periods)**

Electromagnetic radiation, Beer-Lambert's law, principle, introduction to spectroscopy, principle, instrumentation and applications of UV-visible spectroscopy- Principle, instrumentation and applications of IR spectroscopy. Chromatography (Thin layer chromatography) – principle and applications.

Total Periods: 48

TEXT BOOKS:

1. P.C. Jain & Monika Jain, Engineering Chemistry, DhanpatRai Publishing Company(P)Ltd, NewDelhi,17th edition, 2022.
2. K.N. Jayaveera , G.V. Subba Reddy and C.Ramachandriah, Engineering Chemistry, Mc.Graw Hill Publishers, New Delhi.
3. Energy scenario beyond 2100, by S.Muthu Krishna Iyer.

REFERENCE BOOKS:

1. J.D.Lee, Concise Inorganic Chemistry, Oxford University Press, 5th edition 2010.
2. Skoog and West, Principles of Instrumental Analysis, Thomson,6th edition, 2007,
3. Julio de Paula and James Keelar, Atkins' Physical Chemistry, Oxford University Press, 10th edition, 2010.

WEB RESOURSES:

1. https://nptel.ac.in/courses/118102003
2. https://onlinecourses.nptel.ac.in/noc19_cy19/preview
3. https://archive.nptel.ac.in/courses/104/106/104106129/
4. https://nptel.ac.in/courses/113105028
5. https://onlinecourses.nptel.ac.in/noc20_cy08/preview

I B. Tech. – I Semester

(22E00103T) COMMUNICATIVE ENGLISH

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: - Good understanding of English Language

COURSE OBJECTIVES:

1. Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers.
2. Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials.
3. Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations.
4. Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, drafting formal letters and designing well structured reports.
5. Broaden the knowledge base of grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Retrieve the knowledge of basic grammatical concepts.
CO2: Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
CO3: Apply grammatical structures to formulate sentences and correct word forms.
CO4: Analyze discourse markers to speak clearly on a specific topic in informal Discussions.
CO5: Exhibit the skill to write in English without grammatical errors.

DETAILED SYLLABUS:

UNIT-I: Lesson: On the Conduct of Life: William Hazlitt **(09 Periods)**

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Vocabulary and Grammar: Affixes-prefix and suffix; Parts of Speech, Content words and function words; Basic sentence structures; Word order in sentences. Simple question form - wh- questions.

UNIT-II: Lesson: The Brook: Alfred Tennyson **(09 Periods)**

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structured talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters.
Vocabulary and Grammar: Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

UNIT-III: Lesson: The Death Trap: Saki **(10 Periods)**

Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed.
Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Paragraph Writing
Vocabulary and Grammar: Verbs - tenses; subject-verb agreement; direct and indirect speech.

UNIT-IV: Lesson: Innovation: Muhammad Yunus **(10 Periods)**

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Writing structured essays on specific topics using suitable claims and evidences.
Vocabulary and Grammar: Quantifying expressions - adjectives and adverbs; comparing and contrasting; Voice - Active & Passive Voice.

UNIT-V: Lesson: An Astrologer's Day: R.K.Narayan **(10 Periods)**

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides. Reading: Reading for comprehension.
Writing: Letter Writing.
Vocabulary and Grammar: Idioms and Phrases; Identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement).

Total Periods: 48

TEXT BOOKS:

1. Language and Life: A Skills Approach- I Edition 2019, Orient Black Swan.
2. Using English: A Course book for Undergraduate Learners- Orient Black Swan.

REFERENCE BOOKS:

1. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
2. Raymond Murphy's English Grammar in Use Fourth Edition (2012) E-book.
3. Hewings, Martin. Cambridge Academic English(B2). CUP, 2012.
4. Oxford Learners Dictionary, 12th Edition, 2011.
5. Norman Lewis Word Power Made Easy- The Complete Hand book for Building a Superior Vocabulary (2014).

WEB RESOURSES:

1. www.englishclub.com
2. www.easyworldofenglish.com
3. www.languageguide.org/english/
4. www.bbc.co.uk/learningenglish
5. www.eslpod.com/index.html
6. www.myenglishpages.com

I B. Tech. – I Semester

(22E03101T) ENGINEERING MECHANICS

(Common to ME, CSE, CSE (AI&ML), CSE(AI), CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: -

COURSE OBJECTIVES:

- This course will serve as a basic course by introducing the concepts of basic mechanics which will help as a foundation to various courses.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Understand the concepts of the system of forces.
CO2: Determine the centroid and centre of gravity of different sections
CO3: Calculate the moment of inertia of various sections
CO4: Identify the basic relations between distance, time, velocity, and acceleration.
CO5: Apply D'Alembert's principle in rectilinear translation.

DETAILED SYLLABUS:

UNIT-I: **(10 Periods)**

Introduction: Physical quantities, System of units, system of forces, parallelogram law of forces, Lami's theorem, polygon law of forces, Resultant of forces- analytical and graphical methods, Moment of force, principle of equilibrium.

UNIT-II: **(10 Periods)**

Centroid and Center of Gravity: Definitions- centroid, center of gravity, position of centroid of figures, Centroids of Composite figures – Centre of Gravity of bodies.

UNIT-III: **(10 Periods)**

Moment of Inertia: Area moment of Inertia – Parallel axis and perpendicular axis theorems – Moments of Inertia of Composite Figures Moment of Inertia of Simple solids – Moment of Inertia of composite masses.(Simple problems only)

UNIT-IV: **(09 Periods)**

Kinematics: Rectilinear and Curvilinear motion – Velocity and Acceleration – Motion of a Rigid Body – Types and their Analysis in Planar Motion.

UNIT-V: **(09 Periods)**

Kinetics: Principles of dynamics - Newton's Laws of motion, D'Alembert's principle in Rectilinear translation, principle of work and energy.

Total Periods: 48

TEXT BOOKS:

(1) Engineering Mechanics by Jayakumar, Kumar, PHI, 2014

(2) Singer's Engineering Mechanics Statics and Dynamics,Vijay Kumar Reddy,Suresh Kumar. BS Publications 2015

(3) Engineering Mechanics – B. Bhattacharyya, Oxford University Publications,2015

REFERENCE BOOKS:

(1) Engineering Mechanics by Seshigiri Rao, Rama Durgaiah, Universities Press,2005

(2) Engineering Mechanics by Shames & Rao – Pearson Education.

(3) Engineering Mechanics by S.Timoshenko, D.H.Young and J.V.Rao, TataMcGraw-Hill Company

WEB RESOURCES:

https://archive.nptel.ac.in/courses/112/106/112106286/

https://www.iitg.ac.in/rkbc/me101/Presentation/L01-03.pdf

I B. Tech. – I Semester

(22E05101T) C PROGRAMMING AND DATA STRUCTURES

(Common to CE, ME, EEE, ECE, CSE, CSE(AI), CSE(DS) and CSE(AI&ML))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: -

COURSE OBJECTIVES: *The Course is designed to*

1. Illustrate the basic concepts of C programming language.
2. Enable the student to create programs using arrays and functions.
3. Expose the student to understand pointers, strings, structures and unions.
4. To impart the concepts of data structures, stacks and Queues.
5. Introduces data structures such as linked structures, searching and sorting.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Understand the Concepts of C Programming language.
CO2: Develop the programs using arrays and functions.
CO3: Use pointers, Structures and Unions to formulate and write programs.
CO4: Understand the concepts of data structures, stacks and Queues.
CO5: Apply appropriate data structure to solve the given problem.

DETAILED SYLLABUS:

UNIT-I: Introduction To C Language **(09 Periods)**

Basic Structure of C Programs, C Language Elements, Variable Declarations and Data types, Executable statements, Operators and Expressions, Type Conversion.

Decision statements: The if Statement, the if-else statement, the nested if-else statement, the break statement, the continue statement, exit, the switch statement, Loop control statements: the for loop, Nested for loop, while loop, do-while.

UNIT-II: Arrays and Functions **(09 Periods)**

Arrays – Introduction, one-dimensional arrays, Two dimensional arrays, Multidimensional arrays, Functions - Library Functions, Functions with and without Arguments, Communications Among Functions, Using Array Elements as Function Arguments. Scope, Storage Classes - Auto, Register, Static, Extern, and Scope rules, Recursion.

UNIT-III: Pointers **(09 Periods)**

Pointers - Introduction, Pointer Declaration, Pointers and Arrays, Pointers and Two - Dimensional Arrays, Array of Pointers, Pointers to Pointers, Void Pointers, Command line arguments, Pointer to Functions, String Library Functions, Structure and Unions.

UNIT-IV: Introduction to Data Structures **(09 Periods)**

Overview of Data Structures, Implementation of Data Structures-
Stacks: Introduction, Representation of Stack, Operations on Stacks.
Applications of stack: Expression Evaluation, Conversion of Infix to postfix and prefix expression, Tower of Hanoi.
Queues: Introduction, Definition, Representation of Queues, Operations on Queues, Various Queue Structures, Applications of Queues.

UNIT-V: Linked list and Sorting **(09 Periods)**

Linked Lists: Single Linked List, Double Linked List, Applications of Linked List.
Sorting: Bubble sort, Merge sort, searching: Linear Search and Binary Search.

Total Periods: 45

TEXT BOOKS:

1. B.A Forouzon and R.F. Gilberg, "COMPUTER SCIENCE: A Structured Programming Approach Using C", Third Edition, CENGAGE Learning, 2016.
2. Byron. Gottfried, *Programming with C*, Mc Graw Hill Education, 3rd Edition, 2017.

REFERENCE BOOKS:

1. B. W Kernighan and Dennis M. Ritchi, *The C Programming Language*, Pearson Education.
2. Yeshwant Kanetkar. Jain and S. R. K. Iyengar, *Understanding Pointers in C*, BPB Publications.
3. Herbert Schildt, *The Complete Reference C*, McGraw Hill Education., 4th Edition.
4. J. R. HANLY, Ashok N Kamthane and A.Ananda Rao, *Programming in C and Data Structures, Pearson Education First* edition, 2010.

WEB RESOURCES:

1. https://www.geeksforgeeks.org/c-programming-language/
2. http://en.cppreference.com/w/c
3. https://onlinecourses.nptel.ac.in/noc19_cs42/
4. https://www.linuxtopia.org/online_books/programming_books/gnu_c_programming_tutorial/index.html
5. https://codeforwin.org/

I B. Tech. – I Semester

(22E00102L) ENGINEERING CHEMISTRY LAB

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: - Students should know about experimental principle in chemistry.

COURSE OBJECTIVES: Verify the fundamental concepts with experiments.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Determine the viscosity of lubricating oil.
CO2: Prepare advanced polymer materials.
CO3: Measure the strength of an acid present in secondary batteries.
CO4: Analyze the IR spectrum of some organic compounds.
CO5: Explain the preparation of Nano materials.

DETAILED SYLLABUS:

List of Experiments : (Execute any 10 of the following experiments)

1. Conductometric titration of strong acid Vs strong base.
2. Conductometric titration of weak acid Vs strong base.
3. pH metric titration of strong acid Vs strong base.
4. Determination of Strength of an acid in Pb-Acid battery.
5. Preparation of a polymer (Bakelite).
6. Verify Lambert-Beer's law by using $KMnO_4$ solution.
7. Preparation of Nanomaterial's by precipitation method.
8. Analysis of organic mixture (aldehyde and amine) by thin layer chromatography.
9. Identification simple functional groups by IR spectrum.
10. Estimation of Ferrous Iron by dichrometry.
11. Determination of hardness of ground water sample by EDTA method.
12. Determination of viscosity of lubricating oil by Redwood viscometer I.
13. Determination of viscosity of lubricating oil by Redwood viscometer II.

TEXT BOOKS:

1. A Text book of Quantitative Analysis, Arthur J. Vogel.
2. Jain &Jain. Engineering Chemistry: Dhanapathrai Publications, 2015.
3. S.S.Dara, Experiments and Calculations in Engineering Chemistry : S.Chand Publications, Revised edition, 2008.

REFERENCE BOOKS:

1. S.K. Bhasin and Sudha Rani, "Laboratory Manual on Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 2nd edition.
2. Sunitha Rattan "Experiments in Applied Chemistry", S.K.Kataria & Sons, New Delhi, 2nd edition.

I B. Tech. – I Semester

(22E00103L) COMMUNICATIVE ENGLISH LAB

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: - Good understanding of English Language.

COURSE OBJECTIVES:

1. Students will be exposed to a variety of self-instructional, learner friendly modes of language learning.
2. students will learn better pronunciation through stress, intonation and rhythm.
3. students will be trained to use language effectively to face interviews, group discussions, public speaking.
4. students will be initiated into greater use of the computer in resume preparation, report writing, format making etc.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Understand how sounds are produced &how they are transmitted and perceived.
CO2: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
CO3: Apply communication skills through various language learning activities.
CO4: Evaluate and exhibit acceptable etiquette essential in social and professional settings.
CO5: Make students competent enough to express themselves fluently.

DETAILED SYLLABUS:

List of Topics :

1. Phonetics
2. Reading comprehension
3. Describing objects/places/persons
4. Role Play or Conversational Practice
5. JAM
6. Etiquettes of Telephonic Communication
7. Group Discussions
8. Debates
9. Oral Presentations
10. Resume Writing

Suggested Software : Globarena Software

REFERENCE BOOKS:

1. A Textbook of English Phonetics for Indian Students by T.Balasubramanyam.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. A Handbook for English Language Laboratories by E.Suresh Kumar & P.Sreehari-Foundation books.

WEB RESOURSES:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net

I B. Tech. – I Semester

(22E05101L) C PROGRAMMING AND DATA STRUCTURES LAB

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: -

COURSE OBJECTIVES: *This course will enable students to:*

1. Enable student to learn about IDE, editors and Programming constructs.
2. To make the student solve problems using Control structures.
3. Familiarize the arrays, functions, pointers and structures.
4. To understand the concepts of data structures.
5. Ability to use the Sorting and Searching techniques.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Execute the programs using C language to solving a problem.
CO2: Exercise the different Control structures to write C programs.
CO3: Implement programs to develop applications using functions, arrays and structures.
CO4: Apply the Data Structures to solve the given problems.
CO5: Make use of Searching and Sorting techniques to design applications.

DETAILED SYLLABUS:

EXERCISE-1 :

(a) Write, Edit, Debug, Compile and Execute Sample C programs to understand the programming Environment.
(b) Finding the sum of three numbers, exchange of two numbers, maximum of two numbers. To read and print variable values of all data types of C language, to find the size of all data types, to use different library functions of C language.

EXERCISE-2 :

(a) Write a program to find the maximum of three numbers
(b) Write a program to convert years into 1.Seconds, 2 minutes,3.hours, 4.days and 5.months using switch statement.

EXERCISE-3 :

(a) Write a program to check whether the given number is palindrome or not.
(b) Write a program to check whether the number is prime or not using while loop.
(c)Write a program to find the series of prime numbers in the given range using do-while loop.

EXERCISE-4 :

(a) Write a program to generate Fibonacci numbers in the given range.
(b) Write a program to find the maximum of a set of numbers.
(c)Design a C program which finds the second maximum number among array of numbers.

EXERCISE-5 :

(a) Write a program to read two matrices and print their sum and product in the matrix form.
(b) Write a program to read matrix and perform the following operations.
   i. Find the sum of Diagonal Elements of a matrix.
   ii. Print Transpose of a matrix.
   iii. Print sum of even and odd numbers in a given matrix.

EXERCISE -6 :

(a) Swapping of two numbers using call by value and call by reference.
(b) To find the factorial using recursive and non-recursive functions.

EXERCISE -7 :

(a) Write a Program to perform different arithmetic operations using pointers.
(b) Write a program to call a function using pointers.

EXERCISE -8 :

(a) Write a C program that uses functions to perform the following operations:
   i) Reading a complex number ii) Writing a complex number
   iii) Addition of two complex numbers iv) Multiplication of two complex numbers
(b) Write a Program to read and write student information using the union

EXERCISE-9 :

Write a C program that implement stack (its operations) using (i)Arrays (ii) pointers

EXERCISE-10 :

Write a C program that implement Queue (its operations) using (i) Arrays (ii) Pointers

EXERCISE-11 :

Write a C program that uses functions to perform the following operations on singly linked list (i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

EXERCISE-12 :

(a) Write a program that implements the following sorting methods to sort a given list of integers using (i) Bubble sort (ii) Merge sort

(b) Write a program that implements the following Search methods to search in given list of integers using (i) Linear Search (ii) Binary Search

TEXT BOOKS:

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

REFERENCE BOOKS:

1. P.Padmanabham, C Programming and Data Structures, Third Edition, BS Publications.
2. E.Balagurusamy, C Programming, 3rd Edition, TMH Publishers.
3. Ashok N.Kamthane, Amit Kamthane, Programming in C, Pearson Education.

WEB RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc19_cs42/
2. http://learn-c.org/
3. https://www.linuxtopia.org/online_books/programming_books/gnu_c_programming_tutorial/index.html
4. https://www.geeksforgeeks.org/c-programming-language/
5. https://codeforwin.org/

I B. Tech. – II Semester

(22E00201T) DIFFERENTIAL EQUATIONS & VECTOR CALCULUS

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: - Differentiation, Integration, Vectors.

COURSE OBJECTIVES:

1. To enlighten the learners in the concept of differential equations and vector calculus.
2. To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real world applications.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Obtain the knowledge of first and higher order differential equations and its use in solving application problems.
CO2: Analyze the higher order linear differential equations with constant coefficients and its applications.
CO3: Solve the partial differential equations related to various engineering fields.
CO4: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO5: Estimate the work done against a field, circulation and flux using vector calculus.

DETAILED SYLLABUS:

UNIT-I: Ordinary differential equations first order and first degree **(10 Periods)**

Differential equations of first order and first degree, Formation of ODE's, Solution of ODE's, Exact, Linear and Bernoulli's equations – Applications of ODE's to O.T's (Cartesian co-ordinates), Newton's law of cooling.

UNIT-II: Linear differential equations of higher order **(10 Periods)**

Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type e^{ax}, sin ax, cos ax, polynomials in x, $e^{ax}V(x)$, $xV(x)$. Wronskian, Method of variation of parameters. Cauchy's and Legendre's form of differential equations.

UNIT-III: Partial Differential Equations **(10 Periods)**

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear PDE using Lagrange's

method and non-linear first order PDE (standard forms), Classification of second order partial differential equations.

UNIT-IV: Vector differentiation **(09 Periods)**

Scalar and vector point functions, vector differentiation, vector operator del, del applied to scalar point functions-Gradient, del applied to vector point functions-Divergence and Curl, vector identities (del applied twice to point functions and del applied to products of point functions).

UNIT-V: Vector integration **(09 Periods)**

Line integral-circulation-work done, scalar potential, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), Divergence theorem (without proof) and applications of these theorems.

Total Periods: 48

TEXT BOOKS:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
3. R.K.Jain & S.R.K.Iyengar, Advanced Engineering mathematics, Narosa Publications.

REFERENCE BOOKS:

1. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
2. N.Bali, M. Goyal, C.Watkins, Advanced Engineering Mathematics, Infinity Science press.
3. Erwin kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 9th edition, 2006.
4. M.D.Raisinghania, Ordinary and Partial D.Equations, S.chand and co,ltd.

WEB RESOURSES:

1. https://archive.nptel.ac.in/courses/111/105/111105134/
2. https://www.digimat.in/nptel/courses/video/111105121/L33.html

I B. Tech. – II Semester

(22E00104T) ENGINEERING PHYSICS

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: - knowledge on fundamental principles in Physics.

COURSE OBJECTIVES:

1. To impart the knowledge in basic concepts of the optical phenomenon like interference, diffraction and polarization.
2. To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibers along with engineering applications.
3. To enlighten the periodic arrangement of atoms in crystals, Bragg's law and to provide fundamentals related to structural analysis through powder diffraction method.
4. To identify the importance of semiconductors in the functioning of electronic devices.
5. Toenlightentheconceptsrelatedtosuperconductivitywhichleadstotheirfascinatingappli cations.
6. To open new avenues of knowledge and understanding the basic concepts of dielectric and magnetic materials and its application in the emerging micro devices.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Describe the importance of Interference, Diffraction and Polarization and the engineering applications as well.
CO2: Demonstrate the properties of lasers and fibre optics to various applications in science and technology.
CO3: Explain the important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction.
CO4: Illustrate the functioning of semiconductors in electronic devices and the principles related to superconductors.
CO5: Explain the fundamental concepts and theory related to dielectric and magnetic materials.

DETAILED SYLLABUS:

UNIT-I: Wave Optics **(10 Periods)**

Interference- Principle of superposition – Interference of light – Types of Interference – Path difference – Phase difference – Conditions for sustained interference- Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index of liquid.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating spectrum.
Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol's Prism - Half wave and Quarter wave plates with applications.

UNIT-II: Lasers and Fiber optics **(10 Periods)**

Lasers- Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action–Pumping mechanisms–Ruby laser –He-Ne laser–Applications of lasers.
Fiber optics- Introduction – Principle of optical fiber – Acceptance Angle – Numerical Aperture – Classification of optical fibers based on refractive index profile and modes – Propagation of electromagnetic wave through optical fibers – Propagation Losses (qualitative) – Applications.

UNIT-III: Crystallography and X-ray diffraction **(09 Periods)**

Crystallography- Space lattice, Basis, unit cell and lattice parameters – Bravais Lattice – Crystal systems – Packing fraction – Coordination number –Packing fraction of SC, BCC&FCC –Miller indices – Separation between successive (hkl) planes.
X-Ray Diffraction-Bragg's law–Bragg's X-ray diffractometer –Crystal structure determination by Powder method.

UNIT-IV: Semiconductors and Superconductors **(10 Periods)**

Semiconductors- Introduction – Classification of crystalline solids – Intrinsic semiconductors – Intrinsic Density of charge carriers- Intrinsic Conductivity-Intrinsic Fermi level- Extrinsic semiconductors– p-type and n type- Drift and diffusion currents – Einstein's equation – Formation of p- n junction diode – Direct and indirect band gap semiconductors – Hall effect – Hall coefficient – Applications of Hall effect.
Superconductors- Introduction – Properties of superconductors – Meissner effect– Type I and Type II superconductors – BCS theory– Josephson effects (AC and DC) – High T_c superconductors – Applications of superconductors.

UNIT-V: Magnetic Materials and Dielectric materials **(09 Periods)**

Magnetic Materials- Introduction- basic definitions – Origin of permanent magnetic moment – Classification of magnetic materials: Dia, para & Ferro –Hysteresis – Soft and Hard magnetic materials.
Dielectric Materials- Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic, Ionic and Orientation polarizations (Qualitative) – Lorentz internal field – Clausius-Mossotti equation.

Total Periods: 48

TEXT BOOKS:

1. Engineering Physics–Dr.M.N.Avadhanulu & Dr.P.G.Kshirsagar, S.Chand and Company.
2. Engineering Physics–B.K.Pandey and S.Chaturvedi, Cengage Learning.
3. Applied Physics for Engineers- K.Venkataramanan, R.Raja, M.Sundararajan (Scitech) [3,5] 2014.

REFERENCE BOOKS:

1. Engineering Physics–Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018.
2. Engineering Physics–K.Thyagarajan, McGraw Hill Publishers.
3. Engineering Physics-Sanjay D.Jain, D.Sahasrambudhe and Girish, University Press.
4. Semiconductor physics and devices-Basic principle–Donald A, Neamen, McGraw Hill.

WEB RESOURSES:

1. https://www.textbooks.com/Catalog/MG5/Applied-Physics.php
2. https://edurev.in/courses/9596_Electromagnetic-Theory-Notes--Videos--MCQs--PPTs
3. https://libguides.ntu.edu.sg/c.php?g=867756&p=6226561
4. https://bookauthority.org/books/best-applied-physics-books
5. https://www.electronicsforu.com/resources/16-free-ebooks-on-material-science/2

I B. Tech. – II Semester

(22E03102T) ENGINEERING DRAWING

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	2	-	2	3

PRE-REQUISITES: -

COURSE OBJECTIVES:

1. Bring awareness that Engineering Drawing is the Language of Engineers.
2. Familiarize how industry communicates technical information.
3. Teach the practices for accuracy and clarity in presenting the technical information.
4. Develop the engineering imagination essential for successful design.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Draw various curves applied in engineering.
CO2: Draw projections of points and lines graphically.
CO3: Draw projections of planes and regular solids.
CO4: Analyze projections of solids and sections graphically.
CO5: Draw the development of surfaces of solids.

DETAILED SYLLABUS:

UNIT-I: Introduction to Engineering Drawing **(10 Periods)**

Introduction to Engineering Drawing: Principles of Engineering Drawing and its Significance-Conventions in drawing-lettering-BIS conventions.

a) Draw the Conic sections including Ellipse, Parabola, Hyperbola, and the Rectangular Hyperbola using general methods.
b) Draw the Cycloid, Epicycloids, and Hypocycloid.
c) Draw the Involutes of Circle, Square, Pentagon, and Hexagon.

UNIT-II: Projections of Points and Lines **(10 Periods)**

Projections of points and lines: Projection of points in any quadrant, lines inclined to one and both planes, finding true lengths, finding true inclinations, angle made by line.

UNIT-III: Projections of Solids & Planes **(10 Periods)**

Projections of Planes: Projections of regular plane surfaces using rotating plane method.

Projections of solids: Projections of regular solids inclined to one and both the principle Planes using change of position method.

UNIT-IV: Sections of Solids **(10 Periods)**

Sections of solids: Section planes and sectional view of right regular solids-prism, Cylinder, Pyramid and Cone. True shapes of the sections.

UNIT-V: Development of Surfaces **(08 Periods)**

Development of surfaces: Development of surfaces through regular solids – Prism, Cylinder, Pyramid, Cone and their sectional parts

Total Periods: 48

TEXT BOOKS:

1. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.
2. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.

REFERENCE BOOKS:

1. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000.
2. Dhanajay AJolhe, Engineering Drawing, Tata McGraw-Hill,Copy Right, 2009.
3. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009.
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013.
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

WEB RESOURSES:

1. https://archive.nptel.ac.in/courses/112/103/112103019/
2. http://engineeringdrawing.org
3. http://freevideolectures.com/Course/3420/Engineering-Drawing
4. http://inoxwap.com/video/category/engineering-drawing-for-first-year-engineering.html

I B. Tech. – II Semester

(22E05202T) ADVANCED DATA STRUCTURES

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: -

COURSE OBJECTIVES:

1. Introduces a variety of data structures such as linked structures and trees.
2. Understand different Graphs and its operations.
3. To learn different types of sorting Techniques.
4. To learn different types of Searching Techniques.
5. To Understand and apply operations on trees and files.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Comprehend the operations and implementation of tree and linked data structure.
CO2: Implementations of Graph Operations.
CO3: Apply the Different Sorting Techniques.
CO4: Development of programs using linked lists.
CO5: Illustrate the tree and file operations.

DETAILED SYLLABUS:

UNIT-I: Linked Lists and Trees **(10 Periods)**

Linked lists: Circular linked list- Circular Double linked list- Application of linked lists.

Trees: Basic Terminologies- Definition and Concepts- Representations of Binary Tree- Operation on a Binary Tree- Types of Binary Trees-Binary Search Tree, Heap Trees, and Height Balanced Trees, B. Trees

UNIT-II: Graphs **(10 Periods)**

Introduction- Graph terminologies- Representation of graphs- Operations on Graphs Breadth First Search (BFS) and Depth First Search (DFS), connected components, spanning trees, Application of Graph Structures: Shortest path problem- topological sorting.

UNIT-III: Sorting **(09 Periods)**

Sorting Techniques- Sorting by Insertion: Straight Insertion sort- List insertion sort- Binary insertion sort- Sorting by selection: Straight selection sort- Heap Sort- Sorting by Exchange- Bubble Sort- Shell Sort-Quick Sort-External Sorts: Merging Order Files- Merging Unorder Files- Sorting Process.

UNIT-IV: Searching **(09 Periods)**

List Searches- Sequential Search- Variations on Sequential Searches- Binary Search- Analyzing Search Algorithm- Hashed List Searches- Basic Concepts- Hashing Methods- Collision Resolutions- Open Addressing- Linked List Collision Resolution- Bucket Hashing.

UNIT-V: Efficient Binary Search Trees & File Organization **(10 Periods)**

Efficient Binary Search Trees: Optimal Binary Search Trees, AVL Trees, Red – Black Trees, Splay Trees.

File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization.

Total Periods: 48

TEXT BOOKS:

1. Peter Bras, "Advanced Data Structures", Cambridge University Press, 2016
2. Alan L. Tharp, "File Organization and Processing", Wiley and Sons, 1988.

REFERENCE BOOKS:

1. D. Samanta, "Classic Data Structures", 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India, 2012.
2. Ellis Horowitz, Sartaj Sahni and Susan Anderson Freed "Fundamentals of Data Structures in C", 2nd Edition, University Press,2007.
3. Richard F.Gilberg, Behrouz A.Forouzan, "Data Structures A Pseudo code Approach with C", Second Edition, Cengage Learning 2005.

WEB RESOURCES:

1. https://www.tutorialspoint.com/data_structures_algorithms/dsa_useful_resources.htm
2. https://www.mygreatlearning.com/blog/data-structures-using-c/
3. https://www.programiz.com/dsa
4. https://www.codechef.com/certification/data-structures-and-Igorithms/prepare

I B. Tech. – II Semester

(22E02102T) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CE, ME, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

PRE-REQUISITES: - Good Knowledge in Physics.

COURSE OBJECTIVES: *This course will enable students:*

1. To introduce basics of electric circuits and analysis of DC & AC circuits.
2. To explain working principles of transformers and electrical machines.
3. To impart knowledge on Power system generation, transmission and distribution.
4. To understand the basic principles of all semiconductor devices.
5. To be able to compare the performance of BJTs and MOSFETs.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Apply KCL, KVL and network theorems to analyze DC circuit.
CO2: Analyze the single-phase AC Circuits, the representation of alternating. quantities and determining the power and power factor in these circuits.
CO3: Comprehend the construction and Operation of DC and AC machines.
CO4: Understand the operation of PN Junction diode and its application in rectifier circuits.
CO5: Analyze standard combinational and sequential circuits.

DETAILED SYLLABUS:

UNIT-I: Fundamentals of Electrical Circuits **(10 Periods)**

Electrical circuit elements (R - L and C) - Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem-Representation of sinusoidal waveforms - peak and RMS values –phasor representation - real power - reactive power-apparentpower-powerfactor-Analysisofsingle-phaseaccircuitsconsistingofRL- RC - RLC series circuits, Resonance.

UNIT-II: DC & AC Machines **(09 Periods)**

DC Machines: Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC shut Motor.

AC Machines: Principle and operation of Single Phase Transformer-EMF equation- OC and SC tests on transformer - Principle and operation of 3-phase induction motor and alternator., [Elementary treatment only]

UNIT-III: Basics of Power Systems **(10 Periods)**

Layout & operation of Hydro, Thermal, Nuclear Stations -Solar& wind generating stations - Typical AC Power Supply scheme–Elements of Transmission line –Types of Distribution systems: Primary & Secondary distribution systems.

UNIT-IV: Basics of Electronic Devices **(10 Periods)**

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances. Zener diode operation, Zener diode as voltage regulator.

Rectifiers: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier.

UNIT-V: OP Amps and Digital Electronics **(09 Periods)**

Introduction to Op-Amp, Differential Amplifier, Block Diagram, Pin Configuration of 741 Op-Amp, Op-Amp Applications - Inverting, Non-Inverting, Summing and Difference Amplifiers, Voltage Follower, Comparator, Differentiator, Integrator.

Digital Electronics: Binary codes, Number systems, Logic Gates, K-Map Method (3-Variable). Half and Full Adders, BCD Adder. Latches and Flip-Flops (S-R, JK and D).

Total Periods: 48

TEXT BOOKS:

1. **"Basic Electrical and Electronics Engineering",** M. Surya Kalavathi, Ramana Pilla, Ch. Srinivasa Rao, Gulinindala Suresh, S.Chand and Company Limited, New Delhi, 1st Edition, 2017.

2. **"Electronic Devices & Circuit Theory",** R.L.Boylestad and Louis Nashlesky, Pearson Education, 2007.

REFERENCE BOOKS:

1. V.K. Mehtha and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S.Chand& Co., 2009.

2. Jacob Milliman, Christos C.Halkias, Satyabrata Jit (2011), "Electronic Devices and Circuits".

WEB RESOURCES:

Electrical circuits : https://nptel.ac.in/courses/117106108
Basic electrical circuits : https://nptel.ac.in/courses/108104139
Basic electronics : https://nptel.ac.in/courses/122106025
https://vinesoftheyarravalley.com.au/best-electricial-engineering-websites/
https://www.electrical4u.net/useful-information/top-10-electrical-website-for-electrical-engineering-students/

I B. Tech. – II Semester

(22E00104L) ENGINEERING PHYSICS LAB

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: -

COURSE OBJECTIVES: *This course will enable students to:*

1. Understand the role of Optical fiber parameters in engineering applications.
2. Recognize the significance of laser by studying its characteristics and its application in finding the particle size.
3. Illustrates the magnetic and dielectric materials applications.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Determine the radius of a curvature and/or thickness of thin wire using microscope with the help of interference concept.
CO2: Evaluate the wavelength of various colors of grating and also dispersive power of prism by spectrometer using the principle of diffraction.
CO3: Evaluate wave length of light source and particle size with He-Ne laser using the principle of diffraction Estimate the numerical aperture of a given optical fiber and hence to find its acceptance angle.
CO4: Estimate the dielectric constant of a given material.
CO5: Measure the type of conductivity, hall voltage and hall coefficient of a given Semi-conductor using Hall Effect and also measure the energy band gap of a given Semi-conductor material.

LIST OF EXPERIMENTS:

Any 10 experiments to be performed

1. Determine the thickness of the wire using wedge shape method.
2. Determination of the radius of curvature of the lens by Newton's ring method.
3. Determination of wavelength by plane diffraction grating method.
4. Determination of dispersive power of prism.
5. Determination of wavelength of LASER light using diffraction grating.
6. Determination of particle size using LASER.
7. To determine the numerical aperture of a given optical fiber and hence to find its acceptance angle.

8. Determination of dielectric constant by charging and discharging method.
9. Magnetic field along the axis of a circular coil carrying current–Stewart Gee's method.
10. To determine the resistivity of semiconductor by Four probe method.
11. To determine the energy gap of a semiconductor.
12. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
13. Measurement of resistance with varying temperature-Thermistor characteristics.

TEXT BOOKS:

1. Engineering Practical Physics ,BMallick, SPanigrahi, 1st Edition, Cengage Learning Publishers.
2. A Text book of Engineering Physics Practical, Dr.Ruby Das, Dr.RajeshKumar, C.S.Robinson, Prashant Kumar Sah, Laxmi Publications Pvt. Ltd.

REFERENCE BOOKS:

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

I B. Tech. – II Semester

(22E03201L) ENGINEERING & IT WORKSHOP LAB

(Common to CE, ME, EEE, ECE, CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

ENGINEERING WORKSHOP

COURSE OBJECTIVES:

To familiarize students with wood working, sheet metal operations, fitting and electrical House wiring skills

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Apply wood working skills in real world applications.
CO2: Build different objects with metal sheets in real world applications.
CO3: Apply fitting operations in various applications.
CO4: Apply different types of basic electric circuit connections.
CO5: Use brazing techniques.

DETAILED SYLLABUS:

Wood Working:

Familiarity with different types of woods and tools used in wood working and make Following Joints.

a) Half–Lap joint
b) Mortise and Tenon joint
c) Corner Dove tail joint or Bridle joint.

Sheet Metal Working:

Familiarity with different types of tools used in sheet metal working, Developments of Following sheet metal job from GI sheets.

a) Tapered tray
b) Conical funnel
c) Elbow pipe
d) Brazing
e) Plumbing

Fitting:

Familiarity with different types of tools used in fitting and do the following fitting Exercises.

a) V-fit
b) Dovetail fit
c) Semi-circular fit

Electrical Wiring:

Familiarities with different types of basic electrical circuits and make the following Connections.

a) Parallel and series
b) Two-way switch
c) Go down lighting
d) Tube light
e) Soldering

Total Periods: 27

TEXT BOOKS:

1. Workshop practice by K Venkata Reddy, BS Publication, 2016.

Note: In each section minimum of three exercises are to be carried out.

IT WORKSHOP

COURSE OBJECTIVES:

1. To provide technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations.
2. To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system.
3. To learn about Networking of computers and use Internet facility for Browsing and Searching.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
CO2: Prepare the Documents using Word processors.
CO3: Prepare Slide presentations using the presentation tool.
CO4: Inter connect two or more computers for information sharing.
CO5: Access the Internet and Browse it to obtain the required information.
CO6: Install single or dual operating systems on computer.

DETAILED SYLLABUS:

Preparing your computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of are port.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working Condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and troubleshooting a computer.

Task 3: Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: **Operating system features**: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Face book, Skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the color, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present into their directory, formatting paragraphs, spellchecking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 9: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spread sheet application considered features studied. Students should submit a user manual of the word processor considered.

Task 10: Presentations : creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Optional Tasks:

Task 11: Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Microcontroller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO
- Function Generator
- Microwave benches

Task 12: Software: Students may submit a report on specifications of various software that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. The software may be proprietary software or Free and Open source software. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites.

The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop operating system
- Server operating system
- Antivirus software
- MATLAB
- CAD/CAM software
- AUTOCAD

Total Periods: 21

TEXT BOOKS:

1. Introduction to Computers, Peter Norton, McGraw Hill.
2. MOS study guide for word, Excel, Power point & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI.
5. Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH.

WEB RESOURCES:

1. IT Workshop Lab .pdf (lbrce.ac.in)
2. https://ncert.nic.in/vocational/pdf/keit104.pdf
3. https://docs.oracle.com/cd/E19121-01/sf.x2100m2/819-6592-13/Chap1.html
4. https://www.computerhope.com/issues/ch001781.htm
5. https://sysmgt.lenovofiles.com/help/topic/LXPM/os_installation.html

I B. Tech. – II Semester

(22E05202L) ADVANCED DATA STRUCTURES LAB

(Common to CSE, CSE(AI&ML), CSE(AI), and CSE(DS))

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	-	-	3	1.5

PRE-REQUISITES: -

COURSE OBJECTIVES: *This course will enable students to:*

1. To solve computational problems with the help of data structures.
2. Familiarize the application of stacks.
3. Exploring basic data structures such as stacks and queues.
4. Introduces variety of data structures such as hash linked list, trees and graphs.
5. Introduces searching and sorting algorithms.

COURSE OUTCOMES: *After successful completion of the course, students will be able to:*

CO1: Implement stack and queue data structures using array and linked list.
CO2: Demonstrate the applications of stack and queue data structures.
CO3: Implement sorting and searching algorithms and to compare their efficiency.
CO4: Implement binary tree, binary search tree and tree traversals.
CO5: Solve graph problems using appropriate data structure.

DETAILED SYLLABUS:

EXERCISE-1: Implementation of Recursive and Non-recursive functions to sort the elements using Selection Sort.

EXERCISE-2: Implementations of functions to perform the following operations on doubly linked list.: (i) Creation (ii) Insertion (iii) Deletion (iv) Traversal

EXERCISE-3: Implementations of operations on circular linked list.: (i) Creation ii) Insertion iii) Deletion iv) Traversal

EXERCISE-4: Creation of binary search tree, performing operations insertion, deletion, and Traversal.

EXERCISE-5: Implementation of Breadth first search.

EXERCISE-6: Implementation of Depth first search.

EXERCISE-7: Implementation of Quick sort Algorithm.

EXERCISE-8: Implementation of Heap sort Algorithm.

EXERCISE-9: Write a program to search a word in a given file and display all itspositions.

EXERCISE-10: Implementations of Hashing methods.

TEXT BOOKS:

1. Classic Data Structures, Second Edition, Debasis Samanta, PHI.
2. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S.Sahni andSusan Anderson Freed, Universities Press.

REFERENCE BOOKS:

1. Data Structures: A Pseudo code Approach with C, 2nd Edition, R.F.Gilberg and B. A.Forouzan, Cengage Learning.
2. "Data Structures and Algorithm Analysis in C" by Weiss.
3. "Data Structure through C" by Yashavant P Kanetkar.
4. "Problem Solving in Data Structures and Algorithms Using C: The Ultimate Guide toProgramming Interviews" by Hemant Jain.

WEB RESOURCES:

1. http://www.tutorialspoint.com/data_structures_algorithms
2. http://www.geeksforgeeks.org/data-structures/
3. http://www.studytonight.com/data-structures/
4. http://www.coursera.org/specializations/data-structures-algorithm

I B.Tech-II Semester

(22E00101MC) ENVIRONMENTAL SCIENCE

(Common to CE, ME, EEE, ECE, CSE, CSE(AI), CSE(DS),CSE(AI&ML))

Int.Marks	Ext.Marks	Tot.Marks	L	T	P	C
30	-	-	2	-	-	0

PRE-REQUISITES:- NIL

COURSE OBJECTIVES: This course will enable students:

- To make the students to get awareness on environment
- To understand the importance of protecting natural resources, ecosystems for future generationsand pollution causes due to the day to day activities of human life
- To save earth from the inventions by the engineers.

COURSE OUTCOMES: At the end of the course, the student will be able to

CO1: Grasp multidisciplinary nature of environmental studies and various renewable and non renewable resources.

CO2: Understand flow and bio-geo- chemical cycles and ecological pyramids.

CO3: Understand various causes of pollution and solid waste management and related preventive measures.

CO4: About the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.

CO5: Casus of population explosion, value education and welfare programs.

DETAILED SYLLABUS:

UNIT-I: **(08 Periods)**

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance – Need for Public Awareness.

Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:.

UNIT-II: **(06 Periods)**

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity And Its Conservation : Introduction 0 Definition: genetic, species and ecosystem diversity– Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega- diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT- III: **(06 Periods)**

Environmental Pollution: Definition, Cause, effects and control measures of

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role ofan individual in prevention of pollution – Pollution case studies – Disaster management: floods,earthquake, cyclone and landslides.

UNIT-IV: **(06 Periods)**

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT-V: **(06 Periods)**

Human Population And The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain –Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc..

Total Periods: 32

TEXT BOOKS:

1. Text book of Environmental Studies for Undergraduate Courses ErachBharucha for University Grants Commission, Universities Press.
2. Palaniswamy, "Environmental Studies", Pearson education
3. S.AzeemUnnisa, "Environmental Studies" Academic Publishing Company
4. K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as perUGC model syllabus", Scitech Publications (India), Pvt. Ltd.

REFERENCE BOOKS:

1. Deeksha Dave and E.Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications.
2. M.Anji Reddy, "Text book of Environmental Sciences and Technology", BS Publication.
3. J.P.Sharma, Comprehensive Environmental studies, Laxmi publications.
4. J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prentice hall ofIndia Private limited
5. G.R.Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science,Prentice hall of India Private limited.

WEB RESOURCES:

1. https://nptel.ac.in/courses/120108002
2. https://onlinecourses.nptel.ac.in/noc19_ge22/preview
3. https://onlinecourses.nptel.ac.in/noc22_ag10/preview
4. https://archive.nptel.ac.in/content/storage2/courses/downloads_new/105105157/noc18-ce08_Week_08_Assignment_01.pdf
5. https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-hs96/

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UNIT- III: **(06 Periods)**

Environmental Pollution: Definition, Cause, effects and control measures of

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role ofan individual in prevention of pollution – Pollution case studies – Disaster management: floods,earthquake, cyclone and landslides.

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3. S.AzeemUnnisa, "Environmental Studies" Academic Publishing Company
4. K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as perUGC model syllabus", Scitech Publications (India), Pvt. Ltd.

Verified & Submitted

[G. SREENIVASA REDDY]