Bapatla Engineering College

(*Autonomous*)

BAPATLA

B.Tech

Electronics and Communications Engineering

Curriculum Effective from A.Y. 2018-19 (R18 Regulations)

Bapatla Engineering College:: Bapatla

(Autonomous underAcharyaNagarjuna University)

(Sponsored by Bapatla Education Society)

BAPATLA - 522102 Guntur District, A.P.,India

www.becbapatla.ac.in

BAPATLA ENGINEERING COLLEGE: BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

First Year B.Tech (SEMESTER – I)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA001	Linear Algebra and ODE	4	0	0	4	50	50	100	3
18PH001	Waves and Modern Physics	4	0	0	4	50	50	100	3
18CY001	Engineering Chemistry	4	0	0	4	50	50	100	3
18CE001	Environmental Studies	3	0	0	3	50	50	100	2
18CS001	Problem Solving with Programming	4	0	0	4	50	50	100	3
18CYL01	Engineering Chemistry Lab	0	0	3	3	50	50	100	1
18ECL12	Hardware Lab	0	0	3	3	50	50	100	1
18CSL01	Problem Solving with Programming Lab	0	0	3	3	50	50	100	1
	TOTAL	19	0	9	28	400	400	800	17

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BAPATLA ENGINEERING COLLEGE: BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year 2018-2019(R18 Regulations)

First Year B.Tech (SEMESTER – II)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA002	Numerical Methods and Advanced Calculus	4	0	0	4	50	50	100	3
18EC202	Basic Instrumentation	4	0	0	4	50	50	100	3
18EC203	Programming with C ++	4	0	0	4	50	50	100	3
18EL001	Communicative English	3	0	0	3	50	50	100	2
18EC205	Circuit Theory	4	1	0	5	50	50	100	4
18PHL01	Physics lab	0	0	3	3	50	50	100	1
18ECL22	Programming with C ++ Lab	0	0	3	3	50	50	100	1
18ELL01	English Communication and Skills Lab	0	0	3	3	50	50	100	1
	TOTAL	19	1	9	29	400	400	800	18

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BAPATLA ENGINEERING COLLEGE: BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION

(Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year 2018-2019 (R18 Regulations)

Second Year B.Tech (SEMESTER – III)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA003	Probability and Statistics	3	1	0	4	50	50	100	3
18EC302	Data Structures using Python	4	0	0	4	50	50	100	3
18EC303	Electronic Devices and Circuits	4	0	0	4	50	50	100	3
18EC304	Electromagnetic Field Theory	4	1	0	5	50	50	100	4
18EC305	Digital Electronics	4	1	0	5	50	50	100	4
18EL002	Technical English	3	0	0	3	50	50	100	2
18ECL31	Data Structures using Python Lab			3	3	50	50	100	1
18ECL32	Electronic Devices & Digital Electronics Lab			3	3	50	50	100	1
18ECL33	PSPICE Lab			3	3	50	50	100	1
	TOTAL	22	3	9	34	450	450	900	22

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BAPATLA ENGINEERING COLLEGE: BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year2018-2019 (R18 Regulations)

Second Year B.Tech (SEMESTER – IV)

Code No.	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	Total	CIE	SEE	Total Marks	
18MA004	Complex Variables and Special Functions	3	1	0	4	50	50	100	3
18EC402	Electronic Circuit Analysis	4	0	0	4	50	50	100	3
18EC403	EM Waves and Transmission Lines	4	1	0	5	50	50	100	4
18EC404	Signals & Systems	4	1	0	5	50	50	100	4
18EC405	Digital Design Using HDL	4	1	0	5	50	50	100	4
18EC406	Professional Ethics and Human Values	4	0	0	4	50	50	100	3
18ECL41	Electronic Circuits Lab			3	3	50	50	100	1
18ECL02	HDL Lab			3	3	50	50	100	1
18ECL43	Signals and Systems lab			3	3	50	50	100	1
	TOTAL	23	4	9	36	450	450	900	24

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Linear Algebra and ODE
I B.Tech –I Semester (Code: 18MA001)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives:

CO1: To learn about solving a system of linear homogeneous and non-homogeneous equations, finding the inverse of a given square matrix and also its Eigen values and Eigen vectors.

CO2: Identify the type of a given differential equation and select and apply the appropriate analytical technique for finding the solution of first order and higher order ordinary differential equations.

CO3: Create and analyze mathematical models using first and second order differential equations to solve application problems that arises in engineering.

CO4: To learn about solving linear Differential equations with constant coefficients with the given initial conditions using Laplace transform technique.

Course Outcomes: Students will be able to

CLO-1: Apply elementary row operations to find the rank of a matrix, to solve a system of linear equations and to find the inverse of a matrix.

CLO-2: Find the Eigen values and Eigen vectors of the given square matrix and also compute the higher powers of the given matrix.

CLO-3: Solve separable, linear, exact differential equations with and without initial conditions.

CLO-4: Distinguish between linear and non-linear differential equation.

CLO-5: Write the piecewise continuous functions in terms of unit step functions and hence find its Laplace transforms.

CLO-6: Solve linear differential equation with constant coefficients and unit step input functions using Laplace transforms technique.

SYLLABUS

UNIT - I

Linear Algebra: Rank of a Matrix; Elementary transformations of a matrix; Gauss-Jordan method of finding the inverse; Consistency of linear System of equations: Rouches theorem, System of linear Non-homogeneous equations, System of linear homogeneous equations; vectors; Eigen values; properties of Eigen values(without proofs); Cayley-Hamilton theorem (without proof).

[Sections: 2.7.1; 2.7.2; 2.7.6; 2.10.1; 2.10.2; 2.10.3; 2.12.1; 2.13.1; 2.14; 2.15.]

[12 Hours]

UNIT - II

Differential Equations of first order: Definitions; Formation of a Differential equation; Solution of a Differential equation; Equations of the first order and first degree; variables separable; Linear Equations; Bernoulli's equation; Exact Differential equations; Equations reducible to Exact equations: I.F found by inspection, I.F of a Homogeneous equation, In the equation M dx+ N dy=0.

Applications of a first order Differential equations: Newton's law of cooling; Rate of decay of Radio-active materials.

[Sections: 11.1; 11.3; 11.4; 11.5; 11.6; 11.9; 11.10; 11.11; 11.12.1; 11.12.2; 11.12.4; 12.6; 12.8]

[12 Hours]

UNIT – III

Linear Differential Equations: Definitions; Theorem; Operator D; Rules for finding the complementary function; Inverse operator; Rules for finding the Particular Integral; Working procedure to solve the equation;

Method of Variation of Parameters; Applications of Linear Differential Equations: Oscillatory Electrical Circuits.

[Sections: 13.1; 13.2.1; 13.3; 13.4; 13.5; 13.6; 13.7;13.8.1;14.1;14.5] [12 Hours]

UNIT – IV

Laplace Transforms: Definition; conditions for the existence; Transforms of elementary functions; properties of Laplace Transforms; Transforms of derivatives; Transforms of integrals; Multiplication by t^n; Division by t; Inverse transforms- Method of partial fractions; Other methods of finding inverse transforms; Convolution theorem(without proof); Application to differential equations: Solution of ODE with constant coefficients using Laplace transforms.

[Sections:21.2.1; 21.2.2; 21.3; 21.4; 21.7; 21.8; 21.9; 21.10; 21.12; 21.13; 21.14; 21.15.1]

[12 Hours]

TEXT BOOK:

B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

[1] Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.

[2] N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

WAVES AND MODERN PHYSICS
(ENGINEERING PHYSICS-1)
I B.TECH – I SEMESTER (CODE-18PH001)
(Common for ECE,EEE,EIE)

Lectures	**4**	Tutorial	**0**	Practical	**0**	Credits	**3**
Continuous Internal Assessment			**50**	Semester End Examination (3hours)			**50**

COURSE OBJECTIVES

CO1: To familiarize the students in getting knowledge about modern optics and their Engineering applications.
CO2: To make aware of the students to obtain circuit knowledge regarding electrical, Electronics and Magnetism.
CO 3: To make the students to understand the quantum theory and solving the various Physical problems using quantum mechanics.
CO 4: To get the knowledge of various methods of analytical techniques for material testing.

COURSE OUTCOMES:

Student will be able to
CLO1: Learn about principle and working of different types of lasers and their applications.
CLO2: Know about principle, types of optical fibres of their importance in communication.
CLO3: Analyse the electromagnetic principles in electrical and electronic circuits and Maxwell's equations.
CLO4: Study about quantum mechanics and its applications.
CLO5: Read about properties and applications of ultrasonics in various fields.
CLO6: Know about radio isotopes and their applications.

UNIT-I (ADVANCED OPTICS)

Lasers: Interaction of radiation with matter. Einstein co-efficients, Properties of laser,Population inversion, LASER principle, pumping schemes-Three level and four level laser, ypes of lasers: solid-state lasers (Ruby), gas lasers (He-Ne), Semiconductor lasers; applications of lasers in industry and medicine.
Fibre Optics: Importance of optical fibre, Structure and principle of optical fibre, acceptance angle and numerical aperture, Types of optical fibres based on modes and refractive index, V-number, losses associated with optical fibres, , fibre optical communication, advantages of optical fibres

UNIT-II (ELECTRO-MAGNETIC INDUCTION AND MAXWELL'S EQUATIONS)

Maxwell's equations in vacuum and conducting medium. Velocity of electromagnetic wave in vacuum. Electromagnetic oscillations in LC circuit, LCR series resonance in A.C circuit and resonant frequency, Quality factor. Concept of skin effect, Energy in an electromagnetic field; Flow of energy and Poynting vector. Principle of circulating charge and cyclotron, Hall Effect.

UNIT-III (**MODERN PHYSICS)**

Dual nature of light, Debroglie concept of matter waves, Davission-Germer experiment, Heisenberg uncertainty principle and applications (non existence of electron in nucleus and finite width of spectral lines), one dimensional time independent and dependent Schrodinger wave equation, physical significance of wave function, application of Schrödinger wave equation to particle in a one dimensional potential box, concept of quantum tunnelling and construction and working of Scanning Tunnelling Electron Microscope.

UNIT-IV (ANALYTICAL TECHNIQUES)

Ultrosonics: Properties of ultrasonics, Production of ultrasonic waves by magnetostriction and piezo-electric method, Determination of velocity of ultrasonic wave in liquids by Ultrasonic interferometer. Medical applications, Ultrasonic Imaging technique(Doppler Ultrasound Imaging advantages and limitations), industrial applications, NDT : Pulse echo technique, Time of flight diffraction technique.

Nuclear Techniques: Radio isotopes and its applications (medical and Industrial), GM counter, Scintillation counter.

****

Books:

1. Engineering physics M.V. Avadhanulu, P.G.Kshirsagar S.Chand & Company Pvt. Ltd.

2. Engineering physics, Palani Swamy, Scitech publication

Reference books: 1. Basic engineering physics – Dr. P.srinivasa Rao, Dr.K.Muralidhar, Himalaya Publication

3. Applied physics - Dr. P. Srinivasa Rao, Dr. K. Muralidhar, Himalaya publication

ENGINEERING CHEMISTRY

I B.TECH – I SEMESTER (Code :18CY001)

Lecture :	3 hours/week	**Continuous Assessment:**	50 M
Credits :	3	**Semester Exam :**	50M
Code :	18CY001	**Time of SEE :**	3 hrs

PREREQUISITES: None

COURSE OBJECTIVES:

The student should be conversant:

CO1: With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.

CO2: To understand the thermodynamic concepts, energy changes, concept of corrosion & its control.

CO3: With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of knocking and anti-knocking characteristics.

CO4: With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers.

COURSE OUTCOME:

After studying this course, students will be able to:

CLO-1: Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.

CLO-2: Apply their knowledge in converting various energies of different systems and protection of different metals from corrosion.

CLO-3: Have the capacity of applying energy sources efficiently and economically for various needs.

CLO-4: Design economically and new methods of organic synthesis and substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.

UNIT I: Water Chemistry **12 hrs**

Introduction: water quality parameters

Characteristics: Alkalinity, Hardness - Estimation & simple neumerical problems,

Boiler Troubles - Sludges, Scales, Caustic embrittlement, boiler corrosion, Priming and foaming;

Internal conditioning - phosphate, calgon and carbonate methods.

External conditioning - Ion exchange process & Zeolite proess

WHO Guidelines, Potable water, Sedimentation, Coagulation, Filtration. Disinfection methods: Chlorination, ozonization and UV treatment.

Salinity – Treatment of Brackish water by Reverse Osmosis and Electrodialysis.

UNIT II **12 hrs**

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.

Corrosion: Types of corrosion - Chemical or dry corrosion, Electrochemical or wet corrosion; Galvanic, stress, pitting and differential aeration corrosion; Factors effecting corrosion, **Corrosion control** – Cathodic protection, and electro plating (Au) & electoless Ni plating.

UNIT III: Fuels **12 hrs**

Classification of fuels; Calorific value of fuels (lower, higher)
Solid fuels: Determination of calorific value (Bomb Calorimeter) & related problems, Coal ranking,
Liquid Fuels: Petroleum refining and fractions, composition and uses. Knocking and anti- knocking Agents, Octane number and Cetane number; Bio fuels- Biodiesel, general methods of preparation and advantages
Gaseous fuels: CNG and LPG,
Flue gas analysis – Orsat apparatus.

UNIT IV: **12 hrs**

Organic reactions and synthesis of a drug molecule
Introduction to reactions involving substitution (SN^1, SN^2), addition (Markownikoff's and anti-Markwnikoff's rules) , elimination (E_1 & E_2), Synthesis of a commonly used drug molecule.(Aspirin and Paracetamol)

Polymers: Conducting polymers: Classification, Intrinsic and Extrinsic conducting polymers and their applications**.** Plastics: Thermoplasts and thermosetting plastics, Bskelite and PVC.
Bio degradable polymers: types, examples-Polyhydroxy buterate (PHB), Polyhydroxy buterate-co-β-hydroxy valerate (PHBV), applications.

TEXT BOOKS:

1. P.C. Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi 17th edition (2017).
2. Seshi Chawla, "Engineering Chemistry" Dhanpat Rai Pub, Co LTD, New Delhi 13 th edition, 2013.

REFERENCES:

1 Essential Of Physical Chemistry by Arun Bahl, B.S. Bahl, G.D.Tuli, by Arun Bahl, B.S. Bahl, G.D.Tuli, Published by S Chand Publishers, 12th Edition, 2012.

2 Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).

3 Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015.

Environmental Studies

I B.Tech – I/II Semester (Code: 14CE001)

Lectures	4	Tutorial	0	Practical	0	Credits	2
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Prerequisites: None

Course Objectives: To learn

CO1: To develop an awareness, knowledge, and appreciation for the natural environment.
CO2: To understand different types of ecosystems exist in nature.
CO3: To know our biodiversity.
CO4: To understand different types of pollutants present in Environment.
CO5: To know the global environmental problems.

Course Outcomes: Students will be able to

CLO 1: Develop an appreciation for the local and natural history of the area.
CLO 2: Hope for the better future of environment in India which is based on many positive factors like Biodiversity, successive use of renewable energy resources and other resources, increasing number of people's movements focusing on environment.
CLO 3: Know how to manage the harmful pollutants.
CLO 4: Gain the knowledge of Environment.
CLO 5: Create awareness among the youth on environmental concerns important in the long-term interest of the society

UNIT – I

Introduction: Definition, Scope and Importance, Need for public awareness. Ecosystems: Definition, Structure and Functions of Ecosystems, types - Forest, Grassland, Desert, Aquatic (Marine, pond and estuaries). *6 periods*

Biodiversity: Definition and levels of Biodiversity; Values of Biodiversity - Consumptive, Productive, Social, Aesthetic, Ethical and Optional; Threats and Conservation of Biodiversity; Hot Spots of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation. *Chipko movement case study* *6 periods*

UNIT – II

Natural resources: Land: Land as a resource, Causes and effects of land degradation - Soil erosion, Desertification. **Forest**: Use of forests, Causes and effects of deforestation, Afforestation, Mining - benefits and problems. **Water**: Uses, floods and drought, Dams - benefits and problems.

Energy: Importance of energy, Environmental Impacts of Renewable and Non-renewable energy resources. *Silent Valley Project and Narmada BachaoAndolan case studies*8 *periods*

Sustainability: Definition, Concept and Equitable use of resources for sustainable development; Rain water harvesting and Watershed management. Fieldwork on Rain water harvesting and Watershed management. *6 periods + 6 hours field work/Demonstration*

UNIT – III

Pollution: Definition; Causes, effects and control of air, water and nuclear pollution; *Chernobyl Nuclear Disaster* case study; Solid Waste: urban, Industrial and hazardous wastes; Integrated waste management - 3R approach, composting and vermicomposting. *12 periods*

Environmental acts: Water and air (Prevention and Control of pollution) acts, Environmental protection act, Forest Conservation act.
6 periods

UNIT – IV

Environmental issues: Green house effect & Global warming, Ozone layer depletion, Acid rains, Green Revolution, Population Growth and environmental quality, Environmental Impact Assessment.Environmental Standards (ISO 14000, etc.) *12 periods*
Case Studies: Bhopal Tragedy, Mathura Refinery and TajMahal, and Ralegan Siddhi (Anna Hazare). *6 periods*

Field work: Visit to a local area to document environmental assets – Pond/Forest/Grassland. Visit to a local polluted site- Urban and industry/ Rural and Agriculture. *6 hrs.*

TEXT BOOKS:

1. –Environmental Studies‖ by Benny Joseph, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. –Comprehensive environmental studies‖- JP Sharma, Laxmi Publications.
3. Text Book of environmental Studies – ErachBharucha

REFERENCE BOOKS:

1. –Environmental studies‖, R.Rajagopalan, Oxford University Press.
2. –Introduction to Environmental Science‖, Anjaneyulu Y, B S Publications
3. –Environmental Science‖, 11th Edition – Thomson Series – By Jr. G. Tyler Miller.

PROBLEM SOLVING USING PROGRAMMING

(Common for all branches except Civil Engineering)

I B.Tech – II Semester (Code:18CS001)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: BASIC MATHEMATICS

Course Objectives: Students will be able to

1. Understand basic concepts of C Programming such as: C-tokens, Operators, Input/output, and Arithmetic rules.
2. Develop problem-solving skills to translate _English' described problems into programs written using C language.
3. Use Conditional Branching, Looping, and Functions.
4. Apply pointers for parameter passing, referencing and differencing and linking data structures.
5. Manipulate variables and types to change the problem state, including numeric, character, array and pointer types, as well as the use of structures and unions, File.

Course Outcomes:

After the course the students are expected to be able to

1. Choose the right data representation formats based on the requirements of the problem.
2. Analyse a given problem and develop an algorithm to solve the problem.
3. Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
4. Write the program on a computer, edit, compile, debug, correct, recompile and run it.
5. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.

UNIT I (17 Periods)

Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing I/O Operations. Decision Making and Branching.

Programming Exercises for Unit I:C-expressions for algebraic expressions, evaluation of arithmetic and Boolean expressions. Syntactic and logical errors in a given program, output of a given program, values of variables at the end of execution of a program fragment,

Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers. Computation of discount amount on different types of products with different discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, finding given year is leap year or not, and conversion of lower case character to its upper case.

UNIT II (17 Periods)

Decision Making and Looping, Arrays, Character Arrays and Strings.

Programming Exercises for Unit II: To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number.To print graphic patterns of symbols and numbers.To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is palindrome or not with and without using String Handling Functions. Transpose of a matrix and sorting of names using arrays.

UNIT III (18 Periods)

User-defined Functions,Structures and Unions,Pointers

Programming Exercises for Unit - III: Functions - Recursive functions to find factorial & GCD (Greatest Common Divisor), string operations using pointers and pointer arithmetic. Swapping two variable values. Sorting a list of student records on register number using array of pointers

UNIT IV (18 Periods)

File Management in C,Dynamic Memory Allocation,Preprocessor

Programming Exercises for Unit - IV: Operations on complex numbers, and to read an input file of marks and generate a result file, sorting a list of names using command line arguments. Copy the contents of one file to another file. Allocating memory to variables dynamically.

Text Book:

1. **Programming in ANSI C by E.Balaguruswamy,Fifth Edition.**

References:

1. Kernighan BW and Dennis Ritchie M, ‑C programming language‖, 2nded, Prentice Hall.
2. Yashavant P. Kanetkar, ‑Let us C‖, BPB Publications.
3. Herbert Schildt, ―C: The Complete Reference‖, 4th edition, Tata Mcgraw-Hill.
4. Ashok N.Kamthane, ‑Programming in C‖, PEARSON 2nd Edition.

ENGINEERING CHEMISTRY LABORATORY

(Common to all branches)

I B.Tech – I/II Semester (Code: 18CYL01)

Lectures	0	Tutorial	0		Practical	3		Credits	1		
Continuous Internal Assessment			:	50	Semester End Examination (3 Hours)				:	50	

LIST OF EXPERIMENTS

1. **Introduction to Chemistry Lab** (the teachers are expected to teach fundamentals likeCalibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. anderror, accuracy, precision, theory of indicators, use of volumetric titrations).

2. Volumetric Analysis:
    a. Estimation of Washing Soda.
    b. Estimation of Active Chlorine Content in Bleaching Powder
    c. Estimation of Mohr's salt by permanganometry.
    d. Estimation of given salt by using Ion-exchange resin using Dowex-50.
3. Analysis of Water:
    a. Determination of Alkalinity of Tap water.
    b. Determination of Total Hardness of ground water sample by EDTA method
    c. Determination of Salinity of water sample
4. Estimation of properties of oil:
    a. Estimation of Acid Value
    b. Estimation of Saponification value
5. Preparations:
    a. Preparation of Soap
    b. Preparation of Urea-formaldehyde resin
    c. Preparation of Phenyl benzoate
6. Demonstration Experiments (Any two of the following):
    a. Determination of $p^H$of given sample.
    b. Determination of conductivity of given sample by conductometer.
    c. Potentiometric Determination of Iron.

TEXT BOOKS (for Chemistry 1 and 2):

1. Practical Engineering Chemistry by K.Mukkanti, Etal, B.S. Publicaitons, Hyderabad, 2009.
2. Inorganic quantitative analysis, Vogel, 5^{th} edition, Longman group Ltd. London, 1979.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R.n. Goyal and HarrmendraGoel.
2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

HARDWARE LAB

I B.Tech – I Semester (Code: 18ECL12)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

List of Lab Experiments

1. Identification and testing of various circuit elements
2. Study of CRO and Function Generator.
3. Study of RPS and Multimeter.
4. Verification of KCL and KVL.
5. Testing of basic gates.
6. Realization of basic gates using discrete components.
7. V-I characteristics of Diode.
8. V-I characteristics of Zener Diode.
9. Verification of Thevenin‘s Theorem.
10. Component testing using CRO.

Problem Solving using Programming Lab

I B.Tech – II Semester (Code: 18CSL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Lab Examination (3 Hours)			:	50

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if-else statement).

Domestic Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 200	0.50 per unit	
201 – 400	100 plus	0.65 per unit
401 – 600	230 plus	0.80 per unit
601 and above	390 plus	1.00 per unit
Commercial Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 100	0.50 per unit	
101 – 200	50 plus	0.6 per unit
201 – 300	100 plus	0.70 per unit
301 and above	200 plus	1.00 per unit

2. Write a C program to evaluate the following (usingloops):
   a) $1 + x^2/2! + x^4 / 4!+$ …upto tenterms
   b) $x + x^3/3! + x^5/5!+$ … upto ten terms
3. Write a C program to check whether the given numberis
   a) Prime ornot.
   b) Perfect or Abundant orDeficient.
4. Write a C program to display statistical parameters (using one – dimensionalarray).
   a) Mean
   b) Mode
   c) Median
   d) Variance.
5. WriteaCprogramtoreadalistofnumbersandperformthefollowingoperations
   a) Print thelist.
   b) Delete duplicates from thelist.
   c) Reverse thelist.
6. Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message “Element not found in theList”.

7. Write a C program to read two matrices and compute their sum andproduct.

8. Write a C program to read list of student names and perform the following operations

a) To print the list of names.

b) To sort them in ascending order.

c) To print the list after sorting.

9. Write a C program that consists of recursive functions to

a) Find factorial of a given number

b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.

10. A Bookshop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author, and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed, if it is, then the system displays the book details and request for the number of copies required ,if the requested copies are available the total cost of the requested copies is displayed otherwise the message “required copies not in stock” is displayed. Write a program for the above in structures with suitable functions.

11. Write a C program to read a data file of students’ records with fields(Regno, Name, M1,M2,M3,M4,M5) and write the successful students data (percentage > 40%) to a data file.

12. Write a C program to read a file as command line argument and count the given word frequency in a file

Numerical Methods and Advanced Calculus I
B.Tech –II Semester (Code: 18MA002)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)			:	50

Prerequisites: None

Course Objectives:

CO1: To learn about some advanced numerical techniques e.g. solving a nonlinear equation, linear system of equations, Interpolation and Approximation techniques.
CO2: To learn about evaluation of double and triple integrals and their applications.
CO3: To learn some basic properties of scalar and vector point functions and their applications to line,surface and volume integrals.

Course Outcomes: Students will be able to

CLO-1: Solve non-linear equations in one variable and system of linear equations using iteration methods.
CLO-2: Choose appropriate interpolation formulae based on the given data.
CLO-3: Compute the value of a definite integral using numerical integration techniques.
CLO-4: Predict the numerical solution of the derivative at a point from the given initial value problem using appropriate numerical method.
CLO-4 :Evaluate the double and triple integrals using change of variables.
CLO-5: Transform line integrals to surface and surface to volume integrals and evaluate them.

SYLLABUS

UNIT - I

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton-Raphson method; Useful deductions from the Newton-Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss elimination method, Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi‘s iterative method, Gauss-Seidel iterative method.

[Sections: 28.1; 28.2; 28.3; 28.5; 28.6; 28.7.1;28.7.2]. [12 Hours]

UNIT - II

Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton‘s interpolation formulae: Newton‘s forward interpolation formula, Newton‘s backward interpolation formula; Interpolation with unequal intervals; Lagrange‘s interpolation formula; Divided differences; Newton‘s divided difference formula; Numerical integration; Trapezoidal rule; Simpson‘s one-third rule; Simpson‘s three-eighth rule; Numerical solution of ODE‘s: Introduction; Picard‘s method; Euler‘s method; Runge-Kutta method.

[Sections:29.1; 29.1-1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1; 32.2; 32.4; 32.7]. [12 Hours]

UNIT – III

Multiple Integrals: Double integrals; Change of order of integration; Double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integrals, Change of variables.

[Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2]. [12 Hours]

UNIT – IV

Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green‘s theorem in the plane (without proof); Stokes theorem (without proof); Gauss divergence theorem(without proof).

[Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12; 8.13; 8.14; 8.16] [12 Hours]

TEXT BOOK:

B.S.Grewal, ―Higher Engineering Mathematics‖, 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

[1] ErwinKreyszig, –Advanced Engineering Mathematics‖, 9th edition, John Wiley & Sons.
[2] N.P.Bali and M.Goyal, ―A Text book of Engineering Mathematics‖ Laxmi Publications, 2010.

BASIC INSTRUMENTATION

I B.Tech – IISemester (Code: 18EC202)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives: To learn

CO1: Explain basic concepts and definitions in measurement.
CO2 : Describe the bridge configurations and their applications.
CO3: Elaborate discussion about the importance of signal generators and analyzers in Measurement.
CO4: Describe the different types of transducers and data acquisition systems.

Course Outcomes: Students will be able to

CLO-1: Recognize the evolution and history of units and standards in Measurements.
CLO-2: Identify the various parameters that are measurable in electronic instrumentation.
CLO-3: To have a deep understanding about instrumentation concepts which can be applied to Control systems.
CLO-4: Relate the usage of various instrumentation standards..

UNIT-I

Measurement and Error: Definitions, Accuracy and Precision, Significant figures, Types of error, Statistical analysis, Probability of errors, Limiting Errors.
Electromechanical Indicating Instruments: Torque and Deflection of the Galvanometer, Permanent Magnet Moving Coil Mechanism, DC Ammeters, DC Voltmeters, Voltmeter Sensitivity, Series type Ohmmeter, Shunt type Ohmmeter, Calibration of DC Instruments, Alternating Current indicating Instruments.

UNIT-II

Bridge Measurements: Introduction, Wheatstone Bridge, Kelvin Bridge, AC Bridges and their Application-Maxwell Bridge, Hay Bridge, Schering Bridge, Wein Bridge.
Electronic Instruments for measuring Basic Parameters : AC voltmeter using rectifiers, True RMS-Responding voltmeter, Electronic Multimeter, Digital voltmeters, Q Meter, Vector Impedance Meter, Vector Voltmeter, RF Power and Voltage measurement.

UNIT-III

Oscilloscopes: Oscilloscope Block diagram, Cathode Ray Tube, Oscilloscope Techniques. **Special Oscilloscopes**: Storage Oscilloscope, Sampling Oscilloscope, Digital Storage Oscilloscopes.

Signal Analysis: Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analysis. **Frequency Counter and Time-Interval Measurements**: Simple Frequency counter, Display Counter, Time Base, Input Signal Processing, Period Measurement.

UNIT-IV

Transducers as Input Elements to Instrumentation Systems: Classification of Transducers, Selecting a Transducer,Strain gauges, Displacement Transducers, Temperature Measurements.

Analog and Digital Data Acquisition Systems: Instrumentation systems.

TEXT BOOK:

1. Modern Electronic Instrumentation and Measurement Techniques by W.D Cooper & A.D Helfrick PHI, 2008.

REFERENCE BOOKS:

1. A Course in Electrical and Electronics Measurements and Instrumentation by Sawhney. A.K**,** 18th Edition, DhanpatRai& Company Private Limited, 2007.

2. Electronic Instrumentation by H S Kalsi, Tata McGraw-Hill Education, 1995.

PROGRAMMING WITH C++

I B.Tech – II Semester (Code: 18EC203)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives: To learn

CO1: Develop a greater understanding of the issues involved in programming language design and implementation.
CO2: Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.
CO3: Implement several programs in languages other than the one emphasized in the core curriculum (C++).
CO4: Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.

Course Outcomes: Students will be able to

CLO-1: Understand the features of C++ supporting object oriented programming.
CLO-2: Understand the relative merits of C++ as an object oriented programming language .
CLO-3: Understand how to apply the major object-oriented concepts to implement object. oriented programs in C++, encapsulation, inheritance and polymorphism.
CLO-4: Understand advanced features of C++ specifically stream I/O, templates and operator overloading.

UNIT I

Introduction: Basic concepts of OOP, benefits and applications of OOP, what is C++, applications of C++, C++ statements, structure of a C++ program, creating the source file, compiling and linking. C++ tokens, keywords, identifiers and constants, data types in C++, operators in C++,symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables, scope resolution operator, member dereferencing operator, memory management operator, type cast operator, expressions and their types, special assignment expressions, implicit conversions, operator overloading, operator precedence, control structures. C++ streams and stream classes, unformatted I/O operations, formatted I/O operations, managing output with manipulators

UNIT II

Functions in C++: main function, function prototyping, call by reference, return by reference, inline functions, default arguments, const arguments, function overloading, friend and virtual functions. **Classes and objects**: specifying a class, defining member functions,

nesting member functions, private member functions, static data members and member functions, arrays of objects, objects as function arguments, returning objects, local classes.

UNIT III

Constructors and Destructors: constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, copy constructor, dynamic constructor, const objects, destructors. Defining Operator overloading, overloading unary and binary operators, overloading binary operators using friends, rules for operator overloading, manipulation of strings using operators.

UNIT IV

Pointers, pointers to objects, this pointer, pointers to derived classes, pure virtual functions. Inheritance: single inheritance, making a private member inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, abstract classes.

TEXT BOOK

1. Object oriented programming with C++, Balagurusamy, 4th edition, Tata McGraw-Hill publications, 2008.

REFERENCE BOOKS 2. Object oriented programming with ANSI and turbo C++, Ashok N.Kamthane, Pearson Education, 2005. 3. C++ programming language by Bjarne Stroustup,3rd edition, Pearson education,2009.

CIRCUIT THEORY

I B.Tech – II Semester (Code : 18EC205)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives: To learn

CO1: Basics of circuit analysis-KVL, KCL, Mesh analysis and Nodal analysis.
CO2: Analysis of dc/ac electric circuits and important theorems of circuit analysis.
CO3: To expose the students to the concept of resonance and its applications.
CO4: To familiarize the students to the Laplace transform concept for applying it to obtain transient response for DC & AC inputs.

Course Outcomes: Students will be able to

CLO-1: Identify the main circuit elements and apply Kirchhoff‘s Laws to calculate currents, voltages and powers in typical linear electric circuits using a variety of analytical methods.
CLO-2: Reduce more complicated circuits into the Thevenin‘s and Norton‘s equivalent circuits.
CLO-3: Obtain the transient responses of RC, RL and RLC circuits.
CLO-4: know the application of Laplace transform to circuit analysis.

UNIT – I

Voltage and current Laws: Introduction, nodes, paths, loops and branches, Kirchhoff‘s current and voltage laws, series and parallel connected sources, resistors in series and parallel, voltage and current division.
Basic Nodal and Mesh Analysis: Nodal analysis, the super node, Mesh analysis, and The super mesh, Nodal vs. Mesh analysis: A comparison

UNIT II

Useful circuit analysis techniques: Linearity and superposition, source transformations, Thevenin and Norton equivalent circuits, maximum power transfer Theorem, Reciprocity Theorem, and delta-wye conversion.

UNIT III

Basic RL and RC Circuits: The source free RL circuit, properties of the exponential response, the source free RC circuit, driven RL circuits, natural and forced response, driven RC circuits
The RLC Circuit: The source free Parallel circuit, the over damped Parallel RLC circuit,

Critical damping, the under damped parallel RLC circuit, the complete response of the RLC circuit.

Sinusoidal steady state Analysis: Characteristics of sinusoids, forced response to sinusoidal functions, the complete forcing function, the phasor, phasor relationships for R, L and C, impedance, admittance, phasor diagrams.

.

UNIT IV

Complex frequency and the Laplace transform: complex frequency, the damped sinusoidal Forcing function, Application of Laplace transform to circuit analysis

Frequency Response: Parallel Resonance, Bandwidth and High Q circuits, Series resonance, other resonant forms, scaling.

TEXT BOOK:

1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, 8th Edition, Tata McGraw Hill, 2016.

REFERENCE BOOKS:

1. Circuits & Networks: Analysis and Synthesis, A.Sudhakar and ShyammohanS.Pilli, Tata McGraw Hill, 2007.

2. Network Analysis, M. E. Vanvalkenburg, 3rd Edition, PHI, 2003

Communicative English
18EL001

Lectures:3 Periods/Week | Continuous Assessment: 50M
Sem End Exam Duration: 3 hours | Sem End Exam : 50M

Credits: 2

UNIT-I

Vocabulary Development: Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes
Essential Grammar: Prepositions, Conjunctions, Articles
Basic Writing Skills: Punctuation in writing
Writing Practices: Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT-II

Vocabulary Development: Synonyms and Antonyms
Essential Grammar: Concord, Modal Verbs, Common Errors
Basic Writing Skills: Using Phrases and clauses
Writing Practices: Hint Development, Essay Writing

Unit III

Vocabulary Development: One word Substitutes
Essential Grammar: Tenses, Voices
Basic Writing Skills: Sentence structures (Simple, Complex, Compound)
Writing Practices: Note Making

Unit IV

Vocabulary Development: Words often confused
Essential Grammar: Reported speech, Common Errors
Basic Writing Skills: Coherence in Writing: Jumbled Sentences
Writing Practices: Paraphrasing &Summarising

Reference Books

- Communication Skills, Sanjay Kumar &PushpaLatha. Oxford University Press:2011.
- Practical English Usage, Michael Swan. Oxford University Press:1995.
- Remedial English Grammar, F.T.Wood. Macmillan:2007.
- Study Writing, Liz Hamplyons& Ben Heasley. Cambridge University Press:2006

Physics Laboratory

I B.Tech– Semester (Code: 18PHL01)

(COMMON TO ALL BRANCHES)

Lectures	**0**	Tutorial	0	Practical	**3**	Credits	**1**
Continuous Internal Assessment			**50**	Semester End Examination (3hours)			**50**

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee‘s appa□tus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Dete□□□tio□of □dius of □□atu□ of a Pla□ □□□le□ □□o□□g N□□
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. Determination of dispersive power of a given material of prism using prism minimum deviation method.
7. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
8. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using sonometer.
10. Determine the rigidity modulus of the given material of the wire using Torsional pendulum.
11. Draw the load characteristic curves of a solar cell.
12. Determination of Hall coefficient of a semiconductor.
13. Determination of voltage and frequency of an A.C. signal using C.R.O.
14. Determination of Forbidden energy gap of Si &Ge.
15. Determination of wavelength of laser source using Diode laser.

Any three experiments are virtual TEXT BOOK:

1. □Engineering physics laboratory manual□P.Srinivasarao&K.Muralidhar,Himalaya publications.

PROGRAMMING WITH C++ LAB

I B.Tech – IISemester (Code: 18ECL22)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Programs Write C++ programs to illustrate the concept of the following:

1. Arrays
2. Structures
3. Pointers
4. Objects and Classes
5. Console I/O operations
6. Scope resolution and memory management operators
7. Inheritance
8. Polymorphism
9. Virtual Functions
10. Friend Functions
11. Operator overloading
12. Function overloading
13. Constructors and Destructors
14. *this*pointer
15. File I/O operations

Note: A minimum of ten programs are to be executed and recorded to attain eligibility for University Practical examination.

English Communication Skills Laboratory

18ELL01

Lectures:3 Periods/Week Continuous Assessment: 50M Sem End Exam Duration: 3 hours Sem End Exam : 50M

Credits: 1

UNIT-I

Listening Skills; Importance – Purpose- Process- Types
Barriers to Listening
Strategies for Effective Listening

UNIT-II

Phonetics; Introduction to Consonant, Vowel and Diphthong sounds
Stress
Rhythm
Intonation

UNIT-III

Formal and Informal Situations
Expressions used in different situations
Introducing Yourself & Others-Greeting & Parting-Congratulating-Giving Suggestions & Advices-Expressing Opinions-Inviting People-Requesting-Seeking Permission-Giving
Information- Giving Directions- Sympathizing- Convincing People-Complaining & Apologizing-Thanking Others- Shopping- Travelling-Conversational Gambits

UNIT-IV

JAM Session
Debates
Extempore

Reference Books:

- Communication Skills, Sanjay Kumar and PushpaLata. Oxford University Press. 2011
- Better English Pronunciation, J.D. O‘ Connor. Cambridge University Press:1984

- New Interchange (4rth Edition), Jack C Richards. Cambridge University Press:2015
- English Conversation Practice, Grant Taylor. McGraw Hill:2001

Software:

- Buzzers for conversations, New Interchange series
- English in Mind series, Telephoning in English
- Speech Solutions, A Course in Listening and Speaking

ENGINEERING CHEMISTRY LABORATORY

With effect from 2018-19 **3 periods: Credits; 1.5**

LIST OF EXPERIMENTS

1. **Introduction to Chemistry Lab** (the teachers are expected to teach fundamentals like Calibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. and error, accuracy, precision, theory of indicators, use of volumetric titrations).

2. **Volumetric Analysis:**
    a. Estimation of Washing Soda.
    b. Estimation of Active Chlorine Content in Bleaching Powder
    c. Estimation of Mohr's salt by permanganometry.
    d. Estimation of given salt by using Ion-exchange resin using Dowex-50.
3. **Analysis of Water:**
    a. Determination of Alkalinity of Tap water.
    b. Determination of Total Hardness of ground water sample by EDTA method
    c. Determination of Salinity of water sample
4. **Estimation of properties of oil**:
    a. Estimation of Acid Value
    b. Estimation of Saponification value
5. **Preparations:**
    a. Preparation of Soap
    b. Preparation of Urea-formaldehyde resin
    c. Preparation of Phenyl benzoate
6. **Demonstration Experiments (Any two of the following):**
    a. Determination of p^H of given sample.
    b. Determination of conductivity of given sample by conductometer.
    c. Potentiometric Determination of Iron.

TEXT BOOKS (for Chemistry 1 and 2):

1. Practical Engineering Chemistry by K.Mukkanti, Etal, B.S. Publicaitons, Hyderabad, 2009.
2. Inorganic quantitative analysis, Vogel, 5^{th} edition, Longman group Ltd. London, 1979.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R.n. Goyal and Harrmendra Goel.
2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara.

Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications

Numerical Methods and Advanced Calculus
I B.Tech –II Semester (Code: 18MA002)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives:

CO1: To learn about some advanced numerical techniques e.g. solving a nonlinear equation, linear system of equations, Interpolation and Approximation techniques.
CO2: To learn about evaluation of double and triple integrals and their applications.
CO3: To learn some basic properties of scalar and vector point functions and their applications to line, surface and volume integrals.

Course Outcomes: Students will be able to

CLO-1: Solve non-linear equations in one variable and system of linear equations using iteration methods.
CLO-2: Choose appropriate interpolation formulae based on the given data.
CLO-3: Compute the value of a definite integral using numerical integration techniques.
CLO-4: Predict the numerical solution of the derivative at a point from the given initial value problem using appropriate numerical method.
CLO-4 : Evaluate the double and triple integrals using change of variables.
CLO-5: Transform line integrals to surface and surface to volume integrals and evaluate them.

SYLLABUS

UNIT - I

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton-Raphson method; Useful deductions from the Newton-Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss elimination method, Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi's iterative method, Gauss-Seidel iterative method.
[Sections: 28.1; 28.2; 28.3; 28.5; 28.6; 28.7.1;28.7.2]. [12 Hours]

UNIT - II

Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton's interpolation formulae: Newton's forward interpolation formula, Newton's backward interpolation formula; Interpolation with unequal intervals; Lagrange's interpolation formula; Divided differences; Newton's divided difference formula; Numerical integration; Trapezoidal rule; Simpson's one-third rule; Simpson's three-eighth rule; Numerical solution of ODE's: Introduction; Picard's method; Euler's method; Runge-Kutta method.
[Sections:29.1; 29.1-1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1; 32.2; 32.4; 32.7]. [12 Hours]

UNIT – III

Multiple Integrals: Double integrals; Change of order of integration; Double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integrals, Change of variables.
[Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2]. [12 Hours]

UNIT – IV

Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green's theorem in the plane (without proof); Stokes theorem (without proof); Gauss divergence theorem(without proof).
[Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12; 8.13; 8.14; 8.16] [12 Hours]

TEXT BOOK:

B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

[1] Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.

[2] N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

BASIC INSTRUMENTATION

I B.Tech – IISemester (Code: 18EC202)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives: To learn

CO1: Explain basic concepts and definitions in measurement.

CO2 : Describe the bridge configurations and their applications.

CO3: Elaborate discussion about the importance of signal generators and analyzers in Measurement.

CO4: Describe the different types of transducers and data acquisition systems.

Course Outcomes: Students will be able to

CLO-1: Recognize the evolution and history of units and standards in Measurements.

CLO-2: Identify the various parameters that are measurable in electronic instrumentation.

CLO-3: To have a deep understanding about instrumentation concepts which can be applied to Control systems.

CLO-4: Relate the usage of various instrumentation standards..

UNIT-I

Measurement and Error: Definitions, Accuracy and Precision, Significant figures, Types of error, Statistical analysis, Probability of errors, Limiting Errors.

Electromechanical Indicating Instruments: Torque and Deflection of the Galvanometer, Permanent Magnet Moving Coil Mechanism, DC Ammeters, DC Voltmeters, Voltmeter Sensitivity, Series type Ohmmeter, Shunt type Ohmmeter, Calibration of DC Instruments, Alternating Current indicating Instruments.

UNIT-II

Bridge Measurements: Introduction, Wheatstone Bridge, Kelvin Bridge, AC Bridges and their Application-Maxwell Bridge, Hay Bridge, Schering Bridge, Wein Bridge.

Electronic Instruments for measuring Basic Parameters : AC voltmeter using rectifiers, True RMS-Responding voltmeter, Electronic Multimeter, Digital voltmeters, Q Meter, Vector Impedance Meter, Vector Voltmeter, RF Power and Voltage measurement.

UNIT-III

Oscilloscopes: Oscilloscope Block diagram, Cathode Ray Tube, Oscilloscope Techniques. **Special Oscilloscopes**: Storage Oscilloscope, Sampling Oscilloscope, Digital Storage Oscilloscopes.

Signal Analysis: Wave Analyzers, Harmonic Distortion Analyzers, Spectrum Analysis. **Frequency Counter and Time-Interval Measurements**: Simple Frequency counter, Display Counter, Time Base, Input Signal Processing, Period Measurement.

UNIT-IV

Transducers as Input Elements to Instrumentation Systems: Classification of Transducers, Selecting a Transducer,Strain gauges, Displacement Transducers, Temperature Measurements.
Analog and Digital Data Acquisition Systems: Instrumentation systems.

TEXT BOOK:

1. Modern Electronic Instrumentation and Measurement Techniques by W.D Cooper & A.D Helfrick PHI, 2008.

REFERENCE BOOKS:

1. A Course in Electrical and Electronics Measurements and Instrumentation by Sawhney. A.K**,** 18th Edition, Dhanpat Rai & Company Private Limited, 2007.
2. Electronic Instrumentation by H S Kalsi, Tata McGraw-Hill Education, 1995.

PROGRAMMING WITH C++

I B.Tech – II Semester (Code: 18EC203)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives: To learn

CO1: Develop a greater understanding of the issues involved in programming language design and implementation.

CO2: Develop an in-depth understanding of functional, logic, and object-oriented programming paradigms.

CO3: Implement several programs in languages other than the one emphasized in the core curriculum (C++).

CO4: Understand design/implementation issues involved with variable allocation and binding, control flow, types, subroutines, parameter passing.

Course Outcomes: Students will be able to

CLO-1: Understand the features of C++ supporting object oriented programming.

CLO-2: Understand the relative merits of C++ as an object oriented programming language .

CLO-3: Understand how to apply the major object-oriented concepts to implement object. oriented programs in C++, encapsulation, inheritance and polymorphism.

CLO-4: Understand advanced features of C++ specifically stream I/O, templates and operator overloading.

UNIT I

Introduction: Basic concepts of OOP, benefits and applications of OOP, what is C++, applications of C++, C++ statements, structure of a C++ program, creating the source file, compiling and linking. C++ tokens, keywords, identifiers and constants, data types in C++, operators in C++,symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables, scope resolution operator, member dereferencing operator, memory management operator, type cast operator, expressions and their types, special assignment expressions, implicit conversions, operator overloading, operator precedence, control structures. C++ streams and stream classes, unformatted I/O operations, formatted I/O operations, managing output with manipulators

UNIT II

Functions in C++: main function, function prototyping, call by reference, return by reference, inline functions, default arguments, const arguments, function overloading, friend and virtual functions. **Classes and objects**: specifying a class, defining member functions, nesting member functions, private member functions, static data members and member functions, arrays of objects, objects as function arguments, returning objects, local classes.

UNIT III

Constructors and Destructors: constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, copy

constructor, dynamic constructor, const objects, destructors. Defining Operator overloading, overloading unary and binary operators, overloading binary operators using friends, rules for operator overloading, manipulation of strings using operators.

UNIT IV

Pointers, pointers to objects, this pointer, pointers to derived classes, pure virtual functions. Inheritance: single inheritance, making a private member inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, abstract classes.

TEXT BOOK

1. Object oriented programming with C++, Balagurusamy, 4th edition, Tata McGraw-Hill publications, 2008.

REFERENCE BOOKS 2. Object oriented programming with ANSI and turbo C++, Ashok N.Kamthane, Pearson Education, 2005. 3. C++ programming language by Bjarne Stroustup,3rd edition, Pearson education,2009.

Communicative English
I B.Tech (Theory)

Lectures: 3 Periods/Week | Continuous Assessment: 50M
Sem End Exam Duration: 3 hours | Sem End Exam : 50M

Credits: 2

UNIT-I

1.1 **Vocabulary Development**: Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes
1.2 **Essential Grammar:** Prepositions, Conjunctions, Articles
1.3 **Basic Writing Skills**: Punctuation in writing
1.4 **Writing Practices**: Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT-II

2.1 **Vocabulary Development**: Synonyms and Antonyms
2.2 **Essential Grammar**: Concord, Modal Verbs, Common Errors
2.3 **Basic Writing Skills**: Using Phrases and clauses
2.4 **Writing Practices**: Hint Development, Essay Writing

Unit III

3.1 **Vocabulary Development**: One word Substitutes
3.2 **Essential Grammar**: Tenses, Voices
3.3 **Basic Writing Skills**: Sentence structures (Simple, Complex, Compound)
3.4 **Writing Practices**: Note Making

Unit IV

4.1 **Vocabulary Development**: Words often confused
4.2 **Essential Grammar**: Reported speech, Common Errors
4.3 **Basic Writing Skills**: Coherence in Writing: Jumbled Sentences
4.4 **Writing Practices**: Paraphrasing & Summarising

Reference Books

- Communication Skills, Sanjay Kumar & Pushpa Latha. Oxford University Press: 2011.
- Practical English Usage, Michael Swan. Oxford University Press: 1995.
- Remedial English Grammar, F.T.Wood. Macmillan: 2007.
- Study Writing, Liz Hamp lyons & Ben Heasley. Cambridge University Press:2006

CIRCUIT THEORY

I B.Tech – II Semester (Code : 18EC205)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives: To learn

CO1: Basics of circuit analysis-KVL, KCL, Mesh analysis and Nodal analysis.
CO2: Analysis of dc/ac electric circuits and important theorems of circuit analysis.
CO3: To expose the students to the concept of resonance and its applications.
CO4: To familiarize the students to the Laplace transform concept for applying it to obtain transient response for DC & AC inputs.

Course Outcomes: Students will be able to

CLO-1: Identify the main circuit elements and apply Kirchhoff's Laws to calculate currents, voltages and powers in typical linear electric circuits using a variety of analytical methods.
CLO-2: Reduce more complicated circuits into the Thevenin's and Norton's equivalent circuits.
CLO-3: Obtain the transient responses of RC, RL and RLC circuits.
CLO-4: know the application of Laplace transform to circuit analysis.

UNIT – I

Voltage and current Laws: Introduction, nodes, paths, loops and branches, Kirchhoff's current and voltage laws, series and parallel connected sources, resistors in series and parallel, voltage and current division.

Basic Nodal and Mesh Analysis: Nodal analysis, the super node, Mesh analysis, and The super mesh, Nodal vs. Mesh analysis: A comparison

UNIT II

Useful circuit analysis techniques: Linearity and superposition, source transformations, Thevenin and Norton equivalent circuits, maximum power transfer Theorem, Reciprocity Theorem, and delta-wye conversion.

UNIT III

Basic RL and RC Circuits: The source free RL circuit, properties of the exponential response, the source free RC circuit, driven RL circuits, natural and forced response, driven RC circuits

The RLC Circuit: The source free Parallel circuit, the over damped Parallel RLC circuit, Critical damping, the under damped parallel RLC circuit, the complete response of the RLC circuit.

Sinusoidal steady state Analysis: Characteristics of sinusoids, forced response to sinusoidal functions, the complete forcing function, the phasor, phasor relationships for R, L and C, impedance, admittance, phasor diagrams.

.

UNIT IV

Complex frequency and the Laplace transform: complex frequency, the damped sinusoidal Forcing function, Application of Laplace transform to circuit analysis

Frequency Response: Parallel Resonance, Bandwidth and High Q circuits, Series resonance, other resonant forms, scaling.

TEXT BOOK:

1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, 8th Edition, Tata McGraw Hill, 2016.

REFERENCE BOOKS:

1. Circuits & Networks: Analysis and Synthesis, A.Sudhakar and ShyammohanS.Pilli, Tata McGraw Hill, 2007.
2. Network Analysis, M. E. Vanvalkenburg, 3rd Edition, PHI, 2003.

PROGRAMMING WITH C++ LAB

I B.Tech – IISemester (Code: 18ECL23)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Programs Write C++ programs to illustrate the concept of the following:

1. Arrays
2. Structures
3. Pointers
4. Objects and Classes
5. Console I/O operations
6. Scope resolution and memory management operators
7. Inheritance
8. Polymorphism
9. Virtual Functions
10. Friend Functions
11. Operator overloading
12. Function overloading
13. Constructors and Destructors
14. *this* pointer
15. File I/O operations

Note: A minimum of ten programs are to be executed and recorded to attain eligibility for University Practical examination.

Probability and Statistics

Common to All Branches

18 MA 003

II B.Tech,III Semester

Lectures	:	3 Hours/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

UNIT – I

Continuous Random Variables, Normal Distribution, Normal Approximation to the Binomial Distribution, Uniform Distribution, Gamma Distribution and its applications, Beta Distribution and its applications, Joint Distributions (Discrete),Joint Distributions (Continuous).Populations and Samples, Law of large numbers,Central limit theorem and its applications,The sampling distribution of the mean (σ unknown),The sampling distribution of the variance.

[12 Hours]

(Sections 5.1, 5.2, 5.3, 5.5,5.7, 5.8, 5.10, 6.1, 6.2, 6.3, 6.4 of Text Book [1])

UNIT – II

Point estimation, Interval estimation, Tests of Hypotheses, Null Hypothesis and Tests of hypotheses, Hypothesis concerning one mean, Comparisons-Two independent Large samples, Comparisons-Two independent small samples, Paired sample t test.

[12 Hours]

(Sections 7.1,7.2, 7.4, 7.5, 7.6, 8.2, 8.3, 8.4 of Text Book [1])

UNIT-III

The estimation of variances,Hypotheses concerning one variance,Hypotheses concerning two variances, Estimation of proportions, Hypotheses concerning one proportion, Hypotheses concerning several proportions, Procedure for Analysis of Variance (ANOVA) for comparing the means of k (>2) groups- one way classification(Completely randomized designs), Procedure for Analysis of Variance (ANOVA) for comparing the means of k (>2) groups- two way classification(Randomized block designs). [12 Hours]

(Sections 9.1, 9.2, 9.3, 10.1, 10.2, 10.3, 12.2, 12.3 of Text Book [1])

UNIT -IV

Multivariate Analysis: The concept of bivariate relationship, scatter diagram, Pearson's correlation and correlation matrix. Simple linear regression model and assumptions, Least Squares Estimation of the parameters of the model, Testing the significance of the model. Regression versus Correlation, Multiple linear regressionmodel with k explanatory variables and assumptions of the model. Least Square Estimation of regression coefficients. Concept of the coefficient of determination R^2. Test for significance of the regression model and individual regression coefficients.Applications of multiple regression analysis.

[12 Hours]

(1st and 2nd Chapters of Text Book [2])

TEXT BOOKS:

1. Miller & Freund's "Probability and Statistics for Engineers", Richard A. Johnson, 8th Edition, PHI.
2. Introduction to Linear Regression Analysis, Douglas C. Montgomery, E.A. Peck and G.G. Vining, 3rdedition, Wiley.

REFERENCE BOOKS:

1. R.E Walpole, R.H. Myers & S.L. Myers 'Probability & Statistics for Engineers and Scientists', 6th Edition, PHI.
2. Fundamentals of Mathematical Statistics, S.C.Gupta and V.K.Kapoor,11th Edition, Sultan Chand & Sons.
3. Murray R Spiegel, John J.Schiller, R. AluSrinivasa, 'Probability &Satistics', Schaum's outline series.
4. K.V.S.Sarma,'Statistics Made Simple – Do it yourself on PC',Prentice Hall India, Second Edition, 2015.

Data Structures using 'Python'
IIB.Tech – I Semester (Code: 18EC302)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

UNIT – I

Python Primer: Python overview, objects in Python, Expressions, operators and precedence, Control flow, functions, simple Input and Output, Iterators and generators, additional python conveniences, Scopes and namespaces, Modules and the import statement.

Array-Based Sequences: python's sequence types, low- level arrays, dynamic arrays and amortization, efficiency of python's sequence types: python's list and tuple classes, python's string class.

UNIT – II

Linked lists: Singly linked list, circularly linked list, doubly linked list

Stacks: The stack abstract data type, Simple array-based stack implementation, reversing data using a stack, implementing stack with a linked list

Queues: the queue abstract data type, Array based queue implementation, implementing queue with a linked list.

Double-ended queues: the DE queue abstract data type, implementing a de queue with a circular array, implementing de queue with a linked list, de queues in the python collections module

UNIT – III

Trees: tree definitions and properties, tree abstract data type, computing depth and height, binary trees, linked structure for binary tree, Array-based representation of a binary tree, tree traversal algorithms, binary search trees, AVL trees.

UNIT – IV

Graph: The graph ADT, Edge list structure, Adjacency list structure, Adjacency map structure, Adjacency matrix structure, Graph traversal algorithms: depth first search, breadth first search, minimum spanning trees.

TEXT BOOKS

1. "Data Structures & Algorithms", Michael T. GoodRich, Roberto Tamassia, Michael H. Goldwasser.John Wiley & sons ,2013

REFERENCES

1. "Introduction to programming using python", Y.Daniel Liang, Pearson, 2013.
2. "Introducing Python- Modern Computing in Simple Packages", Bill Lubanovic ,O_Reilly Publication, 1st Edition, 2015.
3. "Core python programming",R. NageswaraRao, Dreamtech, 2017.
4. "Programming in Python 3", Mark Summerfield, Pearson Education, 2nd Edition
5. "Beginning Python –From Novice to Professional", Magnus Lie Hetland, APress Publication, 3rdEdition, 2017

ELECTRONIC DEVICES AND CIRCUITS
II B.Tech – III Semester (Code: 18EC303)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

UNIT – I

The P-N Diode Volt-Ampere equation, The Temperature Dependence of P-N characteristics, Diode Resistance(Static and Dynamic), Space Charge Capacitance, Diffusion Capacitance.

Special Diodes: Varactor Diode, Break Down diodes, Tunnel Diode, V-I characteristics of Tunnel Diode with the help of Energy Band Diagrams, Photo Diode, Light emitting diode.

UNIT II

Rectifiers: Half wave, Full wave and Bridge Rectifiers without filter and with inductor filter, Capacitor filter, L section and π- section filters.

UNIT III

Transistors Characteristics: The Junction transistor, Transistor current components, Transistor as an amplifier, Common Base Configuration, Common Emitter Configuration, CE cutoff region, CE Saturation region, CE current gain, Common Collector Configuration, Photo Transistor.

Transistor Biasing and Thermal Stabilization : Operating point, Bias Stability, Self Bias, Stabilization against variations in ICO, VBE, and β, Bias Compensation, Thermistor and Sensistor compensation, Thermal runaway, Thermal stability.

UNIT IV

Field Effect Transistors: The Junction Field Effect Transistor, Pinch-Off voltage, JFET V-I Characteristics, FET Small signal model, Metal-Oxide-Semiconductor FET.

PNPN and Other Devices: SCR, DIAC, TRIAC, UJT and The Phototransistor (their characteristics only).

TEXT BOOK:

1. Integrated Electronics-Jacob Millman, Chritos C. Halkies,Tata Mc-Graw Hill, 2009.
2. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, Tata McGraw Hill, Second Edition.

REFERENCE BOOKS:

1. Electronic Devices and Circuits – J. Millman, C. C. Halkias, Tata Mc-Graw Hill.
2. Robert L Boylested and Louis Nashelsky, Electronic Devices and Circuit Theory, 8th Edition, PHI, 2003.

Electromagnetic field theory
II B.Tech – I Semester (Code: 18EC304)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

UNIT – I

Electrostatics –I: The experimental law of coulomb, Electric field intensity, Field due to a continuous volume charge distribution, Field of a line charge, sheet of charge. Electric Flux Density, Guass's law , Applications of Gauss law, Divergence, Maxwell's First equation (Electrostatics), Energy expended in moving a point charge in an electric field, The line integral, Definition of potential and potential difference. The potential field of a point charge, system of charges, potential gradient, the dipole and Energy density in electrostatic field.

UNIT II

Electrostatics – II: The nature of dielectric materials, boundary conditions for perfect dielectric materials. Capacitance. Several capacitance examples. Capacitance of a two wire line. Derivations of Poisson's and Laplace's equations, Examples of the solution of Laplace's equation. Current and current density, continuity of current, conductor properties and boundary conditions.

UNIT III

The Steady Magnetic Field: Biot-Savart Law, Ampere's Circuital Law, Magnetic Flux and Magnetic Flux Density, The scalar and vector magnetic potentials. Magnetic Forces and Materials: Force on a moving charge, Force on a differential current element, Force between differential current elements, Force and torque on a closed circuit, the nature of magnetic materials, Magnetization and Permeability. Magnetic boundary conditions. Potential energy in magnetic fields.

UNIT IV

Time Varying Fields and Maxwell's Equations: Faraday's law, Displacement current, Maxwell's equations in point form, integral form.

The Uniform Plane Wave: Wave propagation in free space, dielectrics. Poynting theorem and wave power. Propagation in good conductors: skin effect. Wave polarization.

TEXT BOOK:

1. W H Hayt, J A Buck, J Akhtar Engineering Electromagnetics, 8th Edition McGraw Hill Education, 2014.

REFERENCE BOOKS:

1. Mathew NO Sadiku, Elements of Electromagnetics, Oxford University Press, 2003.
2. Joseph A Edminister, Theory and Problems of Electromagnetics, 2nd Edition, Schaum's Outline Series, Mc-Graw Hill International, 1993
3. EC Jordan and KG Balmain, Electromagnetic Waves and Radiating Systems, 2nd Edition, Prentice Hall of India.

Digital Electronics
II B.Tech – I Semester (Code: 18EC305)

Lectures	4	Tutorial	1	Practical	0	Credits	4
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

UNIT – I

Binary Systems: Complements: The r's complement, The (r-1)'s complement, subtraction using method of complements. Binary codes: Decimal codes, Reflected code, Error detecting codes, Alphanumeric codes.

Sign magnitude representation: Signed Magnitude form, Signed 1's complement form, Signed 2's complement form.

Boolean Algebra and Logic Gates: Basic definitions, Axiomatic definitions of Boolean algebra, Basic Theorems and properties of Boolean algebra, Boolean functions. Canonical and standard forms, Digital Logic gates.

UNIT II

Simplification of Boolean Functions: The map method, Two-and Three-variable Maps, Four variable Maps, Five variable Maps, POS simplification, NAND and NOR implementation, Other Two-level implementations, Don't care conditions, The Tabulation Method, Determination of prime - implicants, Selection of prime – implicants.

Combinational Logic: Introduction, Design procedure, Adders, Subtractors, Code conversion, Multilevel NAND circuits, Multilevel NOR circuits, EX-OR and EX-NOR circuits.

UNIT III

Combinational Logic with MSI and LSI: Binary parallel adder, Carry propagation, Decimal adder, Magnitude comparator, Decoders, Demultiplexers, Encoders, Multiplexers.

Sequential Logic: Flip-flops, Triggering of Flip-Flops, Analysis of clocked Sequential Circuits, state reduction and assignment, Flip-Flop excitation tables, Conversions of Flip-Flops, Design of Sequential circuits.

UNIT IV

Registers, Counters and Memory Unit: Registers, shift registers, Ripple counters, Synchronous counters.

Digital Integrated Circuits: Introduction, Characteristics of logic families, RTL and DTL circuits, I2 L, TTL, MOS, CMOS Logic families. Programmable Logic Devices: PLA, PAL, ROM.

TEXT BOOK:

1. Digital Logic and Computer Design, **M Morris Mano**, PHI/Pearson Education.

REFERENCE BOOKS:

"1. Digital Integrated Electronics, **Taub and Schilling**, Mc-Graw Hill.
2. Fundamental of Digital Circuits, **A.Anand Kumar**, Pearson Education, 4th Edition.

Technical English
II B.Tech (Theory) 18EL002

Lectures: 3 Periods/Week | Continuous Assessment: 50M
Sem End Exam Duration: 3 hours | Sem End Exam : 50M

Course Schedule: II B.Tech – I Semester (CIV, CSE, EEE & EI)
II B.Tech – II Semester (ECE, IT & Mech)

Credits: 2

UNIT-I

1.1 Vocabulary Development: Familiarising Idioms & Phrases
1.2 Grammar for Academic Writing: Making Requests
1.3 Language Development: Using Transition & Link words
1.4 Technical Writing: Letter Writing & Email Writing

UNIT-II

2.1 Vocabulary Development: Analogous words, Gender Sensitive language
2.2 Grammar for Academic Writing: Tenses: Simple Past /Present Perfect, The Future: Predicting & Proposing
2.3 Language Development: Cloze tests
2.4 Technical Writing: Technical Reports

UNIT-III

3.1 Vocabulary Development: Abbreviations& Acronyms
3.2 Grammar for Academic Writing: Describing(People/Things/Circumstances) : Adjectival & Adverbial groups
3.3 Language Development: Transcoding (Channel conversion from chart to text)
3.4 Technical Writing: Circular, Memos, Minutes of Meeting

UNIT-IV

4.1 Vocabulary Development: Corporate vocabulary
4.2 Grammar for Academic Writing: Inversions & Emphasis
4.3 Language Development: Reading Comprehension
4.4 Technical Writing: Resume Preparation

Reference Books

- Communication Skills, Sanjay Kumar & Pushpa Latha. Oxford University Press: 2011.
- Technical Communication Principles and Practice. Oxford University Press: 2014.
- Advanced Language Practice, Michael Vince. MacMilan Publishers: 2003.
- Objective English (Third Edition), Edgar Thorpe & Showick. Pearson Education: 2009
- English Grammar: A University Course (Second Edition), Angela Downing & Philip Locke, Routledge Taylor & Francis Group: 2016

DATA STRUCTURES USING PYTHON LAB

II B.Tech (Lab) 18ECL 31

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Programs

1. Python program to implement bubble sort, selection sort, insertion sort.
2. Python program to implement merge sort, quick sort
3. Python program on linear search and binary search.
4. Python program to implement Singly Linked List
5. Python program to implement Doubly Linked List
6. Python program to implement Circular Linked List
7. Python programs to implement stacks using arrays and linked lists.
8. Python programs to implement queues using arrays and linked lists.
9. Python program to perform Binary Tree traversal operations.
10. Python programs to perform Binary search tree operations.
11. Python program to Travers in a graph using Depth first search.
12. Python program to Travers in a graph using breadth first search.

Electronic Devices and Digital Electronics Lab

II B.Tech (Lab) 18ECL32

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Experiments:

Cycle 1:

1. Characteristics of Common Base Configuration
2. Characteristics of Common Emitter Configuration
3. Characteristics of Emitter Follower circuit
4. Design and verification of self bias circuit
5. Characteristics of Silicon Controlled Oscillator
6. Characteristics of DIAC
7. Design and Verification of Collector to Base bias circuit Characteristics of Photo transistor

Cycle 2 :

8. Design of Combinational Logic Circuits like Half-Adder, Full-Adder, Half- Subtractor and Full-Subtractor
9. Design of Multiplexers/De Multiple
10. Applications of IC Parallel Adder(1's and 2's compliment addition)
11. Design of Shift register (To verify Serial to Parallel, Parallel to Serial ,Serial to Serial and Parallel to Parallel Converters) using Flip-Flops
12. Conversion of Flip-Flops (JK-T, Jk-D)
13. Design of Binary/Decade Counter
14. Design Asynchronous Counter, Mod Counter, Up Counter, Down Counter and Up/Down Counter
15. Design Synchronous Counter, Mod Counter, Up Counter, Down Counter and Up/Down Counter

Electronic Devices and Digital Electronics Lab using PSPICE

II B.Tech (Theory) **18ECL33**

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

List of Lab Programs:

Cycle 1:

1. Simulate and study active low-pass & high-pass filter using PSPICE.
2. Simulate and study V-I characteristics of a Diode using PSPICE.
3. Simulate and study Diode Clipper circuits using PSPICE.
4. Simulate and study Diode Clamper circuits using PSPICE.
5. Simulate and study Half-wave and Full-wave Rectifier using PSPICE.
6. Simulate and study V-I characteristics of a NPN-BJT using PSPICE.

Cycle 2:

7. Simulate and study basic AND, OR, NOT, NOR, NAND, EX-OR gates using PSPICE.
8. Simulate and study diode resistor logic gates using PSPICE.
9. Simulate and study resistor transistor logic gates using PSPICE.
10. Simulate and study Half Adder and Full Adder using PSPICE.
11. Simulate and study Digital Multiplexer using PSPICE.
12. Simulate and study FLIP-FLOP’s logic gates using PSPICE.

R 18

(CSE/ECE & EIE)

Complex Analysis and Special functions

18 MA 401 (3Th, 3 Credits)

II B.Tech, II Semester

Lectures	:	3 Hours/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam Marks	:	50

UNIT – I

Complex Numbers and functions: Complex Numbers; Geometric Representation of Imaginary numbers; Roots of a complex number; Complex function; Real and imaginary parts of circular and hyperbolic functions; **Calculus of complex functions:** Introduction; Limit of a complex function; Derivative of f(z); Analytic functions; Harmonic functions; Complex integration; Cauchy's theorem; Cauchy's integral formula.

[Sections: 19.1; 19.2; 19.5; 19.7; 19.12; 20.1; 20.2; 20.3; 20.4; 20.5;20.12; 20.13; 20.14]

[12 Hours]

UNIT – II

Calculus of complex functions: Series of complex terms; Taylor series; Laurent's series; Zeros of an analytic function; Singularities of an analytic function; Residues; Residue theorem; Calculation of residues; Evaluation of real definite integrals: Evaluation around the unit circle, Evaluation around a small semi-circle.

[Sections: 20.16.1; 20.16.2; 20.16.3; 20.17.1; 20.17.2; 20.18.1; 20.18.2; 20.19; 20.20]

[12 Hours]

UNIT – III

Fourier transforms: Introduction; Definition; Fourier integral theorem (without proof); Fourier sine and cosine integrals; Complex form of Fourier integrals; Fourier integral representation of a function; Fourier transforms ; Properties of Fourier transforms; Convolution theorem(without proof); Fourier transforms of the derivative of a function.

[Sections: 22.1; 22.2; 22.3.1; 22.3.3; 22.3.4; 22.4; 22.5; 22.6.2; 22.9] [12 Hours]

UNIT – IV

Series Solution of Differential Equations and Special Functions: Introduction; Validity of series solution; Series solution when x = 0 is ordinary point of the equation; Frobenius method; Bessel's function; recurrence formula for $J_n(x)$; expansions for J_0 and J_1; value of $J_{1/2}$; generating function for $J_n(x)$; orthogonality of Bessel functions.

[Sections: 16.1;16.2;16.3;16.4;16.;,16.6;16.7;16.8;16.9;16.11] [12 Hours]

TEXT BOOK:

1. B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.

2. N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics", Laxmi publications,2010.

ELECTRONIC CIRCUIT ANALYSIS
II B.Tech – II Semester (Code: 18EC402)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Electronic Devices and circuits

Course Objectives: The objective of this course is to
CO 1: Analyze Wave shaping circuits using discrete components.
CO 2: Design and analyze single stage and multi stage Amplifiers
CO 3: Interpret the concept of feedback and classify various types of feedback amplifiers.
CO 4: Understand the concept of power amplifier and identify different power amplifiers.

Course Outcomes: Students will be able to
1. Design and analyze clippers and clampers using discrete components.
2. Understand the operation of MOSFET circuits and analyze different applications using MOSFET.
3. Design various amplifier circuits using MOSFET in different configurations.
4. Understand the concept of OP-AMP and characteristics of OP-AMP.
5. Analyse the importance of negative feedback in electronic circuits.
6. Analyze various types of feedback amplifiers like voltage series, current series, current shunt and Voltage shunt.
7. Understand types of power amplifiers based on position of Quiescent or operating point on load lines and also understand its parameters.
8. Design different types of power amplifiers for practical applications of desired specifications like efficiency, output power, distortion etc.

UNIT – I

WAVE SHAPING CIRCUITS & REGULATORS: Diode clippers, clampers, Discrete Transistor Voltage Regulation.
The Field-Effect Transistor: MOSFET DC Circuit Analysis, Basic MOSFET Applications: Switch, Digital Logic Gate, and Amplifier, Constant-Current Biasing, Multistage MOSFET Circuits.

UNIT II

Basic FET Amplifiers: The MOSFET Amplifier, Basic Transistor Amplifier Configurations: The Common-Source Amplifier ,The Common-Drain (Source-Follower) Amplifier , The Common-Gate Configuration , The Three Basic Amplifier Configurations, Single-Stage Integrated Circuit MOSFET Amplifiers, Multistage Amplifiers. The Differential Amplifier, Basic FET Differential Pair, Differential Amplifier with Active Load.

UNIT III

Introduction to OP-Amp, Equivalent circuit of OP-AMP,
Feedback Amplifiers: Introduction to Feedback, Basic Feedback Concepts, Ideal Feedback Topologies, Voltage (Series–Shunt) Amplifiers, Current (Shunt–Series) Amplifiers, Transconductance (Series–Series) Amplifiers, Transresistance (Shunt–Shunt) Amplifiers.

UNIT IV

Power Amplifiers: Power Amplifiers, Power Transistors, Classes of Amplifiers, Class-A Power Amplifiers, Class-AB Push–Pull Complementary Output Stages.

TEXT BOOK:

1. Electronic devices and circuit theory", Robert L. Boylestad and Louis Nashelsky.
2. Microelectronics: Circuit Analysis and Desigm, DONALD A. NEAMEN, 4th Edition, McGraw-Hill, 2010.

REFERENCE BOOKS:

3. Microelectronic Circuits, 7th Edition, Sedra/Smith, Oxford University Press, 2010.
4. "Integrated electronics", Jacob Millman and Christos C Halkias.

EM waves and Transmission Lines
II B.Tech – II Semester

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Electromagnetic field theory

Course Objectives: To learn

CO1: The concepts related reflections and transmission of plane wave at different interfaces
CO2: the fundamentals of different types of transmission lines
CO3: impedance matching techniques using smith chart and transients associated with different transmission lines
CO4: the theory of waveguides and different modes of propagation of the wave

Course Outcomes: Students will be able to

CLO-1: Solve problems related to waves crossing interface formed by different media
CLO-2: Analyze the different types of transmission lines and losses associated with them
CLO-3: Understand impedance matching using smith chart and analyze the transients present in transmission lines
CLO-4: Derive wave equations for different modes of propagation in waveguides

UNIT – I

Reflection and Transmission of Plane Waves: Reflection and Transmission at a general dielectric interface: Normal incidence, Reflection and transmission at an interface: oblique incidence on a conductor, Oblique incidence on dielectric interfaces, reflection and transmission for layered materials at normal incidence, applications.

UNIT II

Theory of Transmission Lines: The transmission line, transmission line parameters, the transmission line equations, types of transmission lines, the field approach to transmission lines, finite transmission lines, power relations on a general transmission line, resonant transmission line circuits, applications.

UNIT III

The Smith Chart, Impedance Matching and Transmission Line circuits: Smith Chart, The Smith Chart as an Admittance Chart, impedance matching and the Smith Chart, Quarter wavelength transformer matching

Transients on Transmission Lines: Propagation of narrow pulses on finite, lossless transmission lines, propagation of narrow pulses on finite, distortion less transmission lines.

UNIT IV

Waveguides: The concept of a waveguide, Transverse Electromagnetic, Transverse Electric, Transverse Magnetic waves, TE propagation in parallel plate waveguides, TM propagation in parallel plate waveguides, Rectangular Waveguides, Circular Waveguides, TE and TM modes and their characteristics.

Text Books:

1. Engineering Electromagnetic by Ida, Second Edition, Springer Publications (BSP Publications)

2. Microwave & Radar Engineering, M.Kulkarni , Umesh Publications, 3r^{d} edition. (For circular waveguides only)

Reference Books:

1. Electromagnetic waves by R.K.Shevgaonkar ,Tata McGraw Hill.
2. P A Rizzi, Micro Wave Engineering: Passive Circuits, PHI, 2002

SIGNALS & SYSTEMS
II B.Tech – IV Semester (Code: 18EC404)

Lectures	4	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Linear Algebra and ODE

Course Objectives: To learn

CO1: Describe the signals mathematically and understand how to perform mathematical operations on signals.

CO2: Understand system properties and model it mathematically.

CO3: Understand the process of convolution between signals and its implication for analysis of LTI systems. Understand the notion of an impulse response.

CO4: Develop trigonometric& exponential fourier series representations.

CO5: Understanding of the Nyquist sampling theorem and the process of converting continous time signals to its samples.

Course Outcomes: Students will be able to

CLO-1: Perform basic mathematical operations on basic signals and classifying the systems

CLO-2: Analyze the LTI system, Can evaluate systems response and Represent a continuous time periodic signal as a Fourier series and determine response of the LTI system to any input signal

CLO-3: Use the Fourier transform to analyze continuous time signals and systems

CLO-4: Perform sampling of low pass signals; verify correlation and computation of spectral densities.

UNIT-I

Introduction: Signals and systems defined types of signals, systems.
Mathematical description of Continuous–Time Signals: Functions and functional notation, signal functions, scaling and shifting, differentiation and integration, even and odd functions, periodic functions, signal energy and power.
Properties of Continuous –Time systems: Block diagram and system terminology, system modeling, system properties.

UNIT-II

Time-Domain Analysis of Continuous-Time Systems: The convolution integral, block diagram realization of differential equations.
The Continuous-Time Fourier Systems: Periodic excitation and response of LTI systems, Basic concepts and development of the Fourier series, Numerical computation of the Fourier series, convergence of the Fourier series, properties of the Fourier series, band limited signals, responses of LTI systems with periodic excitation.

UNIT-III

The Continuous-Time Fourier Transform: Aperiodic excitation and response of LTI systems, Basic concepts and development of the Fourier transform, Convergence and the generalized Fourier transform, Numerical computation of the Fourier transform, Properties of the continuous time Fourier transform.
Continuous-Time Fourier Transform analysis of signals and systems: Frequency response, Ideal filters, Practical passive filters.

UNIT-IV

Sampling: Representing a continuous time signal by samples, Impulse sampling.
Correlation, Energy Spectral Density and Power Spectral Density: correlation and the correlogram,autocorrelation, cross correlation, correlations and the Fourier series, energy spectral density, power spectral density.

TEXT BOOK:

1. Fundamentals of Signals and Systems, 2nd Edition, Michael J Roberts, Govind Sharma, Tata McGraw Hill, 2010.

REFERENCE BOOKS:

1. Signals and Systems, Simon Haykin, John Wiley, 2004.
2. Signals and Systems, A V Oppenheim, A S Wilsky& IT Young, PHI/ Pearson, 2003.
3. Signals, Systems and Communications, B P Lathi, BSP, 2003.

Digital Design Using HDL
III B.Tech – VI Semester (Code: 18EC405)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Digital Electronics

Course Objectives: To learn
CO1: Hardware Description Language
CO2: Combinational Logic Circuits design using HDL
CO3: Sequential Logic Circuits design using HDL
CO4: Design of Counters and Programmable Logic Circuits using HDL
CO5: Design of Algorithmic State Machines using HDL

Course Outcomes: Students will be able to
CLO-1: Understand various modeling methods in HDL.
CLO-2: Design Combinational and Sequential Logic Circuits using HDL.
CLO-3: Design Programmable Logic Circuits using HDL.
CLO-4: Design State Machines using HDL

UNIT – I

Hardware Description Language – Overview Of Digital Design with Verilog HDL, Hierarchical Modeling Concepts, Basic Concepts – Lexical Conventions, Data Types, System Tasks And Compiler Directives.

Combinational Logic - Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, HDL Models of Combinational Circuits

UNIT II

Synchronous Sequential Logic - Sequential Circuits, Storage Elements: Latches, Storage Elements: Flip- Flops, Analysis of Clocked Sequential Circuits, Synthesizable HDL Models of Sequential Circuits, State Reduction and Assignment, Design Procedure.

Registers – Registers, Shift Registers, HDL for Registers.

UNIT III

Counters – Ripple Counters, Synchronous Counters, Other Counters, HDL for Counters.

Memory and Programmable Logic - Random- Access Memory, Memory Decoding, Error Detection and Correction, Read- Only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices.

UNIT IV

Design at the Register Transfer Level - Register Transfer Level Notation, Register Transfer Level in HDL, Algorithmic State Machines (ASMs), Design Example (ASMD Chart), HDL Description of Design Example, Sequential Binary Multiplier, Control Logic, HDL Description of Binary Multiplier, Design with Multiplexers.

TEXT BOOK:

1. “Verilog HDL A Guide to Digital Design and Synthesis” by Samir Palnitkar. Pearson Education India.
2. “Digital Design with an Introduction to Verilog HDL”, M.Morris Mano, Michael D.Ciletti,(Fifth Edition Pearson Education India).

REFERENCE BOOKS:

3. “A VHDL Primer” by J.Bhasker, Pearson Education, Third edition, 1999.
4. “Fundamentals of Digital Logic with VHDLDesign” by Stephen Brown and Z Vonko Vranesic. TMH publications
5. “Digital Design: Principles and Practices” by Jon F Wakerly. Fourth edition Pearson Education India.

Professional ethics and human values
II B.Tech – II Semester (Code: 18EC406)

Lectures	4	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: None

Course Objectives:

- To create awareness on professional ethics and Human Values.
- To create awareness on Engineering Ethics providing basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues.
- To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards
- To inculcate knowledge and exposure on Safety and Risk, Risk Benefit
- Analysis and have an idea about the Collective Bargaining, Confidentiality, Professional, Employee, Intellectual Property Rights
- To have an adequate knowledge about MNCS, Business, Environmental, Computer Ethics, Honesty, Moral Leadership, sample Code of Conduct.

Course Outcomes:

Understand the core values that shape the ethical behavior of an engineer and Exposed awareness on professional ethics and human values.
understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories
understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field
Aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.
acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives

UNIT – I

HUMAN VALUES: Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully, caring, Sharing, honesty, Courage, Valuing Time, Co-operation, Commitment, Empathy, Self Confidence, Character, Spirituality.

UNIT – II

ENGINEERING ETHICS: Senses of 'Engineering Ethics', Variety of model issues, Types of inquiry, Moral dilemmas, Moral Autonomy, Kohlberg's theory, Gilligan's theory, Consensus and Controversy, Professions and Professionalism, Professional Ideals and Virtues, Theories about right action, Self-interest, customs and Religion, Uses of Ethical Theories.

UNIT – III

ENGINEERING AS SOCIAL EXPERIMENTATION: Engineering as Experimentation, Engineers as responsible Experimenters, Codes of Ethics, A Balanced Outlook on Law. Safety, Responsibility and Rights: Safety and Risk-Assessment of Safety and Risk, risk Benefit analysis

and reducing risk. Collegiality and Loyalty , Respect for Authority , Collective Bargaining, Confidentiality , Conflicts of Interest , Occupational Crime , Professional Rights ,employee Rights , Intellectual Property Rights (IIPR) , Discrimination.

UNIT – IV

GLOBAL ISSUES: Multinational Corporations , Environmental Ethics, Computer Ethics, Weapons Development , Engineers as Managers , consulting Engineering, Engineers as Expert Witnesses and Advisors, Moral Leadership, Sample Code of Ethics like ASME, ASCE, IEEE, Institution of engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE), India, etc.

TEXT BOOKS:

1. R. Subramanian, Professional ethics, Oxford higher Education, 2013.
2. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill, New York 1996.

REFERENCE BOOK:

1. Govindarajan. M, Natarajan. S, Senthilkumar. V.S, Engineering Ethics, PHI, 2004.

Electronic Circuits Lab
II B.Tech – IV Semester (Code: 18ECL41)

Lectures		Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Electronic devices and circuits lab

Course Objectives: To learn

CO1: Design and test rectifiers, clipping circuits, clamping circuits and voltage regulators..

CO2: Design and test MOSFET amplifiers.

CO3: Design and test multistage amplifiers using MOSFET.

CO4: Design and test various power amplifiers

CO5: Design and know the essence of negative feedback using op-amp.

Course Outcomes: Students will be able to

CLO-1: Acquire a basic knowledge in solid state electronics including diodes, MOSFET and opamp

CLO-2: Develop the ability to analyze and design analog electronic circuits using discrete components.

CLO-3: Observe the amplitude and frequency responses of amplification circuits using MOSFET.

CLO- 4: Know about the multistage amplifier using MOSFET determine frequency response and concept of voltage gain.

CLO- 5: Design,construct, and take measurement of various analog circuits to compare experimental results in the laboratory with theoretical analysis.

LIST OF EXPERIMENTS:

1. RECTIFIERS AND VOLTAGE REGULATORS
2. CLIPPERS AND CLAMPERS
3. DRAIN AND TRANSFER CHARACTERISTICS OF MOSFET
4. NMOS INVERTER CIRCUIT AND A TWO-INPUT NMOS NOR LOGIC GATE
5. COMMON-SOURCE AMPLIFIER USING MOSFET
6. THE COMMON-DRAIN (SOURCE-FOLLOWER) AMPLIFIER USING MOSFET
7. COMMON-SOURCE AMPLIFIER IN CASCADE WITH SOURCE FOLLOWER.
8. CLASS A POWER AMPLIFIER
9. COMPLEMENTARY SYMMETRY PUSHPULL POWER AMPLIFIER
10. OP-AMP SERIES–SHUNT FEEDBACK CIRCUIT

TEXT BOOK:

5. Electronic devices and circuit theory", Robert L. Boylestad and Louis Nashelsky.
6. Microelectronics: Circuit Analysis and Desigm, DONALD A. NEAMEN, 4th Edition, McGraw-Hill, 2010.

REFERENCE BOOKS:

7. Microelectronic Circuits, 7th Edition, Sedra/Smith, Oxford University Press, 2010.
8. "Integrated electronics", Jacob Millman and Christos C Halkias.

VERILOG HDL

Lectures	4	Tutorial	1	Practical	0	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Course objective

1. Describe the importance of modern programmable logic devices
2. Demonstrate different styles of writing HDL code
3. Use vivado tools in digital circuits modeling, simulation, functional verification in Verilog
4. Validate and synthesize a digital circuit to FPGA board using Verilog HDL

Course outcome

1. Design basic digital circuit
2. Write HDL code for a given digital circuit
3. synthesize and verify functionality digital circuit

LIST OF PROGRAMS

1. Logic Gates.
2. Multiplexers/ De-Multiplexers.
3. Encoders/ Decoders.
4. Comparators.
5. Adders/ Subtractors.
6. Multipliers.
7. Parity Generators.
8. Design of ALU.
9. Latches.
10. Flip-Flops.
11. Synchronous Counters.
12. Asynchronous Counters.
13. Shift Registers. 14. Memories.
15. CMOS Circuits.

NOTE: A minimum of 10 (Ten) programs are to be executed and recorded to attain eligibility for Semester End Examination.

SIGNALS & SYSTEMS LAB
II B.Tech – IV Semester (Code: 18ECL43)

Lectures	0	Tutorial	0	Practical	3	Credits	1
Continuous Internal Assessment	:	50	Semester End Examination (3 Hours)	:	50		

Prerequisites: Linear Algebra and ODE

Course Objectives: To learn

CO1: Describe the signals mathematically and understand how to perform mathematical operations on signals.

CO2: Understand system properties and model it mathematically.

CO3: Understand the process of convolution between signals and its implication for analysis of LTI systems. Understand the notion of an impulse response.

CO4: Develop trigonometric& exponential fourier series representations.

CO5: Understanding of the Nyquist sampling theorem and the process of converting continous time signals to its samples.

Course Outcomes: Students will be able to

CLO-1: Perform basic mathematical operations on basic signals and classifying the systems

CLO-2: Analyze the LTI system, Can evaluate systems response and Represent a continuous time periodic signal as a Fourier series and determine response of the LTI system to any input signal

CLO-3: Use the Fourier transform to analyze continuous time signals and systems

CLO-4: Perform sampling of low pass signals; verify correlation and computation of spectral densities.

LIST OF LAB PROGRAMS

1. Basic Operations on Matrices.
2. Generation of basic continuous time signals namely unit impulse, step, ramp, exponential and Sinusoidal signals.
3. Generation of basic discrete time signals namely unit impulse, step, ramp, exponential and Sinusoidal signals.
4. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
5. Finding the Even and Odd Parts of Signal or Sequence and Real and Imaginary Parts of Signal.
6. Verification of linearity and time invariance properties of a given continuous /discrete system.
7. Convolution between Signals and Sequences.
8. Autocorrelation and Cross correlation between Signals and Sequences.
9. Verification of Linearity and Time Invariance Properties of a Given Continuous/Discrete system.
10. Computation of Unit Sample, Unit Step and Sinusoidal Responses of the Given LTI System and Verifying its Physical Realizability and Stability Properties.
11. Finding the Trigonometric Fourier Series of a given Signal.
12. Finding the Fourier Transform of a given Signal and plotting its Magnitude and Phase spectrum.

13. Sampling Theorem Verification.
14. Program to find frequency response of analog LP/HP/BP/BS filters.
15. Program to find the impulse response of a system defined by a difference equation.

NOTE: A minimum of 10 (Ten) Programs have to be performed and recorded by the candidate to attain eligibility for Semester End Examination.