ECE A-22 COURSE STRUCTURE

I Year I Semester

Sl. No	Course Type	Dept Course	Code	Name of the Course	L	T	P	C	CIE	SEE
1	BS	S&H	9HC07	Engineering Physics	2	1	0	3	40	60
2	ES	IT	9FC01	Problem Solving using C	3	0	0	3	40	60
3	BS	S&H	9HC11	Matrix Algebra and Calculus	2	1	0	3	40	60
4	HS	S&H	9HC01	Essential English Language Skills	2	0	0	2	40	60
5	ES	S&H	9BC01	Engineering Graphics	1	0	4	3	40	60
6	HS	S&H	9HC61	Oral communication Lab – I	0	0	2	1	40	60
7	BS	S&H	9HC66	Engineering Physics Lab	0	0	3	1.5	40	60
8	ES	IT	9FC61	Problem Solving using C Lab	0	0	3	1.5	40	60
9	ES	S&H		Induction Program	-	-	-	-	-	-
				Total	**10**	**2**	**12**	**18**	**320**	**480**

I Year II Semester

Sl. No	Course Type	Dept Course	Code	Name of the Course	L	T	P	C	CIE	SEE
1	BS	S&H	9HC04	Engineering Chemistry	2	1	0	3	40	60
2	ES	CSE	9EC01	Data Structures	3	0	0	3	40	60
3	BS	S&H	9HC12	Advanced Calculus	2	1	0	3	40	60
4	ES	EEE	9AC42	Electrical Circuits & Networks Analysis	2	1	0	3	40	60
5	HS	S&H	9HC62	Oral communication Lab - II	0	0	3	1.5	40	60
6	BS	S&H	9HC64	Engineering Chemistry Lab	0	0	3	1.5	40	60
7	ES	CSE	9EC61	Data Structures using C Lab	0	0	3	1.5	40	60
8	ES	S&H	9BC61	Workshop/Manufacturing Processes Lab	0	1	3	2.5	40	60
				Total	*9*	*4*	*12*	*19*	*320*	*480*

II Year I Semester

Sl. No	Course Type	Dept Course	Code	Name of the Course	L	T	P	C	CIE	SEE
1	PC	ECE	9CC01	Electronic Devices and Circuits	3	0	0	3	40	60
2	PC	ECE	9CC02	Signals and Systems	3	0	0	3	40	60
3	BS	ECE	9CC03	Probability Theory and Stochastic Process	2	1	0	3	40	60
4	BS	S&H	9HC14	Complex Variable and Transform Techniques	2	1	0	3	40	60
5	HS	MBA	9ZC01	Business Economics and Financial Analysis	3	0	0	3	40	60
6	HS	S&H	9HC03	Universal Human Values	3	0	0	3	40	60
7	HS	S&H	9HC63	Soft Skills Lab	0	1	2	2	40	60
8	PC	ECE	9CC71	Electronic Devices and Circuits Lab	0	0	3	1.5	40	60
9	PC	ECE	9AC72	Electrical Circuits & Networks Analysis Lab	0	0	3	1.5	40	60
				Total	**16**	**3**	**8**	**23**	**360**	**540**

II Year II Semester ECE

Sl. No	Course Type	Dept Course	Code	Name of the Course	L	T	P	C	CIE	SEE
1	PC	ECE	9CC04	Analog Circuits	3	0	0	3	40	60
2	PC	ECE	9CC05	Digital Logic Design	3	0	0	3	40	60
3	PC	ECE	9CC06	Analog & Digital Communications	2	1	0	3	40	60
4	PC	ECE	9C407	Electromagnetic Waves and Transmission Lines	3	0	0	3	40	60
5	BS	S&H	9HC16	Quantitative Aptitude and Logical Reasoning	3	0	0	3	40	60
6	MC	S&H	9HC05	Environmental Science	3	-	-	-	Pass/ Fail	
7	PC	ECE	9CC72	Analog Circuits Lab	0	0	3	1.5	40	60
8	PC	ECE	9C473	Basic Simulation and Digital Logic Design Lab	0	0	4	2	40	60
9	PC	ECE	9CC74	Analog & Digital Communication Lab	0	0	3	1.5	40	60
10	PW	ECE	9C461	Technical seminar	0	1	0	1	100	-
				Total	**17**	**2**	**10**	**21**	**420**	**480**

Note: Summer Industry Internship-I is to be carried out during the summer vacation between 4ᵗʰ and 5ᵗʰ semesters and Evaluation of Summer Industry Internship - I will be done along with III-I courses.

III Year I Semester

Sl. No	Course Type	Dept Course	Code	Name of the Course	L	T	P	C	CIE	SEE
1	PC	ECE	9CC08	Digital Signal Processing	2	1	0	3	40	60
2	PC	ECE	9CC09	IC Applications	3	0	0	3	40	60
3	PC	ECE	9C510	Antennas and Wave Propagations	3	0	0	3	40	60
4	PE	ECE		Professional Elective-I	3	0	0	3	40	60
5	ES	EEE	9AC07	Linear Control systems	3	0	0	3	40	60
6	MC	CSE	9EC45	Artificial Intelligence	2	-	-	-	Pass/Fail	
7	PC	ECE	9CC75	Digital Signal Processing Lab	0	0	4	2	40	60
8	PC	ECE	9CC76	IC Applications Lab	0	0	3	1.5	40	60
9	PC	ECE	9C578	Antenna Simulation Lab	0	0	3	1.5	40	60
	PW	ECE	9C591	Summer Industry Internship-I	0	0	2	1	40	60
				Total	**16**	**1**	**12**	**21**	**360**	**540**

III Year II Semester ECE

Sl. No	Course Type	Dept Course	Code	Name of the Course	L	T	P	C	CIE	SEE
1	PC	ECE	9C611	Microwave and Optical Communications	3	0	0	3	40	60
2	PC	ECE	9C612	VLSI Technology and Design	3	0	0	3	40	60
3	PC	ECM	8DC05	Microprocessors and Microcontrollers	2	1	0	3	40	60
4	PE			Professional Elective-II	3	0	0	3	40	60
5	OE			Open Elective-I	3	0	0	3	40	60
6	MC	IT	9FC24	Cyber Security	2	-	-	-	Pass/Fail	
7	PC	ECE	9C679	Microwave and Optical Communications Lab	0	0	4	2	40	60
8	PC	ECE	9C677	VLSI Technology and Design Lab	0	0	3	1.5	40	60
9	PC	ECM	9DC71	Microprocessors and Microcontrollers Lab	0	0	3	1.5	40	60
10	ES	ECE	9C662	Comprehensive Viva Voce	0	1	0	1	100	-
				Total	**16**	**2**	**10**	**21**	**420**	**480**

Note: Summer Industry Internship-II is to be carried out during the summer vacation between 6th and 7th semesters and Evaluation of Summer Industry Internship - II will be done along with IV-I courses.

IV Year I Semester ECE

Sl. No	Course Type	Dept Course	Code	Name of the Course	L	T	P	C	CIE	SEE
1	PC	ECE	9C713	Internet of Things and Applications	2	1	0	3	40	60
2	PC	ECE	9C714	Wireless Communication Networksand Protocols	3	0	0	3	40	60
3	ES	ECE	9C715	Computer Networks	3	0	0	3	40	60
4	PE	ECE		Professional Elective- III	3	0	0	3	40	60
5	PE	ECE		Professional Elective –IV	3	0	0	3	40	60
6	OE			Open Elective – II	3	0	0	3	40	60
7	PC	ECE	9C780	Internet of Things and Applications Lab	0	0	2	1	40	60
8	PC	ECE	9C781	Advanced Communications and Networks Lab	0	0	2	1	40	60
9	PW	ECE	9C792	Summer Industry Internship - II	0	0	2	1	40	60
				TOTAL	**17**	**1**	**6**	**21**	**360**	**540**

IV Year II Semester ECE

Sl. No	Course Type	Dept Course	Code	Name of the Course	L	T	P	C	CIE	SEE
1	PE	ECE		Professional Elective –V	3	0	0	3	40	60
2	OE	ECE		Open Elective –III	3	0	0	3	40	60
3	PW	ECE	9C893	Project	0	0	20	10	40	60
				TOTAL	**6**	**0**	**20**	**16**	**120**	**180**

I – I

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P**	**C**
I – I	**9HC07**	Engineering Physics	2	1	0	3

Course Objectives

- Explain about the Quantum Mechanics to understand wave particle duality, necessity of quantum mechanics to explore the behavior of sub atomic particles. Schroedinger's Time Independent Wave Equation, Physical Significance of the Wave Function – Application of Schroedinger wave equation.
- To understand the basic concepts of normal light, Laser and its applications and to know about the fiber optics, principle (TIR), Numerical Aperture, Types of optical Fibers, Step index and graded index Fibers, attenuation in optical fibers. Applications: optical fiber communication system, fiber optic sensors, medical endoscopy.
- To study the concepts of magnetism and superconductivity, Bohr magneton, Hysteresis nature, domain structure, Meissner effect, types of superconductors, BCS theory and applications of superconductors.
- To understand the concepts of dielectrics, polarizations and its types, internal fields, Clausius - Mossitti equation, Frequency and temperature effect on dielectrics and its applications – Piezo-electricity, Pyro-electricity and ferro-electricity.
- To know about the semiconductors, types, carrier concentration, Thermistor, Hall effect and also to understand the concept of PN-junction, I-V Characteristics, LED, Solar Cell and Photo diode.
- To discuss about the nano-technology, preparation techniques and characterization (XRD, SEM & TEM), CNTs and to know about the fundamentals of radioactivity and its applications.

CO	Engineering Physics (8HC07)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Explain semiconductor behaviour, types and their applications	3														
CO2	Differentiate the wave and particle, and its application for a particle in one dimension box	2														
CO3	Explain about emission, its types, laser principle and applications of optical fibers (sensors and medical endoscopy)	3														
CO4	Reveals about the magnetism-its origin and types and its applications	3														
CO5	Explain the basic concepts of dielectric materials,	1														

	polarization and its types, their applications (piezo, ferro and Pyro electricity).															
CO 6	Summarize nano& bulk concepts, surface to volume ratio and its applications.	2														
CO		2														

Unit:1

Wave nature of particles, Schroedinger equation and its application
Waves and Particles, de Broglie Hypothesis, Matter waves, Davisson and Germer's Experiment, G.P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schroedinger's Time Independent Wave Equation – Physical Significance of the Wave Function – Application of Schroedinger wave equation - Particle in One Dimensional Potential Box.

Unit:2

Lasers
Characteristics of LASER, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them and significance, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers in engineering and medicine.

Fiber optics
Introduction, Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers, Step index and graded index Fibers Attenuation in Optical Fibers. Applications: Optical Fiber communication system, Fiber Optic Sensors, Medical Endoscopy.

Unit:3

Magnetic and Superconducting materials
Permeability, Field Intensity, Magnetic Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton.Hysteresisbehavior of Ferro Magnetic materials based on Domain theory. Hard and Soft Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their applications, **Super conductivity**, effect of Magnetic Field, Critical current density, Meissner effect, Type-I and Type-II superconductors, BCS theory, applications of superconductors.

Unit:4

Dielectric materials and their properties
Electric Dipole, Dipole Moment, Dielectric Constant, Electric Susceptibility, Electronic and Ionic polarizability (Quantitative) Orientation Polarization (Qualitative), Internal fields in Solids, Clausius - Mossotti equation, Frequency and temperature effect on Dielectrics (Qualitative), Applications - Piezo-electricity, Pyro-electricity and Ferro-electricity.

Unit:5

Semiconductors

Fermi Level in Intrinsic and Extrinsic Semiconductors, calculation of carrier concentration of Intrinsic Semiconductors (quantitatively) and Extrinsic Semiconductors (qualitatively), Direct & Indirect Band Gap Semiconductors, Thermistor, Hall Effect in semiconductors and applications.

Semiconductor devices

Formation of a PN Junction and working of a PN Junction, Energy band Diagram of a open circuited PN Diode, I-V Characteristics of PN Junction, Application - LED, Solar Cell and Photo diode.

Unit:6

Nanotechnology

Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication, Sol-gel, Precipitation, Chemical vapor Deposition(CVD); Top-down Fabrication; Thermal evaporation, Ball Milling, Characterization of Nano materials (XRD&TEM), carbon nano tubes(CNTs), Applications of Nano Materials.

Nuclear Energy: Radioactivity, Nuclear binding energy, Nuclear fission, Nuclear fusion, $\square$, β, γ rays decay, Geiger-Muller counter and practical applications of nuclear physics.

Text Books:

1. B.K. Pandey& S. Chaturvedi Engineering Physics, Cengage Learning

Reference Books:

1. P K Palanisamy, Engineering Physics, Sitech Publications
2. Charles Kittel, Introduction to Solid State Physics, John Wiley Publisher
3. A.S. Vasudeva , Modern engineering Physics, S Chand
4. Dekker, Solid State Physics
5. Dr.M.N. Avadhanulu, Engineering Physics, S Chand
6. Dekker, Solid State Physics
7. Halliday and Resnick, Physics
8. S.O. Pillai, Solid State Physics
9. A. Ghatak - Optics

Course Outcomes

After completing the course, students are able to

- Differentiate the wave and particle, de-Broglie matter waves-its experimental evidence, Schroedinger's wave concept and its application for a particle in one dimension box.
- Explain about emission, its types, laser principle, types, working and its applications and to reveals about TIR principle, optical fiber-types and signal propagation, attenuation, communication system and applications of optical fibers (sensors and medical endoscopy)
- Reveals about the magnetism-its origin and types, Hysteresis, domain theory, Anti-ferro and ferri-magnetism, Superconductivity, experimental facts, theoretical analysis, types of superconductors and its applications.
- Explain the basic concepts of dielectric materials, polarization and its types, local fields, frequency and temperature effect on dielectrics and their applications (piezo, ferro and Pyro electricity).
- Explain semiconductor behavior, types, carrier concentration, Hall effect, Thermistor, demonstrate and analyze semiconductor devices like a PN-junction, I-V characteristics, LED, solar cell, photo diode and their applications.
- Summarize nano& bulk concepts, surface to volume ratio, quantum confinement, CNTs and preparation methods (physical & chemical), analysis the techniques like XRD, SEM, TEM and also to understand the radioactivity, fusion & fission, alpha, beta and gamma rays decay and its applications.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	Sub. Code	Subject Name	L	T	P	C
I – I	9FC01	Problem Solving using C (Common to All Branches)	3	0	0	3

Course Objectives

- To acquire problem solving skills
- To be able to develop flowcharts
- To understand structured programming concepts
- To be able to write programs in C Language

Course Outcomes:

After completion of this course student will learn

1. To formulate simple algorithms for arithmetic, logical problems and to translate the algorithms to programs(in C language)
2. To test and execute the programs and correct syntax and logical errors, to implement conditional branching, iteration and recursion
3. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
4. To use arrays, pointers and structures to formulate algorithms and programs.
5. To apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
6. To apply programming to solve simple numerical method problems, namely rot finding of function, differentiation of function and simple integration.

CO	PROBLEM SOLVING USING C(8FC01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Explain basic fundamentals of Computer Systems , computing environments , Computer Languages – Machine Languages	1														
CO2	Describe C language Programs, Structure of a C Program	1														
CO3	Describe write programs using control structures such as Pre-test and post-test loops, while, do while,	2														

	for, break															
CO 4	Write programs implementing application on arrays	2														
CO 5	Write programs using Pointers and string handling functions	2														
CO 6	Write programs using Enumerated, Structure, Union types and files.	2														
CO		2														

UNIT I

Introduction to Programming: Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)

Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples.

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code

UNIT II

History of C language, Characteristics of C language, Structure of C Language, C Tokens Arithmetic expressions, Operator Precedence & **Associativity** Conditional Branching and Loops Writing and evaluation of conditionals and consequent branching and **Jumping Constructs Pretest and Post test**, Iteration and loops (3 lectures)

UNIT III

Function: Functions (including using built in libraries), Parameter passing in functions, call by value, passing arrays to functions: idea of call by reference, **Storage Classes**

Recursion: Recursion, as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc.

Macros – Definition, comparison with functions.

UNIT IV

Arrays: Arrays (1-D, 2-D), Character arrays **Ragged Arrays and Dynamic Arrays**
Basic Algorithms Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required) Quick sort or Merge sort.

UNIT V

Pointers Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notation of linked list (no implementation) **Dynamic Memory allocation Functions**.

Strings:String Handling Functions.

UNIT IV

Structure: Structures, Defining structures and Array of Structures,
Nested Structures enum, typedef
File handling (only if time is available, otherwise should be done as part of the lab)
File Handling Functions, File Modes, File Operations

Suggested Text Books

(i)   Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

(ii)   E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill Suggested

Reference Books

(i)   Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P**	**C**
I – I	**9HC11**	MATRIX ALGEBRA AND CALCULUS (Common to All Branches)	2	1	0	3

Pre Requisites: Mathematics Knowledge at Pre-University Level
Course Objectives: To make the students to understand and expected to learn
1. *Basic operation of matrices and about the linear system and some analytical methods for solution.*
2. *Concept of Eigen value and Eigen vector and their properties and applications.*
3. *Quadratic form and its properties.*
4. *Mean value theorems and their applications to the given functions, series expansions of a function.*
5. *Various analytical methods to solve first order first degree and also the equations not of first degree ordinary differential equations.*
6. *Methods to solve higher order ordinary differential equations.*

Syllabus

UNIT-I: System of Linear Equations: Elementary row/column operations -Echelon form, Rank of a matrix, Inverse of a matrix by Gauss Jordan method. Non-Homogenous and Homogenous system of linear equations- consistency or inconsistency of a system, Gauss Elimination method, Rank method and problems.Symmetric, Skew-symmetric and Orthogonal matrices.

UNIT-II: Eigen values and Eigen vectors: Definitions and Properties (without proofs). Evaluation of Eigen values and Eigenvectors for a given matrix.Cayley-Hamilton Theorem (without proof) and its applications in finding higher powers & inverse of a matrix, Diagonalization of a matrix.Hermitian, Skew-Hermitian and Unitary matrices.

UNIT-III Quadratic forms: Quadratic forms, Nature, rank, index and signature of a quadratic form.Reduction of quadratic form to canonical form.

UNIT-IV: Single Variable Calculus: Rolle's Theorem, Lagrange's and Cauchy's mean value theorems (without proof); Taylor's and Maclaurin's series (without proof) and their application for series expansions of standard functions.

UNIT-V: First order ODE: Exact differential equations, equations reduced to exact, Linear and Bernoulli's equations, Newton's law of cooling, Law of natural Growth/Decay.

UNIT-VI: Higher order ODE: Higher order linear differential equations with constant coefficients-Complementary function, Particular Integral, Method of variation of parameters.

Suggested Readings:
1. R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
2. B.S. Grewal, Elementary Engineering Mathematics, Khanna Publishers
3. Alan Jeffery, Advanced Engineering Mathematics, Academic Press
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Course Outcomes: After the course completion the students will be able to
1. *Check the consistency or inconsistency of a linear system and can solve the problems.*
2. *Find the Eigen values and Eigen vectors and can solve the problems associated with these concepts.*
3. *Find the nature, index and signature of the quadratic form.*
4. *Verify the applicability of mean value theorems and also can express the given standard function in series form using Taylor's and Maclaurin series.*
5. *Find the solutions of first order first degree differential equations and solve the problems on Newton's law of cooling, Natural growth and decay.*
6. *Solve higher order ordinary differential equations with constant coefficients using some standard methods.*

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Year/Sem	Sub. Code	Subject Name	L	T	P	C
		Syllabus for B. Tech (E.C.E.) – A22 regulation				
I – I	**9HC01**	Essential English Language Skills (EELS) (Common to All Branches)	2	0	0	2

Course Objectives:
Theory (2 per week)
To enable students to:

- Recognize and distinguish between different parts of speech
- Learn the correct usage of articles in sentences
- Write sentences using tenses
- Identify when each punctuation marks is needed and its correct usage
- Recognize the difference between direct and indirect speech and form statements in them
- Understand the appropriate use of active and passive voice in certain context

Units

1. Vocabulary-1:
1.1 Root words
1.2 Synonyms and Antonyms
1.3 Homonyms, Homophones and Homographs
1.4 One word substitutes

2. Vocabulary-2
2.1 Idioms and Phrases
2.2 Confusables

3. Grammar-1
3.1 The Parts of Speech
3.2 Use of Articles
3.3 Omission of Articles

4. Grammar-2
4.1 Tenses
4.2 Prepositions
4.3 Concord

5. Reading & Writing
5.1 Techniques of Reading, Reading Comprehension
5.2 Kinds of Sentences
5.3 Punctuation

6. Writing-2
6.1 Voice – Active voice and Passive Voice
6.2 Speech-Direct & Reported Speech
6.3 Common errors in English

Suggested Reading & References:

1. Word Power Made Easy by Norman Lewis
2. English Grammar In Use: A Self Study Reference And Practice Book Intermediate Learners Book by
   Raymond Murphy
3. The Logic of English Words by Logophilia Education
4. English Vocabulary In Use Elementary Book With Ans And Cd-Rom by Felicity Odell (Second
   Edition)
5. Effective Technical Communicatioin by M. Ashraf Rizvi
6. Intermediate grammar usage and composition; M.L.Tickoo, A.E.Subramanian, P.R.Subramanyam; OBS
7. An Interactive Grammar to Modern English by Shivendra K. Verma and HemalathaNagarajan,
   Frank Bros. & Co.

Course Learning Outcomes:
After completion of the course, the student will be able to:

- Demonstrate competence with suitable accuracy in vocabulary, and language fluency.
- State the definition of nouns, verbs, adjectives, and adverbs.
- Identify the differences of each tense and use the tenses accurately.
- Identify specialized reading strategies for specific types of texts
- Produce written work that is substantive, organized, and grammatically accurate.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	Sub. Code	Subject Name	L	T	P	C
I – I	9BC01	Engineering Graphics	1	0	4	3

Course objectives:

1. To teach students the basic principles of Engineering graphics and instruments used
2. To introduce the concept of projections in drawing and its applications for simple drawing entities
3. To impart the knowledge of various types of solids and their projections in different position wrt principle planes
4. To teach the concept of sections of solids and their applications
5. To develop a clear understanding of the basic principles involved in three dimensional Engineering drawings.
6. To train the students for the extraction of multiple views from a solid model using AutoCAD

Course outcomes

After completing this course, the student will able to:

1) Get familiar to use the instruments to solve the engineering problem and draw various type of curves used in engineering
2) Understand and Implement Orthographic projections and draw projections of simple drawing entities such as points Lines, and Planes
3) Draw projections of different types of regular solids in various positions wrt principal planes of projection
4) Draw Sections of various Solids including Cylinders, cones, prisms and pyramids and draw the developments of these solids and their sections.
5) Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views
6) Understand from basic sketching through 2D and 3-D solid modeling using computer aided design (CAD) software

CO	ENGINEERING GRAPHICS (8BC02)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Get familiar to use the instruments to solve the engineering	3		1												
CO2	Understand and Implement Orthographic	2		1												
CO3	Draw projections of different types of regular solids	2		1												

CO4	Draw Sections of various Solids including Cylinders, cones, prisms and pyramids	2		1														
CO5	Construct Isometric Scale, Isometric Projections and Views and convert 3D views to 2D orthographic views	2		1														
CO6	Understand from basic sketching through 2D and 3-D solid	2		1														
CO		2		1														

UNIT – I

Introduction to Engineering Drawing: Drawing Instruments and their uses, types of lines, Lettering, Dimensioning-Terms & notations, placing of dimensions, general rules of dimensioning.

Curves used in Engineering Practice and their Constructions: Conic Sections including Rectangular Hyperbola - General method, Cycloid and Involutes of circles

Scales: Reducing, Enlarging and Full Scales, types of scales, Construction of plain scales and diagonal scales only-simple problems

UNIT – II

Orthographic Projection: Principles of Projection – Methods of projection, First angle and third angle projections, Projections of Points, Projections of straight lines –line inclined to one plane and line inclined to both reference planes

UNIT –III

Projections of regular Planes: types of planes, plane inclined to one reference plane, Oblique planes

Projections of regular Solids: types of solids, Projections of: Prisms, Cylinders, Pyramids, Cones – simple position and axis inclined to one plane only

UNIT –IV
Sections and sectional views of Solids: Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

Development of Surfaces: Methods of development, Development of lateral Surfaces of Right Regular Solids – Prisms, Cylinders, Pyramids, Cones and their sections.

UNIT – V

Isometric Projection: Meaning, Isometric axes, lines and planes, Isometric Scale – Isometric drawing or View – Isometric drawing of planes and simple solids such as prisms, pyramids, cylinder, cone

UNIT –VI

Conversion of isometric views to orthographic views of simple objects.

Overview of Computer Graphics(Demonstration only) : Demonstrating features of the CAD software - The Menu System, Toolbars, , Dialog boxes and windows, Drawing entities - lines, circles, arcs etc and editing commands, Dimensioning of objects, 2 D drawings-simple exercises , 3D wire-frame and shaded solids- Commands, Boolean operations.

TextBook:

Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House (In First-angle Projection Method)

Reference Books:

1. Shah, M.B. &Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
2. Agrawal B. &Agrawal C. M. (2012), Engineering Graphics, TMH Publication
3. AUTOCAD Software Theory and User Manuals

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P**	**C**
I – I	**9HC61**	Oral Communication Lab-I	0	0	2	1

Course Objectives:
To enable students to:
- Comprehend the basic tactics to communicate effectively and set a road map to achieve their communication goals.
- Know the importance of pronunciation in effective communication and work on mitigating the MTI in their spoken English;
- Communicate in proper tense with conviction and also frame and pose questions aptly.
- Describe people, objects and situations, using appropriate vocabulary, phrases and sequencing of ideas.
- Use the right English language expressions in varying real life contexts.
Develop skill of narration through listening and coordination of ideas.

OC LAB (2 per week)

Unit 1: Communication Skills

Communication basics, essential elements of effective communication, barriers to communication, setting SMART communication goals.

Activities:

- Ice-breaking activities
- Personal Communication SWOT Analysis
- Communication Case Studies: The Terrible & The Terrific

Unit 2: Pronunciation Matters
Importance of pronunciation, neutralizing mother tongue interference (MTI).

Activities:
- Odd Word Out
- Minimal Pairs Masti
- Shadow reading

Unit 3: Use apt expressions in diverse situations
Self-introduction, Greetings, apologizing, complimenting, inviting, complaining etc.

Activity:
Role play in different contexts using the appropriate expressions

Unit 4:Mind your Tenses
Describing present and past habits, states, and events.
Talking about actions in progress, relating past to the present, talking about the future.
Framing questions. (confirmation/information questions)

Activities:
- Speaking activity on daily routine, how students spent their recent vacation, speaking about their childhood, speaking about future plans.
- Dumb Charades (Present/Past continuous - Present/ Past perfect)
- Guessing game (10/20 yes or no questions)

Unit 5: Hone your Describing skills
Describing people, objects, and situations

Activities:
- Picture descriptions.
- Guessing games - listening to the descriptions.
- Narrating memorable incidents from life.
- Describe your ideal world
- Once upon a time……

Unit 6: The Art of Storytelling
Story telling for career success, the basics of story telling
Activities:
- Building stories - chain activity.
- Story prompts activity.
- Narrate the story. (all the hints are given except linking words and tenses)

Suggested Reading & References:
- "An Interactive Grammar of Modern English" by Shivendra K Verma and HemalathaNagarajan, Frank Bros. & Co.
- "Skill Sutras" by JayashreeMohanraj, Prism Books Pvt. Ltd.
- "Better English pronunciation" by J.D. Connor.
- "Effective Communication" John Adair, Pan Macmillan Ltd.
- "Body Language", by Allan Pease, Sudha Publications.
- "Communicative English", by Hariprasad M. and Prakasam V, Neel Kamal Publications.

Course Learning Outcomes:
After completion of the course, the student will be able to:
- Describe people, objects and situations using simple sentences.
- Use appropriate tenses and expressions in different contexts of conversations.
- Identify major areas of concern in their oral communication and address them.
- Create a SMART plan to enhance their communication skills in English

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P**	**C**
I – I	**9HC66**	Engineering Physics Lab	0	0	3	1.5

Course Objectives

- Understand the concept of photo electric effect using photo voltaic cell.
- Discuss the dispersive power of prism-minimum deviation method.
- Discussion of diffraction pattern using the grating – LASER.
- To study the concepts (numerical aperture) of an optical fiber.
- To explain about magnetic induction, Biot-Savart principle.
- Study the frequency of AC mains using Sonometer.
- Explaining about the electrical resonance by using the LCR circuit.
- To understand the rigidity modulus, periodicity.
- To discuss the energy gap (E_g) of a semiconductor diode.
- To study the LED characteristics and forward resistance.
- To know the time constant of RC circuit.
- To understand about the ionizing radiation by using the Geiger–Muller counter.

CO	Engineering Physics Lab (8HC66)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Demonstrate the wave length of monochromatic source of light by using Newton's Rings	3	3													
CO2	Analyze refractive index of a material prism and Dispersive power of a glass Prism by using spectrometer	3	3													
CO3	Determine the wave length of spectral light and laser Source of light by using Diffraction Grating	3	3													
CO4	Design and Analyze RC Circuits	3	3													
CO5	Analyze RLC Series circuit and parallel circuit	3	3													
CO6	Investigate magnetic Circuits	3	2													
CO	3	3														

List of Experiments

1. Determination the Planck's constant using the photo voltaic cell - Photo voltaic cell.
2. Calculation of dispersive power of a given material of prism by using
   Spectrometer in minimum deviation method - Light.
3. Determination of wavelength of a given laser source of light by using diffraction grating in normal incidence method - LASER
4. Determination of a Numerical Aperture (NA) of an optical fiber – Fiber optics.
5. Determination of magnetic induction flux density along the axis of a current carrying circular coil using Stewart and Gee's experiment - Magnetism.
6. Calculating the frequency of AC supply by using the Sonometer – Magnetostriction method.

7. Study of series and parallel resonance of an LCR circuit – Electrical devices.
8. Determination of rigidity modulus of a given wire material using the Torsional pendulum - Vibrations
9. Determination of the energy gap (E_g) of a given semiconductor-Temperature/semiconductor.
10. Studying the characteristics and calculating the forward resistance of a LED – Semiconductor/devices.
11. Determination of time constant of an RC-circuit – Electrical/Electronics.
12. Studying the characteristics of Geiger–Muller counter and verifying the inverse square law - Nuclear physics

NOTE: Any **TEN** of the above experiments are to be conducted.

Course Outcomes

After completing the experiment, students are able to

- Understand the concepts of photo electric effect, importance, photo current, colour filters, optical sensors (photo voltaic cell).
- Know about the light properties-dispersion, prism, spectrometer and minimum deviation arrangement.
- Recognize the difference between the interference and diffraction, grating, laser characteristics.
- Analyze the concepts of fiber optics, fundamentals, numerical aperture its importance, attenuation in fiber and applications.
- Understand and search to apply the fundamentals of magnetic induction, Ampere's law, Oersted's law and the Biot-Savart law.
- Know the difference between AC and DC fundamentals, Magnetostriction, resonance, air column vibrations.
- Analyze the LCR circuit combination, parallel, series electrical resonance, inductance, reactance, capacitance and electrical and electronic fundamentals.
- Summarize the fundamentals of modulus-types, stress, strain, elasticity, plasticity and Hook's law.
- Analyze the concept a semiconductors, types, calculation of energy gap of a semiconductor diode and importance.
- Analyze the difference between normal diode, LED, forward bias, reverse bias, I-V characteristics, direct and indirect band gap semiconductors.
- Characterize the RC network, time constant, capacitor functioning and its application.

Understand the concept of radiation, ionizing radiation, radiological protection and inverse square law

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Syllabus for B. Tech (E.C.E.) – A22 regulation							
Year/Sem	Sub. Code	Subject Name	L	T	P/D	C
I – I	9FC61	Problem Solving using C Lab (Common to CSE, ECE and CE)	0	0	3	1.5

Course Objectives:

1. To be able to understand the fundamentals of programming in C Language
2. To be able to write, compile and debug programs in C
3. To be able to formulate problems and implement in C.
4. To be able to effectively choose programming components
5. To solve computing problems in real-world.

Course Outcomes:

After completion of this course student will learn

1. To formulate the algorithms for simple problems
2. To translate given algorithms to a working and correct program
3. To be able to correct syntax errors as reported by the compilers
4. To be able to identify and correct logical errors encountered at run time
5. To be able to write iterative as well as recursive programs
6. To be able to represent data in arrays, strings and structures and manipulate them through a program
7. To be able to declare pointers of different types and use them in defining self referential structures.
8. To be able to create, read and write to and from simple text files.

[The laboratory should be preceded or followed by a tutorial to explain the approach or algorithm to be implemented for the problem given.]

CO	Problem Solving using C LAB (8FC61)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	Explain basic fundamentals of Computer Systems, computing environments, Computer Languages – Machine Languages. Writing/ Drawing simple Algorithms and flowcharts.	3														
CO	Overall	3														

2. **Unit I (Cycle 1)**
   1. Write an algorithm for converting a given Celsius temperature to its equivalent Fahrenheit temperature and draw a flowchart.
   2. Write an algorithm to find the largest of three given numbers and draw a flowchart.
   3. Write an algorithm and draw a flowchart for finding the roots and nature of roots of a quadratic equation, given its coefficients.
   4. Write an algorithm and flowchart for finding the first n Fibonacci numbers, give n.

3. **Unit II (Cycle 2)**
   1. Write an algorithm, flowchart, and C program for:
   2. Finding the area and circumference of a circle of given radius.
   3. Finding the volume of a sphere of given radius.
   4. Finding the lateral surface area of a right circular cone of given base radius and height.
   5. Finding selling price of an item, given its cost price and profit percent.
   6. Finding the interest on a given principal for a given period of time at a given rate of per year.
   7. Write a C program to display all the sizes of data types in C.
   8. Write a C program to display a given decimal integer into an equivalent octal number and hexadecimal number using %o and %x in printf function.

4. **Unit II (Cycle 3)**
   1. Write a C program to find the roots and nature of the roots of a quadratic equation, given its coefficients.
   2. Write a C program for finding the largest of three given numbers.
   3. A salesman gets a commission of 5% on the sales he makes if his sales is below Rs.5000/- and a commission of 8% on the sales that exceeds Rs.5000/- together with Rs.250/-. Write an algorithm or a flowchart and develop C program for computing the commission of the salesman, given his sales.
   4. Write a C Program to demonstrate Marcos.

5. **Unit III (Cycle 4)**
   1. Write three C programs to print a multiplication table for a given number using while, do-while, and for loops.
   2. Write a C program to compute the sum of:
   3. $1+x+x^2+x^3+\ldots\ldots\ldots..+x^n$, given x and n.
   4. $1! + 2! + 3! + \ldots + n!$, given n.
   5. $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! + \ldots$ to n terms where the nth term becomes less than 0.0001.

6. **Unit III (Cycle 5)**
   1. Write a C program in the menu driven style to perform the operations +, -, *, /, % between two given integers.
   2. Write a C program to find the largest and the least of some numbers given by the user.
   3. Write a C program to find the sum of the digits of a positive integer.

7. **Unit III (Cycle 6)**
   1. Write C functions for the following:
      a) A function that takes an integer n as argument and returns 1 if it is a prime number and 0 otherwise.
      b) A function that takes a real number x and a positive integer n as arguments and returns x^n.
      c) A function that takes a positive integer n as an argument and returns the nth Fibonacci number.

   2. Using recursion write C functions for the following:
      a) Factorial of a non-negative integer n.

    b) Number of combinations of n things taken r at a time.
    c) Greatest Common Divisor of two integers.
    d) Least Common Multiple of two integers.

8. Unit III (Cycle 7)

    a) Write a menu driven style program to compute the above functions (cycle 6) on the choice of the function given by the user.
    b) Define macros for the following and use them to find sum of the squares of the minimum and maximum of two given numbers.
        a) Larger of two numbers.
        b) Smaller of two numbers.
        c) Sum of the squares of two numbers.
    c) Write a program to generate Pascal's triangle.
    d) Write a program to count the number of letters, words, and lines in a given text.

9. Unit IV (Cycle 8)

    1. Write a program to store the numbers given by the user in an array, and then to find the mean, deviations of the given values from the mean, and variance.
    2. Write a C program to initially store user given numbers in an array, display them and then to insert a given number at a given location and to delete a number at a given location.
    3. Write a program to store user given numbers in an array and find the locations of minimum and maximum values in the array and swap them and display the resulting array.

10. Unit IV (Cycle 9)

    1. Write a C program to implement the operations of matrices – addition, subtraction, multiplication.
    2. Write a program to find whether a given matrix is symmetric, lower triangular, upper triangular, diagonal, scalar, or unit matrix.

11. Unit V (Cycle 10)

    1. Write a function to swap two numbers.
    2. Write a function to compute area and circumference of a circle, having area and circumference as pointer arguments and radius as an ordinary argument.

12. Unit VI (Cycle 11)

    1. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, absolute value, multiplication, division, complex conjugate) and implement them in a menu driven style.
    2. Define a structure point. Write a program to find the distance between two points.
    3. Define a structure student having members roll no., name, class, section, marks. Create an array of 10 students give the data and find the average marks, section-wise.

13. Unit VI (Cycle 12)

    1. Write a program to:
        a) Create a file by the name given by the user or by command line argument and add the text given by the user to that file.
        b) Open the file created above and display the contents of the file.
        c) Copy a file into some other file, file names given by the user or by command line arguments.
        d) Append a user mentioned file to another file.
        e) Reverse the first n characters of a file.

I – II

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Syllabus for B. Tech (E.C.E.) – A22 regulation							
Year/Sem	Sub. Code	Subject Name	L	T	P	C
I – II	9HC04	ENGINEERING CHEMISTRY (Common to CSE, ECE and CE)	2	1	0	3

Course Objectives:

1. To understand microscopic chemistry in terms of atomic and molecular orbitals
2. To learn the preparation and applications of commercial polymers and lubricant materials
3. To learn the industrial problems caused by water and municipal water treatment
4. To acquire knowledge about different types of batteries and their working mechanism
5. To develop the concepqts and types of corrosion and the factors influence corrosion
6. To understand the control methods and protective coatings for metals and other surfaces

CO	Engineering Chemistry(8HC04)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	To understand microscopic chemistry in terms of atomic and molecular orbitals	3	2													
CO2	To learn the preparation and applications of commercial polymers and lubricant materials	2	3													
CO3	To learn the industrial problems caused by water and municipal water treatment	2	1													
CO4	To acquire knowledge about different types of batteries and their working mechanism	3	1													
CO5	To develop the concepts and types of corrosion and the factors influence corrosion	1	1													
CO6	To understand the control methods and protective coatings for metals and other surfaces	1	1													
Overall PO Mapping		2	1													

UNIT - I
Atomic and molecular structure (6L)
Molecular orbitals of diatomic molecules and plots of the multicentre orbitals.Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity.Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties.Band structure of solids and the role of doping on band structures.

UNIT - II
Plastics and Lubricants
Plastics (8L)
Polymerization-Addition and Condensation polymerization, Plastics – Thermosetting and Thermoplastics, preparation, properties and **engineering applications of plastics:** PVC, Teflon, Bakelite. Fibers: Nylon 6,6 and Dacron.
Rubbers – natural and artificial rubber, vulcanization of natural rubber, Buna-S, Buna-N and their **engineering applications.**
Fabricated Reinforcing Polymers**- engineering applications**

Lubricants

Definition, classification and function of lubricants, Types of lubrication and mechanisms – Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants – Viscosity, flash and fire point, cloud and pour point and acid value.**Engineering applications.**

UNIT - III

Water Technology (8L)

(a) **Introduction: -** Hardness of water – types of hardness (temporary and permanent), calculation of hardness- Numerical problems. Estimation of hardness of water by EDTA Method.

(b) **Water for Industrial purpose:** Food, sugar, textile, paper and pharma industries, water for steam making characteristics of boiler feed water, boiler troubles- scale and sludge & Carry over (priming &foaming), boiler corrosion, caustic embrittlement.

(c) **Water Treatment:** Internal conditioning- phosphate, carbonate &calgon conditioning. External Treatment: Ion-exchange process. Desalination-reverse osmosis. Municipal water treatment-sedimentation, coagulation, filtration, disinfection-chlorination, ozonization. **Engineering applications: Methodology and working of mineral water plant for drinking purpose.**

UNIT - IV
Electrochemistry (8L)
Conductance – conductors (metallic and electrolytic), types of conductance – specific, equivalent and molar conductance – effect of dilution on conductance.
Free energy and emf, cell potentials, electrode potential (oxidation and reduction).Types of electrodes - redox electrode (quinhydrode electrode), metal – metal insoluble salt electrode and Ion selective electrode.Cell notation and cell reaction –Nernst equation and applications.**Engineering Applications.**

Batteries : Types of batteries

(a)   Primary batteries – Lechalanche cell (dry cell), Lithium cell
(b)   Secondary batteries(Accumulators) – Lead acid battery, Lithium-ion battery
(c)   Fuel cells- $H_2 – O_2$ fuel cell and MeOH-O_2 fuel cell-advantages and applications.

Engineering applications – future water powered car, Hydrogen production and storage.

UNIT - V
Corrosion and its prevention (7L)

Corrosion – basic concepts –types of corrosion, chemical, electrochemical corrosion (absorption of O_2 and evolution of H_2). Types of electrochemical corrosion – galvanic corrosion, pitting corrosion, waterline corrosion- factors affecting the rate of corrosion.
Cathodic protection – sacrificial anodic protection and impressed current cathodic protection method.

UNIT-VI
Surface treatment (5L)

Mechanical surface treatment and coatings, casehardening and surface coating, thermal spraying, vapour deposition, Ion implantation, Diffusion coating.

Methods of metallic coatings-hot dipping (tinning and galvanizing), metal cladding (Al cladding), electroplating (copper plating) and electroless plating (nickel plating) and electroforming, ceramic, organic and diamond coating

TEXT BOOKS:
1. Engineering Chemistry: PK Jain & MK Jain, Dhanapathrai Publications (2018)
2. Engineering Chemistry: by Thirumala Chary Laxminarayana&Shashikala, Pearson Publications (2020)

REFERENCE BOOKS:

1. Textbook of Engineering Chemistry: Jaya Shree Anireddy, Wiley Publications (2019)
2. Engineering Chemistry: by &B.Rama Devi, PrsantaRath& Ch. VenkataRamana Reddy, Cengage Publications (2018)
3. Engineering Chemistry: ShashiChawla, Dhanapathrai Publications (2019)
4. Textbook of Engineering Chemistry: SS Dara, SS Umare S. Chand Publications (2004)

Course Outcomes
After completion of the course, the student will be able to:
1. Understand and analyse microscopic chemistry in terms of atomic orbitals, molecular orbitals and intermolecular forces.
2. Identify and differentiate polymers, thermoplastic, thermosetting plastics and various lubricants.
3. Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.
4. Understand and interpret the important fundamental concepts of electrochemistry and solve the problems related to batteries.
5. Differentiate the types of corrosion and methods used to prevent the corrosion.
6. Learn and implement surface coating techniques.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	Sub. Code	Subject Name	L	T	P	C
I – II	9EC01	DATA STRUCTURES (Common to all Branches)	3	0	0	3

Prerequisites: Problem Solving using C

Course Objectives:
1. To provide the knowledge of structures, unions, enum and typedef.
2. To understand and learn the applications of Abstract data Type, linear data structures such as stacks, queues and linked list.
3. To comprehend different nonlinear data structures.
4. To understand and analyze the concepts of various searching and sorting techniques.

Course Outcomes:
After completion of this course student will be able to:
1. Design the programs using structures, unions and enum.
2. Demonstrate the concepts of Abstract data type and also applications of stacks and queues.
3. Implement basic operations on single, double and circular linked list.
4. Solve problems involving Binary Search trees and AVL trees.
5. Articulate the concepts of graphs, heaps and hashing.
6. Develop algorithms for various searching and sorting techniques and analyze their performance.

UNIT I:
Structures: Introduction, types, initialization and accessing, Array of Structures, Nested Structures, Self-referential structures.Unions, enum, typedef, Dynamic Memory allocation.

UNIT II:
Introduction to data structures: Abstract data type (ADT), Stacks, Queues and Circular queues and their implementation with arrays.
Applications of Stack: infix to post fix conversion, postfix expression evaluation. Applications of Queues.

UNIT III:
Linked list: introduction, advantages of Linked list over Arrays.
Single linked list: creation, insertion, deletion and display operations
Double linked list: creation, insertion, deletion and display operations
Circular linked list: creation, insertion, deletion and display operations,Implementation of Stacks and Queues with singly linked list.

UNIT IV:
Trees: Terminology, Binary Tree: types, representation and traversals (in-order, pre-order, post-order).
Binary Search Tree: introduction, operations (insertion, deletion, display)
AVL Trees: Definition, examples, and operations (insertion, deletion and searching).

UNIT V:
Graphs: terminology, representation, traversals (DFS and BFS).
Heaps: Introduction, Min Heap, Max Heap, Operations on Heaps, Heap Sort.
Hashing: Hash Table, Hash functions.
Collision resolution techniques: separate chaining, open addressing-linear probing, quadratic probing, double hashing.

UNIT VI:
Searching: linear and binary search methods.
Sorting: Bubble Sort, Insertion Sort, Selection Sort, Quick sort, Merge sortPerformance analysis of Searching and Sorting Algorithms.

TEXT BOOKS:
1. Data Structures Using C second edition by ReemaThareja Oxford university press
2. Data Structure through C by YashavantKanetkar.

REFERENCES:
1. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft. Data Structures and Algorithms. Addison Wesley,1983.
2. Data Structures using c Aaron M.Tenenbaum ,YedidyahLangsam,MosheJAugenstein.
3. Introduction to Data Structures in C ByKamtane
4. Data Structures, A pseudocode Approach with C by Richard F. Gilberg and Behrouz A. Forouzan.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P**	**C**
I – II	9HC12	ADVANCED CALCULUS	2	1	0	3

Pre Requisites: Mathematics Knowledge at Pre-University Level

Course Objectives: To make the students to understand and expected to learn
1. *Basic concepts of multivariable differential calculus.*
2. *Evaluation of double and triple integrals.*
3. *Solutions of first order linear and non-linear partial differential equations.*
4. *Series expansion of a given function in terms of sine and cosine terms.*
5. *Basic Concepts of vector differential calculus.*
6. *Concepts of vector integral calculus,*

Syllabus

UNIT-I: Functions of several variables: Limits, Continuity and partial derivative, total derivative, Jacobian, Maxima and minima of two variable functions (without constraints).

UNIT-II: Multiple Integrals: Double integrals, change of order of integration, change of variables (Cartesian to polar), Triple integrals (Cartesian form).

UNIT-III: Partial Differential Equations: Formation of partial differential equations, solutions to first order linear and non-linear partial differential equations-standard Forms,

UNIT-IV: Fourier series: Dirichlet conditions, Fourier series of functions over the intervals of length $2l$ & 2π. Half range sine and cosine series, Problems on Parseval's theorem (without proof).

UNIT-V: Vector Differentiation: Vector and scalar point functions, gradient, directional derivatives; divergence and curl of a vector point function and problems.

UNIT-VI: Vector Integration: Line integrals, surface integrals, volume integrals, Green, Gauss divergence and Stokes theorems (without proofs) and problems.

Suggested Readings:
1. R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
2. B.S. Grewal, Elementary Engineering Mathematics, Khanna Publishers
3. Alan Jeffery, Advanced Engineering Mathematics, Academic Press
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

Course Outcomes: After the course completion the students will be able to
1. *Find the limits and test for the continuity and differentiability of a function.*
2. *Solve the problems on multiple integrals.*
3. *Solve linear and nonlinear first order partial differential equations.*
4. *Find Series expansion a function defined over the intervals.*
5. *Find directional derivative, gradient, divergence and curl of a function.*
6. *Solve problems of line, surface and volume integrals.*

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P**	**C**
I – II	9AC42	Electrical Circuits & Networks Analysis	2	1	0	3

Course Objective:
    To learn the fundamentals and applications of circuits and networks.

Course outcomes:
1. Understand the principle of different methods of electrical circuit reduction.
2. Understand the principle of single phase A.C circuits.
3. Understand the principle of magnetic circuits.
4. Understand the principles of network theorems along with its applications.
5. Understand the principle two port networks along with its applications.
6. Understand the principle of transients with both DC and AC excitation.

CO	Electrical Circuits & Networks Analysis (8AC42)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understand the principle of different methods of electrical circuit reduction.	3												3		
CO2	Understand the principle of single phase A.C circuits	2	2											2		
CO3	Understand the principle of magnetic circuits	2												2		
CO4	Understand the principles of network theorems along with its applications		2											2		
CO5	Understand the principle two port networks along with its applications	3	2											3		
CO6	Understand the principle of transients with both DC and AC excitation	2	3											3		
CO	Overall	2	2											3		

UNIT – I: INTRODUCTION TO ELECTRICAL CIRCUITS:

Circuit concept, R-L-C parameters, Voltage and current sources, Independent and dependent sources, Source transformation, Kirchhoff's laws, Network reduction techniques, series, parallel, series – parallel, Star- to-delta and Delta-to-star transformation, Mesh Analysis, Nodal analysis, Super mesh, Super node concept.
Applications: For finding of voltage and current of different points of OPAMP circuit.

UNIT – II: SINGLE PHASE A.C. CIRCUITS:

R.M.S and Average values, Form factor for different periodic wave forms, Steady state Analysis of R, L and C (in series, parallel and series-parallel combinations) with sinusoidal excitation.
Resonance in series and parallel circuits, Concept of band width and Q factor.
APPLICATIONS: tuning of a channel in radio receiver.

UNIT – III MAGNETIC CIRCUITS:

Basic terms in Magnetic Circuits, Comparison between electric and magnetic circuits, Composite magnetic circuit, Analysis of series, parallel magnetic circuits, Faraday's Laws of electromagnetic induction, Concept of self and mutual inductance, Dot convention, Co-efficient of coupling.
APPLICATIONS: working of transformer and dc machines.

UNIT – IV: NETWORK THEOREMS:

Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer and Millman's Theorems - statements and problems solving using dependent and independent sources with D.C. excitation.
Applications: For finding of voltage and current of different points of OPAMP circuits.

UNIT – V: TWO–PORT NETWORKS:

Z,Y, ABCD and h-parameters, Conversion of one parameter to another parameter, Condition for reciprocity and symmetry, two port network connections in series, parallel and cascaded configurations, Problem solving.
APPLICATIONS: analysis of electrical transmission network.

UNIT – VI: TRANSIENT ANALYSIS:

Transient response of R-L, R-C, R-L-C series circuits with D.C. and A.C excitations, Initial conditions, Solution using differential equation approach and Laplace transform methods of solutions.
APPLICATIONS: transientanalysis of electrical machines.

TEXT BOOKS:

1. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, McGraw Hill 5th Edition, 1993.
2. Circuits & Networks – M.S. Sukhija, K.N. Nagasarkar, Oxford University Press, 2nd edition.

REFERENCES:

1. Network Analysis - M.E. Vanvalkenberg, 3rd edition, PHI.
2. Circuit theory (Analysis & Synthesis) – A.Chakravarthy, DhanpathRai& Co., 6th edition.
Circuits & Networks – A.Sudhakar and ShyamamohanS.Palli, Tata McGraw Hill, 3rdedition.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P**	**C**
I – II	9HC62	Oral Communication Lab-II	0	0	3	1.5

Course Objectives:
To enable students to:
- Strike a conversation and engage in effective small talk.
- Lose stage fear and confidently interact with others in different roles and tap their creative side.
- Speak for a minute, fluently and cohesively.
- Make official presentations with effective use of PPTs.
- Engage in group discussions in a confident and professional manner.
- Shed fear of questions from the audience and the interviewers.

Units
OC Lab (2 hrs. per week)

Unit 1
Small talk and conversational techniques
Tips on enhancing conversation skills.
Conversation starters, small talk questions, how to talk to strangers andpractice activities on initiating informal conversations.
- Talk about your favourite things.
- Interview each other.

Unit 2
Role Play/skit/one act play
- Role play assuming fictional characters and non-fictional characters.
- One Act plays
- Ad' Venture: Advertisement creation and enacting.

Unit 3
Just a minute (JAM)
One-minute speaking activity on topics of students' choice and Extempore.

Unit 4
Presentation skills
Introduction to structural talk.Techniques of making effective presentations.
- Five minute PowerPoint presentations.

Unit 5
Group Discussions
Tips on Dos and Don'ts of Group Discussion (GD).Discussion on evaluation pattern during GD.
- Practice sessions: GDs on different topics.

Unit 6
Facing questions: Mock Interviews
Strategies of handling Question and Answer sessions after Presentations/seminars.

- Question Toss: Practice on asking and answering questions.

Suggested Reading:

- "Effective Technical Communication" by M. Ashraf Rizvi, McGraw Hill.
- "Skill Sutras" by JayashreeMohanraj, Prism Books Pvt. Ltd.
- "Technical Communication: Principles and Practice" by Meenakshi Raman, OUP.
- "Effective Communication" John Adair, Pan Macmillan Ltd.
- "Body Language", by Allan Pease, Sudha Publications.
- "Business Communication: From Principles to Practice" MM Monippally, TataMcGraw Hill.

Course Learning Outcomes:

- Understand the nuances of striking a great conversation in formal and informal situations.
- Gain experience of facing an audience and speaking in public.
- Design a winning presentation and present it with ease.

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Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
I – II	9HC64	Engineering Chemistry Lab (Common to CSE, ECE and CE)	0	0	3	1.5

Course Objectives:

The student will be able to learn:

1. To reparation of Inorganic compounds

2. To determine surface tension of a liquid

3. To determine viscosity of lubricant

4. To determine acid value of an oil

5. To estimate hardness of water

6. To analyze the amount of chloride content

7. To determine cell constant and conductance of solutions

8. To determine redox potential and emf of solutions

9. To determine the rate constant of acid

10. To synthesize a polymer (Thiakol rubber / Urea-Formaldehyde resin)

11. To synthesize a drug- Aspirin

12. To estimate of Mn^{+7} by Colorimetry method

CO	Engineering Chemistry Lab(**8HC64**)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Describe the principle and theory in determination of Hardness of a water sample. Experiment the method of preparation for organic compounds.	2	2				3									
C0	Overall	2	2				3									

List of Experiments

1. Preparation of coordination complex NiDMG Complex

2. Determination of surface tension

3. Determination of viscosity

4. Saponification/acid value of an oil

5. Ion exchange column for removal of hardness of water / Estimation of Hardness of water by EDTA Method

6. Determination of chloride content of water

7. Determination of cell constant and conductance of solutions (HClVsNaOH / Mixture of acid Vs Strong base)

8. Potentiometry - determination of redox potential and emf (FeSO$_4$ Vs KMNO$_4$ / HClVsNaOH)

9. Determination of the rate constant of acid catalyzed hydrolysis of methylacetete

10. Synthesis of a polymer- Thiakol rubber / Urea-Farmaldehyde resin

11. Synthesis of a drug- Aspirin

12. Estimation of Mn^{+7} by Colorimetry method

Course Outcomes

After completion of the course, the student will be able to learn:

1. Preparation of Inorganic compounds

2. Determination surface tension of a liquid

3. Determination viscosity of lubricant

4. Determination acid value of an oil

5. Estimation hardness of water

6. Analysis the amount of chloride content

7. Determination of cell constant and conductance of solutions

8. Determination of redox potential and emf of solutions

9. Determination of the rate constant of acid

10. Synthesis of a polymer (Thiakol rubber / Urea-Farmaldehyde resin)

11. Synthesis of a drug- Aspirin

12. Estimation of Mn^{+7} by Colorimetry method

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	Sub. Code	Subject Name	L	T	P/D	C
I – II	9EC61	Data Structures Using C Lab (Common to all Branches)	0	0	3	1.5

Prerequisites: Problem Solving using C Lab
Course objectives:
1. *Create programs on structures and unions*
2. *Develop the programs on Linear and Non-Linear data structures*
3. *Write programs on various searching and sorting algorithms.*

Course Outcomes:

After completion of the course, the student will be able to:
1. *Write programs on structures and unions.*
2. *Implement Stacks, Queues and circular queues using arrays.*
3. *Write programs to implement basic operations on various types of linked list.*
4. *Implement insertion and traversal operations on binary search tree*
5. *Develop programs on various searching, sorting algorithms.*

Note: Lab Projects will be allocated to the students at the beginning of the semester.

Cycle 1:
1. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, absolute value, multiplication, division, complex conjugate) and implement them in a menu driven style.
2. Define a structure student having members roll no., name, class, section, marks.
   Create an array of 10 students give the data and find the average marks, section-wise.

Cycle 2:
3. Write a C program that implement stack and its operations using arrays
4. Write a C program that implement Queue and its operations using arrays.
5. Write a C program that implement Circular Queue and its operations using arrays.

Cycle 3:
6. Write a C program that uses Stack operations to perform the following:
   i) Converting infix expression into postfix expression
   ii) Evaluating the postfix expression

Cycle 4:
7. Write a C program that uses functions to perform the following operations on singly linked list:
   i) Creation ii) Insertion iii) Deletion iv) Traversal

Cycle 5:
8. Write a C program that uses functions to perform the following operations on doubly linked list:
   i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways
Cycle 6:
9. Write a C program using functions to perform the following operations on circular singly linked list:
   i) Creation   ii) Insertion   iii) Deletion   iv) Traversal

Cycle 7:

10. Write a C program to implement operations on the following Data Structures Using Singly linked list:

    i) Stack   ii) Queue

Cycle 8:

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

    i) Creating a Binary Search Tree.

    ii) Traversing the above binary tree in pre-order, in-order and post-order.

Cycle 9:

12. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:

    i) Linear Search   ii) Binary Search

Cycle 10:

13. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

    i) Bubble Sort   ii) Insertion Sort   iii) Selection Sort

Cycle 11:

14. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:

    i) Quick sort ii) Merge sort iii) Heap Sort

Cycle 12:

15 Lab Projects- Design and Develop Case Studies such as ,Graph Traversal Techniques, Collision Resolution Techniques

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
I – II	9BC61	Workshop/Manufacturing Processes Lab	0	1	3	2.5

COURSE OBJECTIVES:

1) To know the different popular manufacturing process
2) To gain a good basic working knowledge required for the production of various engineering products
3) To provide hands on experience about use of different engineering materials, tools, equipment's and processes those are common in the engineering field
4) To identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances

COURSE OUTCOMES: After completion of the course, the student will be able to:

CO-1: Use various types of conventional manufacturing Processes

CO-2: Manufacture components from wood, MS flat, GI Sheet etc. – hands on experience

CO-3: Manufacturing of components by machining like shafts, holes & threaded holes, surface finishing of components etc.

CO-4: Produce small devices / products /appliances by assembling different components

CO	Workshop/Manufacturing Processes Lab (**8BC61**)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	After completion of the course, the student will be able to **fabricate** components with their own hands	3														
CO2	Assemble different components and produce small devices of their interest.															
CO	Overall	3														

LIST OF EXPERIMENTS

S.No	Trades	Experiment name
1	Fitting Shop	1. Preparation of T-Shape Work piece 2.Preparation of U-Shape Work piece which contains: Filing, Sawing, Drilling, Grinding.
2	Carpentry	3. Cross Half Lap joint 4. Half Lap Dovetail joint
3	Electrical & Electronics	5. One lamp one switch 6. Stair case wiring

4	Welding (Arc & Gas) & Soldering	7. Practice of Lap and Butt joint by Arc welding Demonstration: Gaswelding, Resistance welding& Soldering
5	Casting	8. Preparation of mouldcavityusing solid pattern 9. Preparation of mouldcavityusing split pattern Demonstration: pouring of molten metal
6	Tin Smithy	10. Preparation of Rectangular Tray 11. Preparation of Square box
7	Machine Shop	Turning, Drilling and grinding operations on Lathe, Drilling and grinding machines
8	Plastic molding& Glass Cutting	12 a) Injection Moulding b) Glass Cutting with hand tools
9	Domestic Appliances	Study of internal components & circuit of appliances such as Fans, Mixers, Air blower, Iron box, Rice cooker, Emergency light etc.,
10	Lab project	Making various components and / or assembling the components which can be useful in domestic / engineering applications

II– I

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – I	9CC01	Electronic Devices and Circuits	3	0	0	3

Course Objectives
- To provide the learners a comprehensive understanding of electronic Components like Diodes, Transistors, Field Effect transistors and their applications.
- To maintain the right blend of theory and practice in analyzingand designing of Amplifiers and Oscillators.

Course Outcomes
After studying this course, the students will be able to
- [CO1] Demonstrate the concepts of pn Diode, Zener Diode, Bipolar Junction Transistor, Field Effect Transistor and their characteristics.
- [CO2] Design and Analyze the Amplifier circuitsusingBJT and FET.
- [CO3] Classify and characterize the Feed Back amplifiers and design various Oscillator circuits.
- [CO4] Understand the Basic regulator circuits and voltage multipliers.

CO	Electronic Devices and Circuits (8CC01)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	Understand the operation of semiconductor diode	3												1		
CO2	Understand the Fundamentals of BJT operation,	2	2											1		
CO3	Understand the Fundamentals of SCR, JFET operation.	3	2	1										2		
CO4	Understand the Analysis and design of Amplifier and Oscillators	2	2	2										2		
CO5	Understand the Basic regulator circuits and voltage multipliers. .	2	2	3										2		
CO6	Explore the various number systems	1	2	1										2		
CO	Overall	2	2	2										2		

UNIT-I

PN JUNCTION DIODE: [CO1][T1][Lecture hrs – 10]
P-N Junction diode characteristics and applications under forward & reverse bias.Transition capacitance and Diffusion capacitance. Break down of junctions (Avalanche Break Down and Zener Break down). Zener Diode Characteristics.
P-N junction diode as a Rectifier :Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Analysis of Rectifier circuits without and with filters (Inductor and Capacitor Filters).

UNIT- II

BIPOLAR JUNCTION TRANSISTOR:[CO1][T1][Lecture hrs – 10]
Fundamentals of BJT& Operation, Minority carrier profiles. I/P and O/P Characteristics CB, CE and CC configurations.Transistor as a switch. Switching characteristics (Rise time, Fall time, Delay Time and Storage time), Design of transistor as switch. Problems on transistor switch. BJT Biasing Methods & Stabilization. - Fixed Bias, Collector to Base Bias, Voltage Divider Bias and Problems, Concept of Thermal runway in BJT.

UNIT-III

Small signal & High frequency analysis of BJT:[CO2][T1][Lecture hrs – 8]
Small signal Low frequency Model of BJT, h-parameter representation – Exact analysis of .CE Amplifier-.Approximate analysis of CE, CB and CC Amplifiers. Concept of Multistage amplifier - N-stage cascaded amplifier, equivalent circuits, Frequency response of single & two stage RC coupled Amplifier, Analysis at Low and High frequencies.
Hybrid π model – relationship between high frequency parameters and h- parameters, β cut off Frequency (common Emitter short circuit Current gain), Millers Theorem.

UNIT-IV

FIELD EFFECT TRANSISTOR:[CO1][CO2][T1] [Lecture hrs – 9]
Construction & Working of JFET, JFET characteristics, FET Parameters, Construction & Working of MOSFET, MOSFET characteristics,(Enhancement and depletion mode); Comparison of JFET & MOSFET
Biasing of JFET - Self bias and fixed bias. Small signal Analysis of common source, common drain and common gate amplifier configurations

UNIT- V [CO3] [T1][Lecture hrs – 8]

FEED BACK AMPLIFIERS
Fundamentals-classification- Characteristics of feedback Amplifier effect of feedback in voltage series, voltage shunt, current series and current shunt amplifiers. Problems

OSCILLATORS
Classification of Oscillators. Condition for Oscillations. RC Phase shift Oscillator , Wein bridge oscillator- Hartley oscillator, Colpitts oscillator, Quartz crystal Oscillator,
UNIT-VI

VOLTAGE REGULATORS:[CO4][T1][T2][Lecture hrs – 9]

Classification of Voltage Regulators - Basic regulator circuit: Zener, Transistor Based: Shunt and Series Voltage regulators. Protection Circuits: Current limiting, Short circuit protection. Specifications of Voltage regulator, Voltage multipliers. Switching Regulators – (boost up, step down (buck) &Flyback)

Text Books

[T1]Electronic Devices and Crcuits-J.Millman, C.C.Halkias and satyabrathajit Tata McGraw Hill,2 Ed. 2007

[T2]Electronic Devices AND Circuits-R.L.Boylestad&LouisNashelsky, Pearson/Prentice Hall, 9th edition, 2006.

References

[R1]Electronic circuit analysis-K.Lal Kisshore,2004,BSP

[R2] Electronic Devices and Circuits by S.Salivahanan and N.Suresh Kumar, Tata McGraw Hill Publications

[R3] Electronic Devices and Crcuits by SanjeevGuptha,DhapatRai Publications.

[R4] Electronic Devices and Circuits – K.LalKishore, 2 ed., 2005, BSP

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – I	9CC02	Signals and Systems (Common to ECE/ECM)	3	0	0	3

Pre Requisites: Mathematics-Integration, Differentiation and basic representation of Laplace & Z Transforms

Course Objectives :

To study the concepts of signals and systems their characterization in the Time as well as frequency domains

To know the importance of sampling theorem and various sampling methods to convert continuous time signals into discrete time signals

COURSE OUTCOMES:

After studying this course, the students will be able to

CO1. Understand the concepts of signals, comparison of signals, orthogonal signal space and Apply the orthogonality properties to understand the Fourier methods of signal analysis - Fouries series and Fourier Transforms. **(UNIT- I & II)**

CO2. Understand the concepts of systems, their characterization in the Time as well as Transformed domains and apply the mathematical tools, such as Convolution, Correlation and the Laplace transform to analyze signals and systems. **(UNIT- III & IV)**

CO3. Determine the sampling frequency for any low pass and band pass signals applying the sampling theorem. **(UNIT- V)**

CO4. Distinguish between continuous and Discrete time signals and systems. Apply the concepts of Z-Transforms in the analysis of DT signals and systems. **(UNIT- VI)**

UNIT I[Lecture hrs – 9]

Signals: Signals. Classification of Signals.Even, Odd, Periodic.Non-periodic.Energy and Power Signals.Exponential and Sinusoidal Signals.Concepts of Impulse Function.Unit Step Function.Signum Function. [T1, T2]

Signal Analysis - Analogy between Vectors and Signals. Orthogonal Signal Space. Signal Approximation using Orthogonal Functions. Mean Square Error. Closed or Complete Set of Orthogonal Functions.Orthogonality in Complex Functions. [T1, T2]

Applications: The concepts of orthogonality find applications in DSP, DIP, DC, Design of experiments and so on.

UNIT-II[Lecture hrs – 10]

Fourier Representation of Continuous Time Signals

Periodic Signals- Fourier Series, Dirichlet'sConditions.Trigonometric.Exponential Fourier series. Fourier Spectrum.[T2]

Non- Periodic Signals - Fourier Transforms. Fourier Transform of Arbitrary Signal. Standard Signals. Fourier Transform of Periodic Signals. Properties of Fourier Transforms. Fourier Transforms Involving Impulse and Signum Function Introduction to Hilbert Transform. [T1, T2]

Applications: Knowledge of signal bandwidth is necessary in the design of a filter; in the determination of the carrier frequency and also the sampling frequency and analog communication.

UNIT-III [Lecture hrs – 11]

Signal Transmission through Linear Systems
Systems.Classification of Systems.LinearSystem.Impulse Response (IR) of a Linear System.Linear Time Invariant (LTI) System.Linear Time Variant (LTV) System. Transfer Function of a LTI System. Filter Characteristics of Linear Systems. Distortion Less Transmission Through a System. Signal Bandwidth. System Bandwidth.Ideal LPF, HPF and BPF Characteristics.Causality and Poly-Wiener Criterion for Physical Realization. Relationship between Bandwidth and Rise Time.[T2]

Applications: The concept of system bandwidth is applied in the design of a practical filter or system.

UNIT-IV [Lecture hrs – 11]

Convolution and Correlation of Signals
Concept of Convolution in Time Domain and Frequency Domain.Graphical Representation of Convolution.Convolution Properties. Cross Correlation and Auto Correlation of Functions. Properties of Correlation Function, Relation between Convolution and Correlation.Energy Density Spectrum, Parseval's Theorem, Power density spectrum, Detection of periodic signals in the presence of Noise by Auto and Cross Correlations.[T2]

Laplace Transforms - Review of Laplace Transforms. Partial Fraction Expansion. Inverse Laplace Transform. Concept of Region of Convergence (ROC) for Laplace Transforms. Constraints on ROC for Various Classes of Signals.Properties of LT.Initial and final value theorems, Relation between LT and FT of a Signal. Laplace Transform of Certain Signals using Waveform Synthesis. Laplace Transform of Periodic Signals.[T1, T2]

Applications: These math tools are required in the design, analysis and implementation of various filters, LT signals and systems.

UNIT-V [Lecture hrs – 9]

Sampling
Sampling Theorem.Graphical and Analytical Proof for Band Limited Signals.Impulse (Ideal) Sampling.Natural (Chopped) Sampling and Flat Top(S&H) Sampling.Reconstruction of Signal from its Samples.Effect of Under Sampling.Aliasing. Introduction to Band Pass Sampling.[T1, T2]

Applications: Sampling techniques are applied in the conversion of analog to digital conversion

UNIT-VI [Lecture hrs – 8]

Z–Transforms
Fundamental Difference between Continuous and Discrete Time Signals. Discrete Time Signal Representation using Complex Exponential and Sinusoidal Components. Periodicity of Discrete Time using Complex Exponential Signal.Concept of Z- Transform of a Discrete Sequence. Distinction Between Laplace, Fourier and Z Transforms. Region of Convergence in Z-Transform.Constraints on ROC for Various Classes of Signals.Inverse Z-Transform.Properties of Z-Transforms.Initial and final value theorems.Introduction to Discrete Time Systems. [T2]
Applications: Analysis and Synthesis of DT signals and systems.

Text Books

1. Signals, Systems and Communications- B. P. Lathi, BSPublications.
2. Signals and Systems – Anand Kumar, 2nd Edition, PHI Publications.

References

1. Signals & Systems – Simon Haykin and Van Veen, 2nd Edition, WileyPublications.
2. Signal processing and Linear Syustems - B. P. Lathi, BSPublications.
3. Signals & Systems -A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2^{nd}Edn, PHI Publications.
4. Linear Systems and Signal Processing - B. P. Lathi, Oxford University Press.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	Sub. Code	Subject Name	L	T	P/D	C
II – I	9CC03	Probability Theory and Stochastic Process	2	1	0	3

Course Objectives

- To establish basic foundations on the concepts of probability theory, random variables, random processes and statistical averages.
- To acquaint the learners with the applications of random variables and random processes, in communication systems.

Course Outcomes

After studying this course, the students will be able to

[CO5] Explore the concepts of Probability of Random Events, Joint, Marginal, Conditional and Total Probabilities, Bayes Theorem.

[CO6] Understand the concepts of probability distribution and probability density functions, their properties for single and multiple random variables. Also characterize various statistical averages based on probability density function.

[CO7] Analyze the different types of random processes, their statistical parameters such as Auto-correlation function, Power Density Spectrum.

[CO8] Characterize the response of LTI systems to random processes and explore the applications of probability in Information theory.

CO	Probability Theory and Stochastic Process (8C304)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understand the concepts of Probability, Understand concepts of multiple random variables,	3	2											3		1
CO2	Understand concepts of Discrete Random Variables	3	2											3		1
CO3	Understand concepts of multiple random variables	2	3	1										1		1
CO4	Understand concepts of the.Mean. Auto-correlation, Auto-covariance and Auto-correlation	2	3	1										2		
CO5	Understand the concepts of Power Spectral Density Function of Random Process,	1	2	2	3									2		
CO6	Understand the concepts of Random Signal Response of Linear Systems	2	1	3	2									2		
CO	Overall	2	2	2	3									2		1

UNIT I[Lecture hrs – 10]

PROBABILITY THEORY [T1] [CO1]
Set Definitions.Sample Points and Sample Spaces.Probability of Random Events.Laws of Probability.Joint,Marginal and Conditional Probabilities. Total Probability. Bayes Theorem. Statistical Independence.

Applications. Bayes theorem in calculation of channel capacity, Information Theory i.e., Entropy, Mutual information (rate at which source generates information)

UNIT-II[Lecture hrs – 8]

RANDOM VARIABLES [T1] [CO2]
Probability Distribution Functions.Discrete Random Variables and Probability Mass Function.Expectedvalues.Continuous Random Variables.Probability Density Functions.Complex Random Variables. Moments and Characteristic Functions. Distributions and Density Functions and their Properties.Expected Values. Moments and Characteristic Functions – Binomial. Poisson.Uniform.Gaussian.Exponential. Rayleigh. Transformations of Random Variables.
Applications : Design of queue for Tele communications using Binomial, Poisson distributions.

UNIT-III[Lecture hrs – 8]

RANDOM VECTORS [T1] [CO2]
Joint Probability Distribution Functions.Joint Probability Densities.Conditional Probability Distributions Functions.Marginal Distributions and Density Functions.Conditional Probability Densities.Expected Value of a Function of Random Variables.Joint Moments. Joint Characteristic Functions. Sum of Two RandomVariables.Sum of Several Random Variables.central limit theorem (proof not expected)Jointly Gaussian Random Variables. Independent Random Variables.Transformations (Functions) of Multiple Random Variables.
Applications :design of optimum filter,

UNIT-IV[Lecture hrs – 10]

RANDOM PROCESSES [T1] [CO3]
Definition: The concept. Probabilistic Structure.Classification.Formal Definition. Description: Joint Distribution. Analytical Description using Random Variables. Average Values: Mean. Auto-correlation, Auto-covariance and Auto-correlation Coefficient. Two or More Random Processes: Cross-correlation Function. Cross-covariance Function.Cross-correlation Coefficient.

Applications: Calculation Coding efficiency ofShanonFano Coding.

UNIT-V[Lecture hrs – 9]

STATIONARITY AND CORRELATION THEORY [T1] [CO3]
Strict-sense Stationarity. Wide-sense Stationarity (WSS). Auto-correlation Function of Real WSS Random Process and its Properties.Cross-correlation Function and its Properties.Power Spectral Density Function of a WSS Random Process and its properties.Wiener-KhinchineTheorem.Power and Bandwidth Calculations. Cross-power Spectral Density Function and its Properties
Time Averaging and Ergodicity: Time Averages – Interpretation. Mean and Variance. Ergodicity.GeneralDefinition.Mean-ergodic. Correlation -ergodic.

Applications: Removal of noise using correlation, probability of error in Digital Communications.

UNIT-VI [Lecture hrs – 9]

LINEAR SYSTEMS WITH RANDOM INPUTS [T2] [CO4]
Value of System Random Signal Response of Linear Systems: System Response – Convolution. Mean and Mean-squared Response. Autocorrelation Function of Response. Cross-Correlation Functions of Input and Output. Spectral Characteristics of System Response. Power Density Spectrum of Response. Cross-Power Density Spectrums of Input and Output. Band Pass. Band-Limited and Narrowband Processes. Properties. Thermal Noise. Shot noise.
Information Theory: Entropy, Joint Entropy, Conditional Entropy and Mutual Information

Applications– Modulation, SNR calculations.

Text Books

[T1] Peyton Z. Peebles Jr., Probability, Random Variables and Random Signal Principles, 4th edn., Tata McGraw-Hill, New Delhi, 2002.

[T2] R.P.Singh, S.D.Sapre, Communication Systems; Analog and Digital, Tata McGraw Hill, New Delhi, 3rd Ed, 2012.

References

[R1] G. R. Grimmett, D. R. Stirzaker, Probability and Random Processes, Second Edition, Oxford Science Publications, 1995.

[R2] Hwei HSU, Probability, Random Variables & Random Processes, Schaum's Outlines, TMH, 2009

[R3] Athanasios Papoulis, S.UnnikrishnaPillai, Probability, Random Variables and Stochastic Process , PHI, 4th Edition, 2002

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

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Year/Sem	Sub. Code	Subject Name	L	T	P/D	C
		Syllabus for B. Tech (E.C.E.) – A22 regulation				
II – I	9HC14	Complex Variable And Transform Techniques	2	1	0	3

Pre Requisites: Mathematics Knowledge at Pre-University Level

Course Objectives: *To make the students to understand and expected to learn*
1. Basic concepts of differential calculus of a complex variable function.
2. Complex integration and its application to evaluate definite integrals.
3. Concepts of conformal mapping and their properties
4. Laplace transforms and the contents of this topic.
5. Inverse transform, solving ordinary differential equations using Laplace transforms technique.
6. Z-Transforms, Its properties, solving difference equations using Z-Transforms.

Syllabus

UNIT-I: Complex Variable Differentiation: Differentiation, analytic functions, Cauchy-Riemann equations, harmonic functions, finding harmonic conjugate and analytic functions.

UNIT-II: Complex Variable Integration: Cauchy- integral theorem and integral formula (without proofs), singularities, zeros of analytic functions, Residues, Cauchy residue theorem (without proof), Evaluation of definite integral involving sine and cosine functions.

UNIT-III: Conformal Transformation: Conformal mapping-Translation, Inversion, Rotation and Magnification, Mobius (Bilinear) transformation- Invariant points of bilinear transformation, cross ratio-Determination of bilinear transformation for three given points.

UNIT-IV: Laplace Transform: Laplace transform of standard functions, shifting theorems, change of scale property, Laplace Transform of derivatives and integrals, multiplication by powers of 't', divison by 't' (without proofs). Laplace transform of unit step function, impulse function.

UNIT-V: Inverse Laplace Transform: Inverse transform**:** properties, partial fraction method and convolution theorem (without proof). Solution of ordinary differential equations with constant coefficients using Laplace Transforms.

UNIT-VI: Z- Transform: Z- Transforms and inverse Z-transforms, properties, damping rule, shifting properties, initial and final value theorems convolution theorem (without proofs). Solution of difference equation by Z- transforms

Suggested Readings:
1. R K Jain and S R K Iyengar Advanced Engineering Mathematics, Narosa Publications.
2. Alan Jeffery, Advanced Engineering Mathematics, Academic Press
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

Course Outcomes: Students will able to
1. Solve the problems on differential calculus of complex variable.
2. Solve the problems on contour integration.
3. Solve problems on bilinear transformation.
4. Evaluate the Laplace transform of a given function.
5. Find Inverse Laplace of a transform
6. Solve problems on Z-Transform.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – I	9ZC01	Business Economics And Financial Analysis	3	0	0	3

After completion of the course the student will be able to :

Co 1: Explain the Basics of Economics and its relation to Business Economics (L2)

Co 2: Analyze the production function in terms of cost and revenue (L4)

Co 3: Examine the basic market structures and their relevance to business (L4)

Co 4: Outline the fundamentals of financial accounting and prepare financial statements (L2)

Co 5: Apply financial ratios to analyze the financial performance of the company (L3)

UNIT I-INTRODUCTION TO BUSINESS ECONOMICS:

Definition, Nature and Scope of Business Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions, Elasticity of Demand, Types of Elasticity of Demand and Demand Forecasting – Statistical and Non-Statistical techniques.

UNIT II-THEORY OF PRODUCTION AND COST ANALYSIS:

Production Function – Isoquants and Isocosts, Internal and External Economies of Scale, Law of Returns Cost Analysis: Cost concepts, different types of costs, Break-even Analysis (BEA)- Determination of Break-Even Point (simple problems).

UNIT III-INTRODUCTION TO MARKETS

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition, Pricing Methods and strategies.

UNIT IV-FINANCIAL ACCOUNTING - I:

Accounting concepts and Conventions, Double-Entry system of Accounting, Accounting Cycle, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance.

UNIT V-FINANCIAL ACCOUNTING – II:

Introduction to Final accounts, Revenue and Capital Expenditure, elements of Financial Statements, Preparation of Final Accounts with simple adjustments (simple problems).

UNIT-VI-FINANCIAL ANALYSIS THROUGH RATIOS:

Concept of Ratio Analysis, Various Types of Ratios: Liquidity Ratios (short term solvency ratios), Leverage Ratios (long term solvency ratios), Turnover Ratios and Profitability Ratios (Simple problems).

TEXT BOOKS:

• Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.

REFERENCES:

• Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.

• H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.

• Suma Damodaran, Managerial Economics, Oxford University Press.

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Year/Sem	Sub. Code	Subject Name	L	T	P/D	C
— Syllabus for B. Tech (E.C.E.) – A22 regulation						
II – I	9HC03	Universal Human Values	3	0	0	3

Human Values Courses: This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values 2: Understanding Harmony"is designed which may be covered in their III or IV semester. During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.

OBJECTIVE: The objective of the course is four fold:
1. *Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.*
2. *Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence*
3. *Strengthening of self-reflection.*
4. *Development of commitment and courage to act.*

COURSE TOPICS: The course has 28 lectures and 14 practice sessions in 6 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education
1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!
7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
8. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of 'I' and harmony in 'I'
11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensureSanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship
13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
14. Understanding the meaning of Trust; Difference between intention and competence

15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence
18. Understanding the harmony in the Nature
19. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
20. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space
21. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module 5: Implications of the above Holistic Understanding
22. Natural acceptance of human values
23. Definitiveness of Ethical Human Conduct
24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

Module 6:Harmony on Professional Ethics
25. Competence in professional ethics:
    a. Ability to utilize the professional competence for augmenting universal human order
    b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
    c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
26. Case studies of typical holistic technologies, management models and production systems
27. Strategy for transition from the present state to Universal Human Order:
    a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers
    b. At the level of society: as mutually enriching institutions and organizations
28. Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. to discuss
the conduct as an engineer or scientist etc.

3. READINGS:

3.1 Text Book
1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010 3.

2 Reference Books
1. JeevanVidya: EkParichaya, ANagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews

7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

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Year/Sem	Sub. Code	Subject Name	L	T	P/D	C
		Syllabus for B. Tech (E.C.E.) – A22 regulation				
II – I	9HC63	Soft Skills Lab (Common to CSE/IT/AIML/CS/DS&IOT)	0	1	2	2

Course objectives:
To enable students to:
- make self-assessment.
- know the importance of certain soft skills like time management and goal setting.
- enhance their team skills and design thinking capabilities for effective critical thinking and creativity.
- know their emotional quotient which guides their thinking, behavior and helps them manage stress efficiently.

Tutorial (1 per week)
Units
Unit-1
1.1 Introduction to soft skills
1.2 SWOT / SWOC Analysis
1.3 SWOT / SWOC Grid
1.4 Johari window

Unit-2
2.1 Emotional intelligence
2.2 Time management
2.3 Goal Setting

Unit-3
3.1 Attitude
3.2 Professional etiquette & Grooming

Unit-4
4.1 Styles of Communication
4.2 **Inter-personal Skills**
4.3 Team work, Team building
4.4 Leadership Skills

Unit-5
5.1 Problem Solving & Decision making
5.2 Critical & Creative thinking

Unit-6
6.1 Values : Personal, Social & Cultural

Lab (2 per week)
Unit-1
- Activities based on Soft skills
- Self-Analysis
- Questionnaire,

- SWOT Practice

Unit-2
Activities :
- big picture challenge
- Goal setting charts

Unit-3
Practice activities on
- Attitude
- Professional etiquette & Grooming

Unit-4
- Activities on social skills
- Role Plays
- Team building activities

Unit-5
Practice activities on
- Problem solving situations
- Games and puzzles
- Case Studies and Group Discussions on decision making and problem solving, creativity and innovation.

Unit-6
Practice activities
- Role Plays

Text Book: SOFT SKILLS – Dr. K. Alex, S. Chand publications
Suggested Readings: * SOFT SKILLS – MeenakshiRaman ; * Step Ahead with Soft Skills - Oxford University Press ; * Skill Sutras- JayashreeMohanraj * The Power of Soft Skills – Robert A. Johnson ; * Soft Skills for Everyone – Jeff Butterfield

Course Learning Outcomes:

After completion of the course, the student will be able to:
- Determine the significance of soft skills in the working environment
- Understand how to demonstrate empathy in a wide range of situations.
- Effectively communicate through verbal/oral communication and improve the listening
- Become more effective individual through goal/target setting, self motivation and practicing creative thinking.
- Develop a positive and responsible *attitude* to their own well-being
- Identify stress factors and handle stress effectively.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – I	9CC71	Electronic Devices and Circuits Lab (Common to ECE/ECM/EEE)	0	0	3	1.5

Course Objectives:

This course introduces the characteristics and applications of semiconductor devices; emphasis is placed on characteristics and testing practically to strengthen the knowledge.

Course Outcomes:

After studying this course, the students will be able to

1. Understand color coding, operations on Diode, BJT, FET and other electronic components.
2. Correlate theoretical concepts with practical implementation.
3. Apply the knowledge of Diodes, Capacitors and Transistors for the realization of rectifiers, regulators, amplifiers and Oscillator circuits.
4. Adapt effective Communication, presentation and report writing skills

PART A

CO	Electronic Devices & Circuits Lab (8CC71)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Identify, Specify and test R, L, C Components (Colour Codes), Potentiometers, Switches, Coils, Relays		1		3					2				2		
CO2	Identify, Specify and test Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT	1	2		3					2				2		
CO3	Describe operation of Multimeters, Function Generator and Regulated Power Supplies	1	1		3					2				2		
CO4	Explain and use CRO for experiments	1	2	2	3					2				2		
CO5	Explain and demonstrate working of PN Junction diode characteristics	2	2	2	3					2				2		
CO6	Explain and demonstrate working Half and Full wave Rectifier with and without filters	2	2	2	3					2				2		
CO	**Overall**	1	2	2	3					2				2		

Electronic Workshop Practice (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Bread Boards.
2. Identification and Specifications of Active Devices like Diodes, BJTs and JFETs.
3. Study and operation of
   - Digital Multimeters
   - Function Generator
   - Regulated Power Supplies
   - Soldering
   - SMD components

PART B

(For Laboratory examination – Minimum of 10 experiments)

1. Study and Operation of CRO:Oscilloscope, CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger Pulse, delay line, probes for CRO, Measurement of amplitude and frequency. Time Period measurement, Lissajous patterns.
2. Determination of Cut-in Voltage, Forward and Reverse resistances of PN Junction diode usingV-I Characteristics.
3. Zener diode characteristics and Zener as voltage Regulator.
4. Input and output characteristics of BJT in CB Configuration.
5. Input and output characteristics of BJT in CE Configuration.
6. Half wave rectifier with and without filters.
7. Full wave rectifier (Center trapped and Bridge) with and without filters.
8. Drain and Transfer characteristics of FET in CS Configuration.
9. Common Emitter Amplifier Characteristics
10. Common Collector Amplifier Characteristics (Emitter Follower).
11. FET amplifier (Common Source).
12. RC Phase Shift Oscillator.

Major Equipment required for Laboratories:

1. Regulated Power Suppliers, 0-30V
2. 20 MHz, Dual Channel Cathode Ray Oscilloscopes.
3. Functions Generators-Sine and Square wave signals
4. Multimeters
5. Electronic Components

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P**	**C**
II-I	9AC72	Electrical Circuits & Networks AnalysisLab	0	0	3	1.5

Course Objectives:

To make the student to learn:

  i.   Verification of network theorems experimentally.
  ii.   To measure frequency of RLC series and parallel circuits under resonance
  iii.   To determine self & mutual inductance and co-efficient of coupling for coupled circuits
  iv.   The construction of current locus diagram for a given parallel circuit.
  v.   Simulation for analysis of electrical networks
  vi.   Method for determining the parameters of a coil

Course Outcomes:

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

  i.   Perform the test for verification of various network theorems
  ii.   Measure the frequency for a RLC series/parallel circuits under resonance.
  iii.   Conduct an experiment for determination of self & mutual inductance and coefficient of coupling
  iv.   Construct current locus diagram by performing a test on single phase parallel circuits
  v.   Simulate for analysis of electrical circuits.
  vi.   Determine the parameters of the coil

CO	Electrical circuits and Network Analysis Lab (8AC61)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Perform the test for verification of various network theorems	2	2			2				2				2	1	
CO2	Measure the frequency for a RLC series/parallel circuits under resonance	2	2			2				2				2	1	
CO3	Conduct an experiment for determination of self & mutual inductance and coefficient of coupling	2	2			2				2				2	1	
CO4	Construct current locus diagram by performing a test on single phase parallel circuits	2	2			2				2				2	1	
CO5	Simulate for analysis of electrical circuits	2	2			2				2				2	1	
CO6	Determine the parameters of the coil	2	2			2				2				2	1	
CO		2	2			2				2				2	1	

List of Experiments (ANY 10 Experiments to be conducted)

1. Verification Thevenin's Theorem and Norton's Theorem
2. Verification of Maximum Power Transfer Theorem
3. Verification of Superposition Theorem
4. Verification of Compensation Theorem
5. Verification of Reciprocity Theorem and Millmann's Theorem
6. Finding resonant frequency in Series and Parallel circuits
7. Determination of Self Inductance, Mutual Inductance and Coefficient of coupling
8. Calculation of Z and Y Parameters
9. Construction of current locus diagram for RL and RC circuit
10. Mesh and Nodal Analysis by simulation
11. Determination of Average value and RMS value of a complex wave
12. Determination of parameters of a coil.
13. Determination of Time constant of RL and RC series circuit.

II–II

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	Sub. Code	Subject Name	L	T	P/D	C
II – II	9CC04	Analog Circuits (Common to ECE, EEE AND ECM)	3	0	0	3

Course Objectives :

To understand the basic functioning and applications of the basic building blocks of analog electronic circuits - amplifiers and oscillators.

COURSE OUTCOMES :

After studying this course, the students will be able to

1. Distinguish between small and large signal amplifier and able to compare the conversion efficiency levels
2. Analyze and Design tuned RF amplifiers and different types of sweep generators
3. Understand linear and non-linear wave shaping methods and able to Analyze various types of Logic gates and Sampling gates.
4. Understand and design various types of multivibrators and applications

CO	ANALOG CIRCUITS (8CC05)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Distinguish between small and large signal amplifiers.	3	3	2	2	3				2			2	3	3	2
CO2	Analyze and Design tuned and RF amplifiers	3	3	3	2	3				2			2	3	3	2
CO3	Understand linear and non-linear wave shapingmethods	3	3	3	3	3				2			2	3	3	2
CO4	Understand analyze and design various types of multivibrators, their analysis, designing and	3	3	3	3	3				2			2	3	3	2

	applications														
CO5	Explain different sweep generators and their applications	3	3	3	3	3				2			2	3	3	2
C06	Analyze various types of Logic gates and Sampling gates	3	3	2	2	3				2			2	3	3	2
Over all		3	3	3	3	3				2			2	3	3	2

UNIT I [Lecture hrs – 9]

POWER AMPLIFIERS [T1] [CO1]
Classification of Power Amplifiers - Class A, B, AB & C   power amplifiers –push pull configuration, complementary symmetry circuits, Distortion in Amplifiers. Harmonic distortion and Crossover Distortion in Power Amplifiers– Conversion efficiency and relative performance.

UNIT II [Lecture hrs – 9]

TUNED AMPLIFIERS [T1] [CO2]
Introduction to Tuned Amplifiers, Q-Factor. single tuned capacitive coupled amplifier, tapped single tuned capacitance coupled amplifier, single tuned inductively coupled amplifier, stagger tuning, synchronous tuned Amplifier.

UNIT III [Lecture hrs – 9]

WAVE SHAPING – Linear and Non-linear: [T2,T3] [CO3]
RC high pass, low pass circuit response for sinusoidal, step, pulse, square, ramp & exponential inputs-Differentiator –Integrator. RL, Diode clippers- Transistor clipper- clipping at two independent levels – Emitter coupled clipper- comparator-– Applications of voltage comparators.
Clamping operation – clamping with source, diode resistances- clamping circuits theorem- practical clamping circuits.

UNIT IV [Lecture hrs – 9]

MULTIVIBRATORS: [T2] [CO4]
Stable states of BistableMultivibrator A fixed bias transistor BistableMultivibrator -A self biased transistor BistableMultivibrator - commutating capacitor – Unsymmetric triggering of BistableMultivibrator - triggering through a unilateral device- symmetrical triggering – Schmitt trigger circuit.

General operation of monostablemultivibrator, collector coupled monostablemultivibrator - wave forms of collector coupled monostablemultivibrator - Emitter coupled monostablemultivibrator - triggering of monostablemultivibrator. Astablemultivibrator, collector coupled Astablemultivibrator - Emitter coupled Astablemultivibrator. Designing ofBistable, Monostable and AstableMultivibrators.

UNIT V[Lecture hrs – 9]

TIME BASE GENERATORS: [T2] [CO2]
General features of time base signals-sweep circuit using a transistor switch-UJT,UJT characteristics, UJT as a sweep circuit, - General considerations & principles of Miller & Boot strap time base generators- the transistor miller time base- the transistor, Boot strap time base generator- A simple current sweep transistor current time base generator.

UNIT VI[Lecture hrs – 9]

SAMPLING and LOGIC GATES: [T2] [CO3]
Basic operating principle unidirectional, Bidirectional sampling gates using diodes, transistors-reduction of pedestal effect and sampling oscilloscope.
LOGIC GATES: Digital operation of a system- OR, AND, NOT, NAND &NOR gates- DTL Logic – RTL Logic, TTL logic – comparison.

Text Books:
> [T1] Integrated electronics-J.Milliman and C.C.Halkias, MC Graw –Hill-1972
> [T2] Pulse digital and switching wave forms-J. Millman and H. Taub, Tata McGraw-Hill, New Delhi,2001.
> [T3] Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002 .

References:
> [R1] Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
> [R2] Wave Generation and Shaping - L. Strauss
> [R3] Electronic Circuit Analysis-K.Lal Kishore, 2004, BSP

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – II	9CC05	Digital Logic Design (Common to ECE/ECM/EEE)	3	0	0	3

COURSE OBJECTIVES:

To learn the different numbering systems, Boolean functions and design of Combinational circuits

To learn design of Sequential Circuits, design using PLDs and digital controllers using Algorithmic State machines

COURSE OUTCOMES:

After completing this course, the students will have demonstrated

[CO1]. An ability to understand number systems and apply the rules of Boolean algebra and K-maps to simplify Boolean expressions.

[CO2]. An ability to design MSI combinational circuits such as full adders, multiplexers, decoders, encoders.Code converters.

[CO3]. An ability to design basic memory units (latches and flip-flops) and sequential circuits such as counters and registers

[CO4]. An ability to design digital design using PLD's such as ROM's, PLA's, PALs and digital controllers using Algorithmic State Machine Charts.

CO	Digital Logic Design (8CC02)	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	An ability to understand number systems and apply the rules of Boolean algebra	2	2	2	2									3		
CO 2	An ability to simplify of Boolean expressions using K-map	1	2	2	2									3		
CO 3	An ability to design MSI combinational circuits	2	2	2	2								2	3		
CO 4	An ability to design basic memory units	2	2	2	2								2	3		
CO 5	An ability to design digital design using PLD's such as ROM's, PLA's,PALs.	1	2	2	2								2	3		
CO 6	An ability to design digital controllers using Algorithmic State Machine Charts.	1	2	2	3								2	3		
CO	Overall	2	2	2	2								2	3		

UNIT – I [Lecture hrs – 9]

Number System: Binary, decimal, octal, hexa decimal, weighted and un-weighted codes.

Boolean Algebra: Axiomatic definition of Boolean algebra, Binary operators, postulates of and theorems. Boolean addition, subtraction, 1's complement, 2's complement. Switching functions, Canonical forms and Standard forms, Simplification of switching functions using theorems.

UNIT – II [Lecture hrs – 8]

Logic gates: Basic gates and universal gates.

Minimization of Switching Functions: simplification rules, Karnaugh map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Quine-McCluskey Tabular Method, Prime Implicant chart.
Application: Design of a Basic Calculator Using Logic Gates.

UNIT – III [Lecture hrs – 9]

Combinational Logic Design:
Single output and multiple output combinational logic circuit design, AND-OR, OR-AND, and NAND/NOR realizations, Exclusive-OR and Equivalence functions, Binary adders/subtractors, Encoder, Decoder, Multiplexer, Demultiplexer, MUX realization of switching functions, Parity bit generator, Code-converters, Concepts of threshold logic and threshold gates.
Applications: Application of Decoder in Seven Segment Display, application of Encoders in Servomotors.

UNIT - IV [Lecture hrs – 9]

Sequential Circuits-1:
Classification of sequential circuits (Synchronous, Asynchronous Pulse mode, and Level mode with examples). Basic flip-flops-Triggering and excitation tables. Conversion of flip-flops.
Applications: Application of SR Flip Flop in Switch Debounce Circuit.

UNIT – V [Lecture hrs – 9]

Sequential Circuits-2:
The sequential circuit model, Asynchronous counters, Design of simple synchronous sequential circuits such as counters (Design of modulo-N counter, Ring counter, twisted ring counter) and Shift registers
Applications: Design of 1010 sequence detector, Design of Digital Clock using Counters

UNIT – VI [Lecture hrs – 9]

Programmable LogicDevices:
Basic PLD's-ROM, PROM, PLA, and PLD Realization of Switching functions using PLDs.
Algorithmic State Machines: State machines and state diagrams.
Applications: Design of a Weighing machine and Binary multiplier.

Text Books:

[T1]. Morris Mano-, Digital design –PHI, 2nd Edition.

[T2}. ZviKohavi and Niraj K Jha -Switching & Finite Automata theory – Cambridge, 3rd Edition.

References:

[R1]. Fletcher -An Engineering Approach to Digital Design – PHI.

[R2]. Fundamentals of Logic Design, Roth, Kenny, Seventh Edition, Cengage Learning

[R3]. R.P.Jain-Switching Theory and Logic Design- TMH Edition,2003.

[R4]. CVS Rao -Switching Theory and Logic Design –Pearson Education, 2005

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – II	9CC06	Analog& Digital Communications	2	1	0	3

Prerequisite: Probability theory and Stochastic Processes

Course Objectives:

☐ To develop ability to analyze system requirements of analog and digital communication systems.

☐ To understand the generation, detection of various analog and digital modulation techniques.

☐ To acquire theoretical knowledge of each block in AM, FM transmitters and receivers.

☐ To understand the concepts of baseband transmissions, source coding and channel coding.**.**

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

☐ Analyze and design of various continuous wave and angle modulation and demodulation techniques

☐ Understand the effect of noise present in continuous wave and angle modulation techniques.

☐ Attain the knowledge about AM , FM Transmitters and Receivers

☐ Analyze and design the various Pulse Modulation Techniques.

☐ Understand the concepts of Digital Modulation Techniques and Baseband transmission, source coding and channel coding **.**

CO	Analog& Digital Communications (8CC06)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Analyze and design of various continuous wave and angle modulation and demodulation techniques	2	2	2	2	2						2		2	2	
CO2	Understand the effect of noise present in continuous wave and angle modulation techniques.	2	2	2	2	2								2	2	
CO3	Attain the knowledge about AM , FM Transmitters and Receivers	2	2	2	2	2								2	2	
CO4	Analyze and design the various Pulse Modulation Techniques	2	2	2	2	2								2	2	
CO5	Understand the concepts of Digital Modulation Techniques and Baseband transmission, source coding and channel coding	2	2	2	2	2								2	2	
Over all		2	2	2	2	2								2	2	

UNIT – I[Lecture hrs – 9]

Amplitude Modulation
Need for modulation, Amplitude Modulation - Time and frequency domaindescription, single tone modulation, power relations in AM waves, Generation of AM waves - Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, principle of Vestigial side band modulation.
Applications: AM transmitter system

UNIT –II[Lecture hrs – 9]

Angle Modulation
Basic concepts of Phase Modulation, Frequency Modulation: Single tonefrequency modulation, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis.
Applications: Design of a 88-108 MHz FM system using FDM

UNIT - III

Transmitters
Classification of Transmitters, AM Transmitters, FM Transmitters

Receivers
Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodynereceiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers.
Applications: Design of an AM transmitter system.

UNIT - IV

Pulse Modulation
Types of Pulse modulation- PAM, PWM and PPM.Comparison of FDM and TDM.

Pulse Code Modulation
PCM Generation and Reconstruction, Quantization Noise, Non-UniformQuantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.
Applications: Design of E1 and T1 digital-carrier systems

UNIT - V

Digital Modulation Techniques
ASK- Modulator, Coherent ASK Detector, FSK- Modulator, Non-Coherent FSK Detector, BPSK-Modulator, Coherent BPSK Detection. Principles of QPSK, Differential PSK and QAM.

Baseband Transmission and Optimal Reception of Digital Signal

A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams.

Applications: Design of MODEM for voice transmission

Unit-VI:

SOURCE CODING

Introduction, advantages, Shannon's theorem for Channel capacity, Huffman code, Shannon-Fano coding, bandwidth –S/N trade off.

CHANNEL CODING

Introduction - types of errors, redundancy, detection vs correction, forward error correction versus retransmission; linear block codes, error detection and correction capabilities of linear block codes, Hamming code, cyclic codes: encoding, syndrome calculation, decoding, CRC codes – hardware realization; convolutional codes: encoding using state, tree and trellis diagrams, decoding using Viterbi algorithm

APLLICATIONS : Design of channel coding for 3G

TEXTBOOKS:

1. Analog and Digital Communications – Simon Haykin, John Wiley, 2005.

2. Electronics Communication Systems-Fundamentals through Advanced-Wayne Tomasi, 5th Edition, 2009, PHI.

REFERENCE BOOKS:

1. Principles of Communication Systems - Herbert Taub, Donald L Schilling, Goutam Saha, 3rd Edition, McGraw-Hill, 2008.
2. Electronic Communications – Dennis Roddy and John Coolean , 4th Edition , PEA, 2004

3. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004 Analog and Digital Communication – K. Sam Shanmugam, Willey,20

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – II	9C407	Electromagnetic Waves and Transmission Lines	3	0	0	3

Prerequisites: Coordinate Systems and Vector Calculus

Course Objectives
- To be confident about the fundamentals of electrostatics and magneto statics and their concepts in field calculations
- To acquire the knowledge about the wave concepts and properties of transmission lines which are required as prerequisites to antennas and wave propagation.

Course Outcomes

After studying this course, the students will be able to

[CO1]. Apply the concepts of electrostatics in the study electric field and in understanding the Maxwell's two equations which are useful in understanding propagation of EM waves.

[CO2].Apply the concepts of static magnetic field in the study magnetic field and in understanding the Maxwell's two equations which are useful in understanding propagation of EM waves.

[CO3]. Understand the property of EM energy at different boundary conditions and Maxwell's equations which will be helpful in understanding the reflection properties of EM Energy when the EM energy propagates through different media.

[CO4].Design different transmission lines andUnderstand the concepts of high frequency dissipation less and open& short circuited lines

CO	ELECTROMA GNETIC WAVES AND TRANSMISSI ON LINES(8C408)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Apply the Maxwell's equations in propagation of EM waves	3	3	2	1	2							2	3	3	2
CO2	Demonstrate the behavior of EM waves in different media	3	3	3	1	2							1	3	3	1
CO3	Understand the property of EM energy at different boundary conditions	3	3	3	1	2							1	3	3	1

CO																
CO4	Understand the impossibility of TEM waves in rectangular wave guides	3	3	3	1	2							1	3	3	1
CO5	Design different transmission lines	3	3	3	1	2							3	3	3	3
C06	Understand the concepts of high frequency dissipation less and open& short circuited lines	3	3	2	1	2							2	3	3	2
Overall		3	3	3	1	2							2	3	3	2

UNIT I

REVIEW OF VECTOR ANALYSIS AND ORTHOGONAL COORDINATE SYSTEMS
Line, surface, and volume integrals. Curl, divergence and gradient of fields.

ELECTROSTATICS [T1],[T2],[CO1]

Static electric fields, Coulomb's Law, Gauss Law and Applications, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation time, Parallel plate, Coaxial and Spherical capacitors.
Applications: Electric current in vacuum and gases, photocopier.

UNIT II

MAGNETOSTATICS:[T1],[T2],[CO2]
Static magnetic fields, Ampere's Circuital Law, Magnetic Flux Density, Magnetic Scalar and Vector Potentials. Forces due to Magnetic fields, Ampere's Force Law, Inductance and magnetic energy.
Applications: Electromagnetic suspension (EMS) maglev train, speakers and micro phones.

UNIT III

MAXWELL'S EQUATIONS:[T1],[T2],[CO3]
Differential and Integral forms-word statement-proofs and conversion. Faraday's Law and their Application in free space, polarization,Poynting vector, Power flow and energy storage; Skin depth,Boundary conditions and boundary value problems.
.**Applications: Electromagnetic wave propagation**

UNIT I V

REFLECTION AND REFRACTION OF EM WAVES:[T1][T2][R2][CO3]
Reflection by a perfect conductor-Normal and Oblique Incidence-Reflection by a perfect Insulator-Normal and Oblique Incidence. Brewster angle.EM Wave characteristics, wave

equations,Guidedwaves between parallel Planes, Power losses in plane conductor. Pointing Theorem.Phase and group velocity.

Applications: Calculation of power loss in plane conductor.

UNIT V

TRANSMISSION LINE THEORY:[T2][R1][CO4]

Transmission line – general solution –The infinite line – Wavelength, velocity of propagation – Waveform distortion – the distortion less line - Loading and different methods of loading – Line not terminated in Z_0 – Reflection coefficient – calculation of current , voltage, power delivered and efficiency of transmission – Input and transfer impedance – Open and short circuited lines – reflection factor and reflection loss.

Applications: Calculation of voltage and current distribution in a 10-Km transmission line.

UNIT VI

HIGH FREQUENCY TRANSMISSION LINES:[T2][R1][CO4]

Transmission line equations at radio frequencies – Line of Zero dissipation – Voltage and current on the dissipation less line, Standing Waves, Nodes, Standing Wave Ratio – Input impedance of the dissipation less line - Open and short-circuited lines – Power and impedance measurement on lines – Reflection losses. S-Parameters, Smith Chart-Construction and applications.

Applications: determination of load standing wave ratio and reflection coefficient with smith chart

Text Books:

1. W.H.Hayt Jr., Engineering Electromagnetics, Tata Mc-Graw-Hill, 2001.
2. Elements of Electromagnetics-Mathew N.OSadiku, 4ed., 2008, Oxford Univ.Press

References:
1. Transmission Lines and Networks by UmeshSinha
2. EC Jordan, EM waves and radiating systems, PHI, 1995.
3. N. NarayanaRao, Elements of Engineering Electro magnetics, Pearson Education, 2006.
4. J.D.Ryder, Networks lines and fields, PHI, 1990

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – II	9HC16	Quantitative Aptitude & Logical Reasoning	3	0	0	3

Pre Requisites: Nil

Course objectives:*To answer general problems in his everyday life within in short time and to improves the certain skills of a student such as numerical and logical ability, mental capacity and also in sharpening minds.*

Syllabus
Unit I: Number System: Test for Divisibility, Test of prime number, Division and Remainders – HCF and LCM of Numbers–Fractions and Decimals -Average-Problems on Ages- Problems on Numbers- Ratio and Proportion.

Unit II: Percentage – Profit, Loss and Discount – Partnership and Share-Simple Interest- Compound Interest. Time and Work- Pipes and Cisterns-Time and Distance- Problems on Trains- Boats and Streams.

Unit III: Allegation or Mixtures,Clocks & Calendar.Mensuration: Area of Plane Figures, Volume and Surface Area of Solid Figures.Data Interpretation: Tabulation, Bar Graphs, Pie Charts, Line Graphs.

Unit–IV: Series Completion: Number Series, Alphabet Series, Alpha – Numeric Series.
Analogy: Completing the Analogous Pair, Simple Analogy, Choosing the Analogous pair, Double Analogy, Word Analogy, and Number Analogy.
Classification: Word Classification, Number Classification and Letter Classification.
Coding & Decoding: Letter Coding, Number Coding, Matrix Coding, Substitution, Deciphering Message Word Codes, Jumbled Coding. Crypt arithmetic-Inequalities-Input Output Tracing

Unit–V: Blood Relations– Direction sense test- Number, Ranking & Time Sequence Test –Mathematical Operations-Arithmetical Reasoning. Puzzle Test: Classification Type Questions, Seating Arrangements, Comparison Type Questions, Sequential Order of Things, Selection Based on Given Conditions, Family Based Puzzles, Jumbled Problems.

Unit –VI: Logical Venn Diagrams –Cubes and Dice – Analytical Reasoning-Assertions and Reason–Logical Deductions-Syllogism-Statement and Arguments-Statement and Conclusions--Data Sufficiency.

Text Books:
1. Quantitative Aptitude by R.S.Agarwal
2. Verbal and Non Verbal Reasoning by R.S.Agarwal.

Course outcomes: *By learning Quantitative Aptitude and Logical Reasoning, a student can answer the questions on*

1. *Number system, HCF and LCM, Averages, Ages and ratio and proportion.*
2. *Various important topics of quantative aptitude.*
3. *Mensuration and data interpretation topics.*
4. *Series Completion, analogy, classification and coding and decoding topics.*
5. *Various topics of logical reasoning.*
6. *Venn-diagrams, cubes and dice and also on clocks and calendar problems.*

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	Sub. Code	Subject Name	L	T	P/D	C
II – II	9HC05	Environmental Science (for CSE, CSD, CSM, CSI, CSO, IT and ECM)	3	-	-	-

Course Objectives:
1. *To understand structure and function of ecosystem*
2. *To learn classification and uses of natural resources*
3. *To learn about Understanding the impacts of developmental activities and mitigation measures.*
4. *To know the source, causes and preventive methods of pollution*
5. *To understand the importance of ecological balance for sustainable development.*
6. *To understand the environmental policies and regulations*

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

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

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

UNIT-IV Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants. Acid rain-Threshold limit values of chemicals present in environment, Global warming, Ozone layer depletion, Water pollution: Sources and types of pollution. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Sewage water Treatment, Kyoto protocol, and Montréal Protocol.

UNIT-V Sustainable development and Green Technology: Concept of sustainable development, threats to sustainability population and its explosion, Crazy consumerism, over- exploitation of resources, strategies for achieving sustainable development environmental education, conservation of resources, urban sprawl sustainable cities and sustainable communities, human health , role of IT in Environment, Environmental Ethics, Environmental Economic – Concept of Green Building, Clean Development Mechanism (CDM).

UNIT-VI Environmental Policy, Legislation & Environment Impact Assessment: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

Course Outcomes

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

1. *Understand about ecosystem and energy flow among the organisms.*
2. *Know the resources available, use of them and overexploitation of the resources in the nature.*
3. *Learn the value, use and value of biodiversity.*
4. *Understand the causes and effect of pollution and implement measures in control of pollution.*
5. *Understand the sustainable development and implement green technology for sustainable development.*
6. *Learn and implement policy to protect the environment.*

TEXT BOOKS:

1. Perspectives in Environmental Studies: Kaushik A. and Kaushik, C.P. New Age International (P) Ltd. (2008)

REFERENCE BOOKS:

1. Environmental Studies by ErachBharucha, 2005 University Press.
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
4. Environmental Science by Daniel B. Botkin& Edward A. Keller, Wiley INDIA edition.
5. Environmental Studies by AnubhaKaushik, 4th Edition, New age international publishers.
6. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – II	9CC72	Analog Circuits Lab (Common to ECE, EEE AND ECM)	**0**	**0**	**3**	**1.5**

Course Objectives

To prepare students to practice the design and analysis of any Analog electronics circuit.

Course Outcomes:

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

1. To understand the design and working of various linear and non-linear wave shaping circuits.
2. To demonstrate the working principle of various multivibrators and functionalities of various logic gates.
3. To perform and verify the working of oscillators, feedback amplifiers and voltage regulators.
4. To perform laboratory experiment to verify the conversion efficiency of various power amplifiers.

CO	Analog Circuits Lab **(8CC74)**	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	To understand the design and working of various linear and non-linear wave shaping circuits.	3	3	3	2	2				2				2	2	
CO2	To demonstrate the working principle of various multivibrators and functionalities of various logic gates	3	3	3	2	2				2				2	2	
CO3	To perform and verify the working of oscillators, feedback amplifiers and voltage regulators.	3	3	3	2	2				2				2	2	
CO4	To perform laboratory experiment to verify the conversion efficiency of various power amplifiers.	3	3	3	2	2				2				2	2	
	overall	3	3	3	2	2				2				2	2	

Syllabus Content:

Part-A

Hardware based experiments

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers. clampers.
3. UJT Relaxation Oscillator
4. Astable and monostable Multivibrator.
5. Bistable Multivibrator.
6. Study of Logic Gates with discrete components.

Part-B

Software Simulation based experiments (Multisim OR Pspice OR Tina Pro Or Equivalent Simulation Software)

1. Common Emitter and Common Source amplifier
2. Voltage shunt and Feedback Amplifier
3. Cascade Amplifier (CE+CE, CE+CC)
4. RC Phase Shift Oscillator using Transistors
5. Class- A and Class-B Complementary Symmetry Power Amplifier
6. Series and Shunt Voltage Regulator.

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – II	9C473	Basic Simulation and Digital Logic Design Lab	0	0	4	2

Course Objectives:

The objective of this lab is

- To generate continuous and discrete signals and analyze systems with various signals.
- To Design and analyze the various circuits and systems using Digital ICs.

Course Outcomes:

After studying this course, the students will be able to

1. Basic operations on matrices
2. Generate various signals and systems.
3. To simulate operations on signals and systems.
4. Verify the operations of digital circuits using ICs

BASIC SIMULATION

SYLLABUS CONTENT

1. Basic Operations on Matrices

2. Generation of Various signals and sequences (Periodic and Aperiodic) such as Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc

3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.

4. Finding Even and Odd parts of a Signal/Sequence and Real and Imaginary Parts of a Signal.

5. Convolution of Signals and Sequences.

6. Auto Correlation and Cross Correlation of Signals and Sequences

7. Computation of unit sample, unit step and sinusoidal response of the given LTI system and
8. Computation of unit sample, unit step and sinusoidal response of the given LTI system and verifying its physical realiazability and stability properties.

9. Gibbs Phenomenon.

10. Sampling Theorem Verification.

11. Locating the Zeros and Poles and Plotting the Pole-Zero maps in the S-Plane and Z-Plane for the given transfer function.

12. Verification of Linearity and Time Invariance Properties of a given Continuous / Discrete System

13. Generation of Gaussian noise (Real and Complex), Computation of its Mean, Mean Square Value and its Skew, Kurtosis, and PSD , Probability Distribution Function.

14. Finding the Fourier transform of the signal using Fast Fourier Transform

DIGITAL LOGIC DESIGN

Syllabus Content

Verify the operations of the Digital ICs (Hardware) in the Laboratory

1. Realization of A-O-I Gates using Universal gates
2. Implementation of 4-Bit binary to Gray code converter
3. Implementation of 4-bit parity generator and checker
4. Verification of 4-bit Binary Adder using IC 74x283
5. Realization of 4x1 Multiplexer and 1x4 Demultiplexer
6. Verification of 3x8 Decoder using IC 74x138
7. Verification of Priority encoder using 74x148
8. Verification of D Flip-Flop IC 74x74
9. Conversion of JK-Flipflop to D-Flipflop
10. Verification of Decade counter using IC74x90
11. Implement 4-bit Ring Counter
12. Verification of Universal Shift Register

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – II	9CC74	Analog& Digital Communication Lab	0	0	3	1.5

Prerequisites: SS, PTSP, BS Lab

Course Objectives:

The objectives of this course are

- To perform laboratory experiments on various analog and digital modulation techniques and measure the performance parameters.

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

CO1	Demonstrate the modulation and demodulation of few analog and digital modulation techniques.
CO2	Verifying the spectral components of AM and FM&the concepts of frequencyand time division multiplexing techniques
CO3	Demonstrate the modulation and demodulation of few pulse analog, and pulse digital modulation techniques &Verifying sampling theorem
CO4	Demonstrate the modulation and demodulation of digital modulation technique&Generation of line coding techniques.

CO	Analog& Digital Communication Lab (8CC75)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Demonstrate the modulation and demodulation of few analog and digital modulation techniques.	2	2			2								2	2	
CO2	Verifying the spectral components of AM and FM&the concepts of frequencyand time division multiplexing techniques	2	2			2								2	2	
CO3	Demonstrate the modulation and demodulation of few pulse analog, and pulse digital modulation techniques &Verifying sampling theorem	2	2			2								2	2	
CO4	Demonstrate the modulation and demodulation of digital modulation technique&Generation of line coding techniques.	2	2			2								2	2	
	overall	2	2			2								2	2	

Part A:
1. AM - Generation and Detection
2. DSBSC - Generation and Detection
3. FM - Generation and Detection
4. Spectrum Analysis of AM and FM signals
5. FDM – Verification
6. Receiver Characteristics

Part B:
1. Sampling Theorem – Verification
2. PPM - Generation and Detection
3. TDM – Verification
4. PCM - Generation and Detection
1. DM - Generation and Detection
2. Line Coding Techniques
3. ASK, FSK,PSK - Generation and Detection

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Syllabus for B. Tech (E.C.E.) – A22 regulation						
Year/Sem	**Sub. Code**	**Subject Name**	**L**	**T**	**P/D**	**C**
II – II	9C461	Technical Seminar	0	1	0	1

Course Objective:

Develop ability to be a public speaker. Learn the importance of delivering seminars for demonstrating oratory and develop interview facing skills.

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

1. *Identify current general, political and technology related topics.*
2. *Arrange and present seminar in a effective manner*
3. *Collect, survey and organize content in presentable manner*
4. *Demonstrate oratory skills with the aid of Power Point Presentations*
5. *Exhibit interview facing skills and team leading qualities*
6.

Procedure :
1. Seminar in-charges shall highlight the significance of technical seminar in the first two sessions and enlighten the students on the utility of these seminars.
2. The slots, titles shall be decided upfront and seminar in charge shall take signatures.
3. The same sheet shall be affixed in the respective classrooms and seminar register.
4. If any student fails to present his/her seminar on the given slot, to genuine reasons, they may be asked to present in the subsequent slot/week.
5. Progress of the seminars need to be reviewed by the concerned HOD once in 15 days.
6. The evaluation for technical seminars has to be informed to students and displayed in the classrooms.
7. Report and presentation must contain topic, introduction, explanation, diagrams, tables, applications and conclusions.

There shall be a technical seminar evaluated for 100 marks each from I year I Semester to II year II Semester. The evaluation is purely internal and will be as follows:

Sl.No	Description	Marks
1	Literature survey, topic and content	10
2	Presentation including PPT	10
3	Seminar Notes	05
4	Interaction with audience after presentation	05
5	Final Report 3 copies	10
6	Class room participation	05
7	Punctuality in giving seminar as per Scheduled time and date	10
8	Mid Semester Viva (on the seminar topics completed up to the end of 9th week	15
9	End Semester Viva	30
	Total	**100 Marks**

Student must secure 40% i.e. 40 marks to be successful in sum total (Hundred Marks) in Technical Seminar.