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

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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

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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

BAPATLA ENGINEERING COLLEGE :: BAPATLA

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year2018-2019 (R18 Regulations)

Third Year B. Tech (SEMESTER – V)

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	
18EC501	Linear Integrated Circuits	4	0	0	4	50	50	100	3
18EC502	Linear Control Systems	4	1	0	5	50	50	100	4
18EC503	Microprocessors and Microcontrollers	4	0	0	4	50	50	100	3
18EC504	Digital Signal Processing	4	0	0	4	50	50	100	3
18EC505	Analog and Digital Communications	4	0	0	4	50	50	100	3
18ECD11,..,14	Elective-1	4	0	0	4	50	50	100	3
18ECL51	Microprocessors and Microcontrollers programming lab			3	3	50	50	100	1
18ECL52	Linear Integrated Circuits Lab			3	3	50	50	100	1
18ECL53	Analog and Digital Communications Lab			3	3	50	50	100	1
18ECMOOC1	MOOCs								2*
	TOTAL	24	1	9	34	450	450	900	**24**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

* Means No Classwork / Exam.

Elective-I

18ECD11: Computer Organization & Architecture

18ECD12: Data Communication and Computer Networks

18ECD13: Programming with JAVA

18ECD14: Pulse and Switching Circuits

BAPATLA ENGINEERING COLLEGE :: BAPATLA

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electronics and Communications Engineering

Effective from the Academic Year2018-2019 (R18 Regulations)

Third Year B. Tech (SEMESTER – VI)

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	
18EC601	Constitution of India	4	0	0	4	50	50	100	0
18EC602	Internet of Things	4	1	0	5	50	50	100	4
18EC603	Digital Image Processing	4	0	0	4	50	50	100	3
18EC604	Antenna and Wave Propagation	4	0	0	4	50	50	100	3
18EC605	VLSI Design	4	0	0	4	50	50	100	3
18ECD21,…,24	Elective – II	4	0	0	4	50	50	100	3
18ECL61	Signal and Image Processing using SCILab			3	3	50	50	100	1
18ECL62	Internet of Things Lab			3	3	50	50	100	1
18ELL02	Soft Skills Lab			3	3	50	50	100	1
	TOTAL	24	1	9	34	450	450	900	**19**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

Elective – II

18ECD21: Artificial Intelligence

18ECD22: Information Theory and Coding

18ECD23: Embedded System Design

18ECD24: Telecommunication Switching Systems and Networks

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.

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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.

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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.

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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.

Linear Integrated Circuits
V - Semester (Code: 18EC501)

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: To understand the basic concepts of operational amplifier and its various applications.
CO2: To Apply the techniques for the design of various Oscillators and Comparators.
CO3: To Analyze Nonlinear Wave shaping circuits and different A/D and D/A Convertors.
CO4: To Analyze the Filters and understand the functioning of different ICs and their Applications.

Course Outcomes: Students will be able to

CLO1.1: Illustrate the block diagram, classifications and characteristics of Op-Amp.
CLO1.2: Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.
CLO1.3: Analyze and Design Linear and Non Linear applications.
CLO2.1: Analyze the applications of Oscillators and Comparators.
CLO3.1:Design Nonlinear wave shaping circuits and understand the classifications, Characteristics and need of data converters.
CLO4.1: Design various active filter configurations based on frequency response using IC741 Op-amp.
CLO4.2: Design different multivibrators using IC 555 timer and study their applications.
CLO4.3: Determine the lock range and capture range of PLL and use in various applications of Communications.

SYLLABUS

UNIT – I

OPERATIONAL AMPLIFIERS: Operational amplifier and block diagram representation, op-amp with negative feedback. Block diagram representation of feedback configurations, voltage series feedback amplifier, voltage shunt feedback amplifier, differential amplifier with one op-amp, input offset voltage, input bias current, input offset current, total output offset voltage, frequency response of op-amp, stability, slew rate.

OP-AMP APPLICATIONS: The summing amplifier, Differential and instrumentation amplifiers, Voltage to current and current to voltage conversion, The Op-amp with complex impedances, Differentiators and integrators, Non Linear Op Amp circuits, Precision rectifiers.

UNIT – II

OSCILLATORS& COMPARATORS: Oscillator principles, Oscillator types, Frequency stability, Phase shift oscillator, Wein bridge oscillator, Quadrature oscillator, Square-wave generator, Triangular wave generator, Saw tooth wave generator, and Voltage controlled

oscillator. Introduction to comparator, Basic comparator, Zero-crossing detector, Schmitt Trigger, Comparator characteristics, Limitations of Op-Amps as comparators, Voltage limiters.

UNIT – III

CLIPPERS, CLAMPERS & CONVERTERS: Positive and negative clippers, Positive & negative clampers, Absolute value output circuit, Peak detector, S/H circuit. D/A conversion fundamentals, weighted resistor summing, R-2R Ladder D/A converters, A/D conversion: Ramp type, Successive Approximation, Dual slope converters, Parallel & Tracking A/D converters.

UNIT – IV

APPLICATIONS OF SPECIAL ICS & ACTIVE FILTERS: The 555 timer, 555 as Monostable and AstableMultivibrator and applications. Phase Locked Loops, Operating principles, Monolithic PLLs, 565 PLL applications, A 723 Voltage Regulator and its design. Active LP and HP filters, Band pass filters: Wideband, Narrow Band pass filters, Band stop filters, State variable filters, and All pass filters.

TEXT BOOKS:

1. Rama Kant A. Gayakwad, Op-Amps& Linear Integrated Circuits, 4th Edition, PHI/ PearsonEducation, 2003.
2. D.Roy and Choudhury, ShailB.Jain, Linear Integrated Circuits, 2nd Edition, New Age International, 2003.

REFERENCE BOOKS:

1. Microelectronics: Circuit Analysis and Design, Donald A. Neamen, 4th Edition,McGrawHill, 2010.
2. Microelectronic Circuits, 7th Edition, Sedra Smith, Oxford University Press, 2010.

Linear Control System
V – Semester (Code: 18EC502)

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: Types of control systems and evaluation of Transfer functions from Block Diagram reduction techniques and from Mason's gain formula.

CO2: The Behavior of control systems for standard test signals, to know the time domain Parameters of a control system and also the error constants

CO3: The differences between frequency and time domain parameters. To know the stability concepts of control systems by R-H Criterion, Root Locus Techniques and also by frequency plots (Graphical methods) like Polar, Bode and Nyquist Criterion.

CO4: The state space model concept of control system

Course Outcomes: Students will be able to

CLO1: Know different types feedback systems and solve problems to find transfer functions using Block diagram reduction Techniques and Mason's gain formulas.

CLO2: Analyze the effect of controls system for various test signals and also able to find the time domain parameters and Error constants.

CLO3: Identifies the differences between frequency and time domain parameters. Evaluate the stability of the open loop and closed loop control systems stability mathematically by Routh – Hurwitz criterion, Root Locus Technique and also by drawing frequency response plots like Polar, Bode and Nyquist plots.

CLO4: Know the State space modeling, solution of state equations and the Concepts of Controllability and Observability of a given control system

SYLLABUS

UNIT – I

INTRODUCTION: Basic concept of simple control system, open loop – closed loop control systems. Effect of feedback on overall gain – stability sensitivity and external noise. Types of feedback control systems – Linear time invariant, time variant systems.

MATHEMATICAL MODELS AND TRANSFER FUNCTIONS OF PHYSICAL SYSTEMS: Differential equations – impulse response and transfer functions – translational and rotational mechanical systems. Transfer functions and open-loop and closed-loop systems.

Block diagram representation of control systems – block diagram algebra – signal flow graph – Mason's gain formula

UNIT – II

TIME DOMAIN ANALYSIS: Standard test signals – step, ramp, parabolic and impulse response function – characteristic polynomial and characteristic equations of feedback systems – transient response of first order and second order systems to standard test signals.

Time domain specifications – steady state response – steady state error and error constants. Effect of adding poles and zeros on over shoot, rise time, band width – dominant poles of transfer functions.

STABILITY ANALYSIS IN THE COMPLEX PLANE: Absolute, relative, conditional, bounded input – bounded output, zero input stability, conditions for stability, Routh – Hurwitz criterion.

UNIT – III

FREQUENCY DOMAIN ANALYSIS: Introduction – frequency domain specifications – correlation between time and frequency responses.

Polar plots – Bode plots – Nyquist stability criterion – Nyquist plots. Assessment of relative stability using Nyquist criterion – closed loop frequency response.

UNIT – IV

Root LOCUS TECHNIQUE: Introduction – stability from root locus – construction of root loci.

STATE SPACE ANALYSIS: Concepts of stat, state variables and state models – digitalization – solution of state equations – state models for LTI systems. Concepts of controllability and Observability.

TEXT BOOKS:

1. B.C. Kuo, Automatic control systems, 9th edition, PHI.
2. I. J. Nagrath& M Gopal, Control Systems Engineering, 3rd edition, New Age International.

REFERENCE BOOKS:

1. Schaum Series, Feedback and Control Systems, TMH.
2. M. Gopal, Control Systems Principles and Design, TMH.
3. John Van de Vegta, Feedback Control Systems, 3rd edition, Prentice Hall, 1993.
4. K. Ogata, Modern Control Engineering, 3rd edition, PHI.
5. Control Systems Engineering, Norman S. Nise, 6th edition, Wiley, 2011.
6. Modern Control Systems,Richard C. Dorf and Robert H. Bishop,12th Edition, Prentice Hall,2011.

Micro Processors and Micro Controllers
V– Semester (Code: 18EC503)

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

Prerequisites: None

Course Objectives: The course should enable the students to:

CO1: Illustrate the architecture of 8051 and 8086 microprocessors.
CO2: Introduce the programming and interfacing techniques of 8086 microprocessor.
CO3: Understand the interfacing circuits for various applications of 8051 microcontroller.
CO4: Analyze the basic concepts and programming of 8051 microcontroller.

Course Outcomes: Students will be able to
CLO1: Describe the architecture and addressing modes of 8086.
CLO2: Develop 8086 programming skills in assembly language.
CLO3: Explain the need for different interfacing devices.
CLO4: Understand the fundamentals of microcontroller systems and interface, and have the ability to program 8051 using proper simulation tools.

SYLLABUS

UNIT – I

MICROPROCESSOR: introduction to microcomputers and microprocessors, introduction and architecture of 8086 family, addressing modes, instruction description and assembler directives of 8086 microprocessors.

UNIT – II

8086 PROGRAMMING AND SYSTEM CONNECTIONS: Program development steps, writing programs for use with an assembler, assembly language program development tools, writing and using procedures and assembler macros. 8086 interrupts and interrupt responses.

UNIT – III

DIGITAL INTERFACING: Programmable parallel ports, handshake IO, 8255 programmable peripheral interface. Interfacing microprocessor to keyboards.
ANALOG INTERFACING: DAC principle of operation and interfacing.
PROGRAMMABLE DEVICES: Introduction to Programmable peripheral devices 8254, 8259, 8251, DMA data transfer, 8237 DMA controller, RS232 communication standard and maximum mode of 8086 operation.

UNIT – IV

INTRODUCTION TO MICROCONTROLLERS: comparing microprocessors and microcontrollers, Architecture of 8051, pin configuration of 8051microcontroller, hardware input pins, output pins ports and external memory, counters and timers, serial data input and output and interrupts. Programming & interfacing 8051:- Addressing modes of 8051 microcontroller, Instruction set of 8051 microcontroller, simple programs using 8051 microcontroller. Interfacing a stepper motor, ADC.

TEXT BOOKS:

1. Duglus V. Hall, Microprocessor and Interfacing, Revised 2nd Edition, TMH, 2006.
2. Mohammed Ari Mazidi and JanciGillispie, The 8051 Microcontroller and Embedded Systems, Pearson Education Asia, New Delhi.

REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals AK Ray and KM Bhurchandi 2nd Edition, TMH.
2. The 8051 *Microcontroller*, 3rd Edition, Kenneth *Ayala,* Cengage Learning

Digital Signal Processing
V – Semester (Code: 18EC504)

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: Various types of Digital signals and systems in time and frequency domain (Z - domain).
CO2: The concept of DFT and importance and implementation of FFT.
CO3: The designingand realization ofan IIR Digital Filters through Approximation Procedures.
CO4: The designingand realization ofa FIR Digital Filters through Different Techniques.

Course Outcomes: Students will be able to
CLO-1: Analyze various types of Digital signals and systems in time and frequency domain.
CLO-2: Understand and determine the DFT of a given signal.
CLO-3: Construct an IIRDigital Filter for given specifications.
CLO-4: Construct a FIR Digital Filter for given specifications.

SYLLABUS

UNIT – I

DISCRETE-TIME SIGNALS AND SYSTEMS: Introduction to Digital Signal Processing, Advantages and Applications, Discrete time signals, LTI system: Stability and Causality. Frequency domain representation of discrete time signals and systems.

Z-TRANSFORMS: The Z Transform, Region of Convergence, Z-Transform theorems and Properties, Persaval's relation, Relation between Z-Transform and Fourier Transform, Inverse Z-transform using: (i) Cauchy's Integration theorem (ii) Partial fraction method (iii) Long division method. One sided Z-Transform, Solution of Difference equations using one sided Z-Transform.

UNIT – II

THE DFT AND FFT: Discrete Fourier Series (DFS), Properties of DFS, Discrete Fourier Transform (DFT), Properties of DFT, Computations for evaluating DFT, Decimation in time FFT algorithms (DITFFT), Decimation in Frequency FFT algorithms (DIFFFT), Computation of Inverse DFT.

UNIT-III

DESIGN OF IIR FILTERS: Introduction, Properties of IIR filter, Design of Digital Butterworth and Chebyshev filters using: (i) Bilinear transformation method (ii) Impulse invariance method. Design of Digital filters using frequency transform method.

UNIT – IV

DESIGN OF FIR FILTERS: Introduction, Characteristics of Linear Phase FIR filters, Frequency response of FIR linear phase filters, Design of Linear-Phase FIR Filters Using Windows, Design of Linear-Phase FIR Filters by the Frequency-Sampling Method.

REALIZATION OF DIGITAL FILTERS: Direct, Canonical, Cascade, Parallel and Lattice-Ladder realizations of Digital filters, Realization of Linear phase FIR filters

TEXT BOOKS:

1. Lonnie C Ludeman, "Fundamentals of Digital Signal Processing," John Wiley & Sons, 2009.
2. Sanjit K Mitra, "Digital Signal Processing: A Computer Based Approach," 3rd Edition, TMH, SIE, 2008.

REFERENCE BOOKS:

1. John G. Proakis, Dimitris G Manolakis, "Digital Signal Processing: Principles, Algorithms and Applications," 4th Edition, Pearson Education, 2007.
2. Alan V Oppenheim and Ronald W Schafer, Discrete Time Signal Processing, Pearson Education, 2007.
3. Andreas Antoniou, "Digital Signal Processing", Tata Mc Graw Hill, 2006.
4. Johnny R.Johnson-Introduction to Digital Signal Processing, Prentice Hall, 1989

Analog and Digital Communications
V– Semester (Code: 18EC505)

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

Prerequisites: None

Course Objectives: The objective of this course is to:
CO1:Study of amplitude modulation and demodulation techniques.
CO2: Understand the basic principles of angle modulation and demodulation techniques.
CO3:Explore the various pulse analog and pulse digital modulation and demodulation techniques.
CO4: Describe some important digital band-passmodulation techniques used in practice.

Course Outcomes: Students will be able to:
CLO1: Understand the basic principles of amplitude modulation and demodulation techniques.
CLO2:Analysis of angle modulation and demodulation techniques.
CLO3: Analyze the pulse modulation and demodulation techniques.
CLO4:Understand and analyze the digital band-pass modulation techniques.

SYLLABUS

UNIT – I

AMPLITUDE MODULATION: Introduction to Continuous-wave Modulation, Need for Modulation.Amplitude Modulation, Virtues, Limitations, and Modifications of Amplitude Modulation, Double Sideband- Suppressed Carrier Modulation, Coherent detection, Costas Receiver, Quadrature Carrier Multiplexing, Single-Sideband Modulation, Vestigial Sideband Modulation, AM Transmitters and Receivers.

UNIT – II

ANGLE MODULATION: Basic Definitions, Properties of Angle Modulated Waves, Relationship between PM and FM waves, Narrow-Band Frequency Modulation, Wide-Band Frequency Modulation, Transmission Bandwidth of FM waves, Generation of FM waves, Demodulation of FM signals. Pre-emphasis and De-emphasis in FM, FM Transmitters and Receivers. Noise in Analog Communication (SNR calculations)

UNIT – III

PULSE MODULATION: Sampling Process (ideal and flat-top), Pulse-Amplitude Modulation, Pulse-Position Modulation, Quantization Process, Quantization Noise, Pulse Code Modulation: Encoding, Regeneration, Decoding, Delta Modulation, Differential Pulse Code Modulation, Line Codes.

UNIT – IV

DIGITAL BAND-PASS MODULATION TECHNIQUES: Introduction, Pass band transmission model, Matched filter Receiver, Binary Amplitude-Shift Keying (BASK), Phase-Shift Keying (BPSK, QPSK), Frequency-Shift Keying (BFSK, MSK),Noncoherent Digital Modulation Schemes (BASK, BFSK, DPSK),M-ary Digital Modulation Schemes (M-ary PSK, M-ary QAM, M-ary FSK), SNR calculations with Matched filter, BER calculations for Digital Modulations.

TEXT BOOK:

1. Simon Haykin and Michael Moher, "An Introduction to Analog & Digital Communications",2nd Ed., Wiley, 2007.

REFERENCE BOOKS:

1. H Taub& D. Schilling, GautamSahe, "Principles of Communication Systems", TMH, 3rdEdition, 2007.
2. Sam Shanmugam, "Analog and Digital Communication Systems", John Wiley and Sons, 1992.

ELECTIVE-I

COMPUTER ORGANIZATION & ARCHITECTURE

V – Semester (Code: 18ECD11)

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: Basic structure and instructions of a digital computer.

CO2:Arithmetic units for Integer addition, subtraction, multiplication and division for instruction execution.

CO3: To know the concept of pipelining and memory system of a digital computer.

CO4: To study the different ways of communicating with I/O devices.

Course Outcomes: Students will be able to

CLO1: Understand basic units and operations of digital computer.

CLO2: Understand the Hardware implementation of processing unit and Arithmetic units.

CLO3: Understand the concept of memory system and fast execution using pipelining.

CLO4: Understand various paths of communicating with I/O devices through different standard interfaces.

SYLLABUS

UNIT – I

BASIC STRUCTURE OF COMPUTERS: Computer types, Functional Unit, Basicoperational concepts, Bus structures, Performance, multiprocessors and multicomputers.

MACHINE INSTRUCTIONS AND PROGRAMS: Numbers, Arithmetic operations andcharacters, Memory location and addresses , Memory operations, Instructions andinstruction sequencing ,Addressing modes, Basic Input and Output operations,Stacks and Queues, Subroutines, Additional instructions.

UNIT – II

BASIC PROCESSING UNIT: Some fundamental concepts, Execution of a complete Instruction, Multiple-Bus organization, Hard wired control, Micro programmed control, Microinstructions.

Arithmetic: Addition and subtraction of signed numbers, Design of fast adders,Multiplication of positive numbers, Signed operand multiplication, Fastmultiplication, Integer division.

UNIT – III

PIPELINING: Basic concepts, Data hazards, Instruction hazards, Influence ofinstruction sets, Data path and control considerations, Superscalar operation.

THE MEMORY SYSTEM: Some basic concepts, Semiconductor RAM memories-Internal Organization of memory chips, Read only memories, Speed, size and cost,Cache memories, Performance considerations, Virtual memories.

UNIT – IV

INPUT/OUTPUT ORGANIZATION: Accessing I/O devices, Interrupts, Direct memory access, Standard I/O interfaces: PCI, SCSI, and USB.

TEXT BOOK:

1. Computer Organization Carl Hamacher, ZvonkoVranesic, SafwatZaky, Fifth Edition, McGraw Hill.

REFERENCE BOOKS:

1. Computer Architecture and Organization-John P. Hayes, Third Edition, McGraw Hill.
2. Computer Organization and Architecture William Stallings, Sixth Edition, Pearson/PHI.
3. Computer Systems Architecture M. Moris Mano, Third Edition, Pearson/PHI.

DATA COMMUNICATION AND COMPUTER NETWORKS
V - Semester (Code: 18ECD12)

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: To learn various protocols, Network hardware, Network software.
CO2: To gain knowledge about functionality of each layer in OSI, TCP/IP protocols.
CO3: Understand basics and challenges of network communication.
CO4: Interpret the operation of the protocols that are used inside the Internet.

Course Outcomes: Students will be able to
CLO1: Independently understand basic computer network technology.
CLO2: Understand and explain Data Communications System and its components.
CLO3: Identify the different types of network topologies and protocols.
CLO4:Understand and building the skills of subnetting and routing mechanisms.

SYLLABUS

UNIT – I

Introduction to Data Communication and Networking: Uses of Computer Networks, Network Hardware, Network Software Internet Reference Models (OSI and TCP/IP).
Physical Layer: Basis for Data Communication, Guided Transmission Media, Wireless Transmission Medium, Circuit Switching and Telephone Network, High Speed Digital Access.

UNIT – II

Data Link Layer: Data Link Layer Design Issues, Error Detection and Correction, Data Link Control and Protocols, Example Data Link Protocol.
Medium Access Layer: Channel Allocation Problem, Multiple Access, CSMA, CSMA/CD, CSMA/CA.

UNIT – III

Local Area Network:Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless LAN, Blue tooth, Connecting devices:-Repeaters, Hub, Bridges, Switch, Router, Gateways, Virtual LAN,
Network Layer:Network Layer Design Issues, Routing Algorithms (Optimality principle, Static Routing Algorithms, Shortest Path, Flooding, Dynamic routing Algorithms, Distance Vector, Link State routing.), Congestion control Algorithms (Principles, Policies, Algorithms),Quality of Service (Requirements, Techniques, Integrated Services & Differentiated Services), Network Layer Protocols (IP Addressing,IP layer protocols (ICMP, ARP, RARP, DHCP, BOOTP), IPv6).

UNIT – IV

Transport layer:Transport Layer Service, Elements of Transport protocols, Internet protocols (UDP and TCP)

Application Layer:DNS- Domain Name System, Electronic Mail, World Wide Web, Multimedia (Audio Compression, Streaming Audio, Voice over IP, Video Compression, Video on Demand).

TEXT BOOKS:

1. Andrew S. Tanenbaum, David.J.Wetherall, "ComputerNetworks", Prentice-Hall, 5th Edition, 2010.
2. Behrouz A. Foruzan, Data communication andNetworking, 4th Edition,TMH, 2004.

REFERENCE BOOKS:

1. W.Tomasi,"Introduction to Data Communications and Networking" Pearson education.
2. G.S.Hura and M.Singhal,"Data and Computer Communications",CRCPress,Taylor and Francis Group.
3. S.Keshav,"An Engineering Approach to CoputerNetworks",Pearson Eduction,2nd Edition.

PROGRAMMING WITH JAVA
V – Semester (Code: 18ECD13)

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: Fundamentals of java and java run-time environment
CO2: Proper java program structuring and how to write java application programs using OOP principles.
CO3: Implementation of Exception handling and multithreading using java programs
CO4: Design of webpage using applet programming and graphics programming

Course Outcomes: Students will be able to
CLO1: Understand basic Java language syntax and semantics to write Java programs, use concepts, such as variables, conditional and iterative execution methods etc. And use the Java SDK environment to create, debug and run Java programs
CLO2: Identify packages, classes, interfaces, objects, members of a class and relationships among them needed for a specific problem and Write Java application programs using OOP principles and proper program structuring.
CLO3: Analyze and Implement the role of exception handling and multithreading in program design using JAVA.
CLO4:Explore applet programming and graphics programming concepts using JAVA.

SYLLABUS

UNIT – I

INTRODUCTION: Creation of java, java buzzwords, importance of java to internet, hardware and software requirements, java support systems, java environment, fundamentals of object oriented programming, simple java program, java program structure, java tokens, java statements, implementing a java program, java virtual machine, command line arguments, constants, variables, data types, initialization of variables, scope of variables, type casting, operators, control statements, arrays.

UNIT – II

CLASSES AND OBJECTS: Introduction, defining a class, field's declaration, methods, creating objects, accessing class members, constructors, method overloading,static members,thiskeyword, garbagecollection, parameterpassingmechanisms, Strings
INHERITANCE:Basicconcepts, forms of inheritance,methodoverriding, usageofsuperkeyword, usage of final keyword,finalize method, abstractclasses.
INTERFACES AND PACKAGES: Introduction to interfaces, defining an interface, implementing interface, extending interfaces, creating a Package, accessing package, Access control.

UNIT – III

MANAGING ERRORS AND EXCEPTIONS:Introduction, Types of errors, Exceptions, SyntaxofExceptionhandling,multiplecatch statements,usage of finally,throwing our own exceptions, using exceptions for debugging.

MULTITHREADED PROGRAMMING:Introduction, creating threads, extending the thread class, stopping and blocking a thread, life cycle of a thread, using thread methods, thread exceptions, thread priority, synchronization, Runnableinterface.

UNIT – IV

APPLET PROGRAMMING: Introduction, how to Applets differ from Applications, preparing to write Applets, building applet code, creating an executable applet, designing a web page, applet tag, running the applet, passing parameters to applets, aligning the display, displaying numerical values.

GRAPHICS PROGRAMMING: Introduction, the graphics class, lines and rectangles, circles and ellipses, drawing arcs and polygons, line graphs, using control loops in applets, drawing bar charts.

TEXT BOOK:

1. "Programming with java", a primer, E. Balaguruswamy, 4th edition, McGraw-Hill publishing company ltd.

REFERENCE BOOKS:

1. Big Java, 2nd Edition, Cay Horstmann, John Wiley and Sons, Pearson Education.
2. JavaHowtoProgram,SixthEdition,H.M.DietelandP.J.Dietel,PearsonEducation/PHI.
3. CoreJava2, Vol1, Fundamentals, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
4. Core Java 2, vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, PearsonEducation.
5. BeginninginJava2,IverHorton,WroxPublications.

Pulse and Switching Circuits
V – Semester (Code: 18ECD14)

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: Analyze RC circuits for low pass and high pass filtering.
CO2: Design different clipper and clamper circuits.
CO3: Design Bistable, Monostable and Astable Multivibrators using discrete components.
CO4: Analyze voltage and current sweep circuits and identify methods to mitigate sweep errors.

Course Outcomes: Students will be able to
CLO1: Analyze the response of low pass and high pass circuits for different waveforms.
CLO2:Know the Application of diode as clippers, clamper circuits.
CLO3: Design Multivibrators for various applications.
CLO4:Undestand the Operation of Time base generators.

SYLLABUS

UNIT – I

LINEAR WAVE SHAPING: The high- pass RC circuit, Response of RC high- pass circuit to sinusoidal, step, pulse, squarewave,exponential and ramp input, The high-pass RC circuit as a differentiator, Double differentiation, low-pass RC circuit, Response of RC low-pass circuit to sinusoidal, step, pulse, square-wave, exponential and Ramp inputs, The low-pass RC circuit as an integrator, Attenuators.

UNIT – II

NON-LINEAR WAVE SHAPING:
Clipping (Limiting) circuits, Diode clippers, Clipping at two independent levels, Comparators, Diode-differentiator comparator, Applications of voltage comparators, the clamping operation, Positive clamper, Negative clamper, a clamping circuit theorem,The transistor as a switch.

UNIT – III

BISTABLE MULTIVIBRATORS : The stable states of a binary, A fixed bias transistor binary, A self-biased transistor binary, Commutating capacitors, Methods of improving resolution, Unsymmetrical triggering of the binary, Triggering Unsymmetrically through a unilateral device, Symmetrical triggering, Direct –connected binary circuit, Schmitt Trigger circuit, Emitter- coupled binary.
MONOSTABLE AND ASTABLE MULTIVIBRATORS: The Monostable multivibrator, Gate width of a collector-coupled monostable multivibrator, Waveforms of the collector-coupled monostable multivibrator,rator, Triggering of the monostable multivibrator, Astable collector-coupled multivibrator.

UNIT – IV

VOLTAGE TIME BASE GENERATORS: General features of a time- base signal, Exponential sweep circuit, Miller and Bootstrap Sweep circuits.

CURRENT TIME-BASE GENERATORS: A simple current sweep, Linearity correction through adjustment of driving waveform, a transistor current time -base generator.

TEXT BOOK:

1. J Millman and H Taub, Pulse, Digital and Switching Circuits, TMH, 2003.

REFERENCE BOOKS:

1. J Millman and H Taub, Mothiki S. Prakash Rao, Pulse Digital & Switching Waveforms, 2nd Edition, TMH.
2. David A Bell, Solid State Pulse Circuits, 4th Edition, PHI 2003.

Micro Processors and Micro Controllers Programming Lab
V – Semester (Code: 18ECL51)

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

Prerequisites: None

Course Objectives: The course should enable the students to:
CO1: Introduce the programming and interfacing techniques of 8086 microprocessor.
CO2: Analyze the basic concepts and programming of 8051 microcontroller.

Course Outcomes: Students will be able to
CLO1: Develop 8086 programming skills in assembly language.
CLO2: Understand the instruction set of 8051 microcontroller, and have the ability to program 8051 using proper simulation tools.

LIST OF LAB EXPERIMENTS

Experiments Based on ALP (8086)

1. Programs on Data Transfer Instructions.
2. Programs on Arithmetic and Logical Instructions.
3. Programs on Branch Instructions.
4. Programs on Subroutines.
5. Sorting of an Array.
6. Programs on Interrupts (Software and Hardware).
7. 8086 Programs using DOS and BIOS Interrupts.

Experiments Based on Interfacing & Microcontroller (8051)

8. DAC Interface-Waveform generations.
9. Stepper Motor Control.
10. Keyboard Interface / LCD Interface.
11. Data Transfer between two PCs using RS.232 C Serial Port
12. Programs on Data Transfer Instructions using 8051 Microcontroller.
13. Programs on Arithmetic and Logical Instructions using 8051 Microcontroller.
14. Applications with Microcontroller 8051.

NOTE: A minimum of 10 (Ten) experiments, choosing 5 (Five) from each part, have to bePerformed and recorded by the candidate to attain eligibility for Semester EndExamination.

Linear Integrated Circuits Lab
V – Semester (Code: 18ECL52)

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

Prerequisites: None

Course Objectives: To learn

CO1: To understand the basic concepts of operational amplifier and its various applications.
CO2: To Apply the techniques for the design of various Oscillators and Comparators.
CO3: To Analyze Non-linear Wave shaping circuits and different A/D and D/A Convertors.
CO4: To Analyze the Filters and understand the functioning of different ICs and their applications.

Course Outcomes: Students will be able to

CLO1: Understand the various applications of linear IC's like 741 and 555 timer
CLO2: Define significance of Op Amps and their importance.
CLO3: Build circuits using Analog IC's.
CLO4: In-depth knowledge of applying the concepts in real time applications.
CLO5: Analyze and Design Linear and Non Linear applications.
CLO6: Analyze and Design the applications of Oscillators and Comparators.
CLO7: Design Non-linear wave shaping circuits and understand the classifications, Characteristics and need of data converters.
CLO8: Able to use OP Amp as analog to digital and digital to analog converter.
CLO9: Design various active filter configurations based on frequency response using IC741 Op-amp.
CLO10: Design different multivibrators using IC 555 timer and study their applications.
CLO11: Determine the lock range and capture range of PLL and use in various applications of Communications.
CLO12: Design the applications of IC 566 and IC 723.

LIST OF LAB EXPERIMENTS

1. Measurement of Op-amp Parameters.
2. Applications of Op-amp (Adder, Subtractor, Integrator, Differentiator).
3. Design of Full Wave Rectifier using Op-Amp.
4. Design of Low Frequency Oscillators using Op-Amp (Wein Bridge & RC Phase Shift Oscillators).
5. Waveform Generation using Op-amp (Square, Triangular).
6. Instrumentation Amplifier using Op-AmpIC741.
7. Design and Verification of Schmitt Trigger using Op-AmpIC741.
8. Design of Active Filters (First Order LPF&HPF).
9. Design of State Variable Filter using Op-Amps.
10. Applications of 555 Timer ICs (Astable, Monostable, Schmitt Trigger).
11. PLL using IC 556.

12. Design of Fixed Voltage Regulators.
13. Design of Variable Voltage Regulator using IC 723.
14. Design of VCO using IC 566.
15. Design of 3 bit DAC using R-2R Ladder Network.

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

Analog and DigitalCommunications Lab
V – Semester (Code: 18ECL53)

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

Prerequisites: None

Course Objectives: The objective of this course is to:

CO1: Study of amplitude modulation and demodulation techniques.

CO2: Understand the basic principles of angle modulation and demodulation techniques.

CO3: Explore the various pulse analog and pulse digital modulation and demodulation techniques.

CO4: Describe some important digital band-pass modulation techniques used in practice.

Course Outcomes: Students will be able to:

CLO-1: Understand the basic principles of amplitude modulation and demodulation techniques.

CLO-2: Analysis of angle modulation and demodulation techniques.

CLO-3: Analyze the pulse modulation and demodulation techniques.

CLO-4: Understand and analyze the digital band-pass modulation techniques.

LIST OF EXPERIMENTS

1. Amplitude Modulation and Demodulation.
2. DSB SC Modulation and Demodulation.
3. SSB SC Modulation and Demodulation.
4. Frequency Modulation and Demodulation.
5. Pre-Emphasis and De-Emphasis Circuits.
6. Frequency Demodulation using Phase Locked Loop.
7. PAM Generation and Reconstruction.
8. PWM and PPM: Generation and Reconstruction.
9. Generation and Detection of PCM.
10. Generation and Detection of FSK.
11. Generation and Detection of PSK.
12. Write a program to generate digital modulation (Binary and M-ary) and demodulation scheme.
13. Synchronous Detector.
14. Verification of Sampling theorem.
15. Delta Modulation and Demodulation.

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

TEXT BOOK:

1. Simon Haykin and Michael Moher, "An Introduction to Analog & Digital Communications",2nd Ed., Wiley, (2007).

REFERENCE BOOKS:

1. H Taub& D. Schilling, GautamSahe, "Principles of Communication Systems", TMH, 3rd Edition, (2007).
2. Sam Shanmugam, "Analog and Digital Communication Systems", John Wiley and Sons, 1992.

CONSTITUTION OF INDIA
VI – Semester (Code: 18EC601)

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

Prerequisites: None.

Course Educational Objective:
The objective of the course is how to deal and adjust in the society under government regulations. Constitution is the highest law of the land and every department owes its origin to its laws. To make governance better an engineer must conduce to E-governance through computers and knowledge of cyber laws. An engineer must know the limits of state action and regulations by acquainting himself with the laws that applied by the bureaucrats.
Since an engineer works at different places and sights, he must have the basic knowledge of centre – state relations with reference to policy of financing the key projects.

Course Outcomes (COs): At the end of the course, students will be able to
CLO1:Understand Constitution of India.
CLO2: Understand the union government and its administration and rules to follow.
CLO3: To understand state government and its administration policies to follow.
CLO4: Analyze various local administration and election commission rules to follow.

SYLLABUS

UNIT – I
INTRODUCTION: Constitution' meaning of the term, Indian Constitution:Sources and constitutional history, Features: Citizenship,Preamble, Fundamental Rights and Duties, DirectivePrinciples of State Policy.

UNIT – II
UNION GOVERNMENT AND ITS ADMINISTRATION: Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM andCouncil of ministers, Cabinet and Central secretariat, LokSabha, Rajya Sabha.

UNIT – III
STATE GOVERNMENT AND ITS ADMINISTRATION: Governor: Role and Position, CM and Council ofministers, State Secretariat: Organisation, Structure and Functions

UNIT – IV
LOCAL ADMINISTRATION: District's Administration head: Role and Importance,Municipalities: Introduction, Mayor and role of ElectedRepresentative, CEO of Municipal Corporation, Pachayatiraj: Introduction, PRI: ZilaPachayat, Elected officials and their roles, CEO ZilaPachayat: Position and role, Blocklevel: Organizational Hierarchy (Different departments),Village level: Role of Elected and Appointed officials,Importance of grass root democracy.

ELECTION COMMISSION: Election Commission: Role and Functioning, ChiefElection commissioner and Election Commissioners, StateElection Commission: Role and Functioning, Institute andBodies for the welfare of SC/ST/OBC and women.

TEXT BOOKS:

1. 'Indian Polity' by Laxmikanth-6th edition-Mcgraw-hillindia
2. 'constitution of india'-Dr. P.K. AgrawalDr. K.N. Chaturvedi -Kindle Edition
3. 'Indian Constitution' by D.D. Basu-24th edition-lexis nexis publishers
4. 'Indian Administration' by Avasti and Avasti-Lakshmi Narain Agarwal Educational Publishers

REFERENCE BOOKS:

1. G. Austin (2004) Working of a Democratic Constitution of India, New Delhi: Oxford University Press.
2. Basu, D.D (2005), An Introduction to the Constitution of India, New Delhi, Prentice Hall.
3. N. Chandhoke&Priyadarshini (eds) (2009) Contemporary India: Economy, Society, Politics, New Delhi: Oxford University Press.

INTERNET OF THINGS
VI – Semester (Code: 18EC602)

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

Prerequisites: None.

Course Objectives: The course should enable the students to
CO1: Understand the architecture of Internet of Things and connected world.
CO2:Explore on use of various hardware, communication and sensing technologies to build IoT applications.
CO3:Illustrate the real time IoT applications to make smart world.
CO4:Understand challenges and future trends in IoT

Course Outcomes: Students will be able to
CLO1:Understand and intuition of the whole process line of extracting knowledge from data about the Internet ofThings.
CLO2:Solid knowledge in a broad range of methods based on design and implementation of IoT in network performance, analysis and problem solving with design of networks.
CLO3:Experience in deriving theoretical properties of methods involved in IoT.
CLO4:Understand significance of models in IoT.
CLO5:Describe the Transport layer protocols and how its uses in IoT.
CLO6:Apply basic IoT algorithms for predictive network performance.
CLO7:Understand basic terms what security issues. Identify key distribution methods.
CLO8:Identify common approaches used for Feature Generation of IoT

SYLLABUS

UNIT – I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT enabling technologies, IoTlevels and deployment, domain specific IoTs.

UNIT – II

IoT AND M2M: Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT – III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model.

Logical design using Python: Installing Python, Python data types and data structures, control flow, functions, modules, packages, file handling

UNIT – IV

IoT PHYSICAL DEVICES AND ENDPOINTS: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

IoT PHYSICAL SERVERS AND CLOUD OFFERINGS: Introduction to cloud storage models and communication APIs, WAMP – Auto Bahn for IoT, Xively cloud for IoT, case studies illustrating IoT design – home automation, smart cities, smart environment.

TEXT BOOKS:

1. ArshdeepBahga, Vijay Madisetti, "Internet of Things: A Hands-on-Approach", VPT, 1st Edition, 2014.
2. Matt Richardson, Shawn Wallace, "Getting Started with Raspberry Pi", O'Reilly (SPD), 3rd Edition, 2014.

REFERENCE BOOKS:

1. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", John Wiley andSons2014.
2. Francis daCosta, **"**Rethinking the Internet of Things: A Scalable Approach toConnecting Everything", Apress Publications,1st Edition2013.

WEB REFERENCES:

1. https://www.upf.edu/pra/en/3376/22580.
2. https://www.coursera.org/learn/iot.
3. https://bcourses.berkeley.edu.
4. www.innovianstechnologies.com.

E-TEXT BOOKS:

1. https://mitpress.mit.edu/books/internet-things
2. http://www.apress.com

Digital Image Processing
VI – Semester (Code: 18EC603)

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

Prerequisites: None

Course Objectives: This course aims to

CO1: Develop a theoretical foundation of fundamental Digital Image Processing concepts.

CO2: Provide mathematical foundations for digital manipulation of images; image acquisition;Preprocessing; segmentation; Fourier domain processing; and compression.

CO3: Gain experience and practical techniques to write programs using MATLAB language for digitalmanipulation of images; image acquisition; preprocessing; segmentation; Fourier domainprocessing; Morphological operations and compression.

Course Outcomes: Students will be able to

CLO1: Demonstrate knowledge of a broad range of fundamental image processing and image analysis techniques and concepts (linear and non-linear filtering, de-noising, edge detection, line finding, detection, morphological operators, compression, shape metrics and feature based recognition)

CLO2: Identify, Demonstrate and apply their knowledge by analyzing image processing problems and recognizing and employing (or proposing) effective solutions.

CLO3: Design and create practical solutions to a range of common image processing problems and to critically assess the results of their solutions, including shortcomings.

SYLLABUS

UNIT – I

INTRODUCTION: What Is Digital Image Processing? The Origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.

DIGITAL IMAGE FUNDAMENTALS: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels, An introduction to the mathematical tools used in Digital Image Processing.

UNIT – II

INTENSITY TRANSFORMATIONS AND SPATIAL FILTERING: Background. Some Basic Intensity Transformation functions, Histogram Processing, Fundamentals of Spatial Filters, Smoothing Spatial Filters, Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

FILTERING IN THE FREQUENCY DOMAIN: Background, Extension to Functions of two variables, Some properties of 2D Discrete Fourier Transform, The basics of filtering in the Frequency Domain, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters, Selective filtering.

UNIT – III

IMAGE RESTORATION: A Model of the Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Geometric Mean Filter.

COLOR IMAGE PROCESSING: Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening, Image Segmentation based on Color, Noise in Color Images, Color Image Compression.

UNIT – IV

IMAGE COMPRESSION: Fundamentals, Some basic compression Methods, Huffman coding, Golomb coding, Arithmetic coding, LZW coding, Run length coding, Symbol based coding, Bit plane coding, Block transform coding, Predictive coding.

MORPHOLOGICAL IMAGE PROCESSING: Preliminaries, Erosion and Dilation, Opening and Closing, The Hit & Miss Transformation.

TEXT BOOK:

1. R. C. Gonzalez, R. E. Woods, Digital Image Processing 4thEdition, Pearson Education Publishers,2019.

REFERENCE BOOKS:

1. S Jayaraman, S Esakkirajan, T Veerakumar, Digital Image Processing, Mc-Grah Hill Publications, 2010.
2. Milan Sonka, Vaclav Hlavac and Roger Boyle, Image Processing Analysis and Machine Vision,Thomson learning, Second Edition, 2001.
3. S.Sridhar, Digital Image Processing, Oxford University Press, 2016.

Antennas and Wave Propagation
VI – Semester (Code: 18EC604)

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

Prerequisites: None

Course Objectives:

CO1: To understand the radiation phenomenon associated with various types of antennas along with emphasis on their applications.
CO2: To attain knowledge on basic parameters those are considered in the antenna design process and the analysis while designing an antenna.
CO3: To understand the radiation mechanisms associated with the antenna arrays.
CO4: To analyze the electric and magnetic field emissions from various antennas and mathematical formulation of the analysis.
CO5: To obtain the basic knowledge about concepts of radio wave propagation in the atmosphere.

Course Outcomes:

CLO1: Gain knowledge about the radiation pattern of various basic antennas and mechanisms associated with it.
CLO2: Understand the basic parameters that are important in the design of antennas.
CLO3: Analyze the radiation patterns and other parameters of antenna arrays.
CLO4: Understand the radiation mechanisms associated of broadband antennas present.
CLO5: Recognize the importance of radio wave propagation required for communication and know how the radio waves gets effected when propagating through atmosphere.

SYLLABUS

UNIT – I

RADIATION: Radiation Mechanism, Potential functions-heuristic approach, Maxwell's equation approach, Potential functions for sinusoidal oscillations, Alternating current element, Power radiated by current element, Application to short antennas, Assumed current distribution, Radiation from quarter wave Monopole / half wave dipole, Traveling wave antennas.

UNIT – II

ANTENNA FUNDAMENTALS: Isotropic, Directional, Omni-directional patterns, Principle patterns, Field regions, Radiation density, Radiation intensity, Directive gain, Power gain, Half power Beamwidth, Antenna polarization, Power loss factor, Radiation efficiency, Effective aperture of antenna, Relation between maximum effective aperture and directivity, Friss transmission equation.

ARRAY ANTENNAS: Two element array, Uniform linear array, Side lobe level and beam width of broadside array, Beam width of end fire array, Principle of multiplication of patterns, Effect of earth on vertical patterns, Binomial array.

UNIT – III

Characteristics of typical antennas: Rhombic antennas, Folded Dipole, Loop antenna, Yagi-Uda array, Helical antenna, Log periodic antenna, Pyramidal and conical Horn antenna, Corner reflector antenna, Parabolic reflector antennas –Paraboloid, Cassegrain system of reflectors, Basic principles of slot antennas and micro strip antennas.

UNIT – IV

RADIO WAVE PROPAGATION: Ground wave Propagation, Space-wave Propagation, Effect of curvature of an Ideal Earth, Variations of Field strength with height in space-wave Propagation, Atmospheric effects in space-wave Propagation, Radio-Horizon, Duct Propagation, Extended-range Propagation resulting from Tropospheric Scattering, lonospheric Propagation, Gyro frequency, Refraction and reflection of Sky Waves by the Ionosphere, Critical Frequency, Skip Distance, Maximum Usable Frequency.

TEXT BOOKS:

1. Edward C Jordan and Keith G Balmain, Electromagnetic Waves and Radiating Systems, 2nd Edition, PHI, 2003.
2. Constantine A Balanis, Antenna Theory: Analysis and Design, Harper and Row Publishers, 2002

REFERENCE BOOKS:

1. J. D. Kraus and Ronald J Marhefka, Antennas For all Applications, TMH, 2003.
2. G. S. N. Raju, Antennas and Wave Propagation, 1st Edition, Pearson Publication.

VLSI Design
VI – Semester (Code: 18EC605)

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

Prerequisites: None

Course Objectives:

CO1: To understand various techniques of MOS fabrication process and basic electrical properties ofMOS and Bi CMOS circuits.

CO2: To design and analyze basic MOS circuits by using stick diagram and MOSlayout with the help technology-based design rules

CO3:To design combinational and sequential circuits using MOS technology.

CO4:To get introduced to various types of design flows like ASIC design Flow, FPGA, CPLD.

Course Outcomes: Students will be able to

CLO1: Understand various techniques of MOS fabrication process and basic electrical properties ofMOS and Bi CMOS circuits.

CLO2:Design and analyze basic MOS circuits by using stick diagram and MOS Layout.

CLO3:Design combinational and sequential circuits using MOS technology.

CLO4:Identify various types of design flows like ASIC design Flow, FPGA, CPLD.

SYLLABUS

UNIT – I

An introduction to MOS technology: Introduction to IC technology, Basic MOS transistors,NMOS fabrication, CMOS fabrication and BICMOS technology. Basic Electrical Properties ofMOS and BICMOS Circuits: Ids versus Vds relationships, threshold voltage Vt,Transconductance gm, Figure of merit uo, pass transistor, NMOS inverter, Pull-up to pulldown ratio, CMOS inverter, BICMOS inverters, Latch up in CMOS circuits.

UNIT – II

MOS and BICMOS circuit Design processes: MOS layers,Stick diagrams, Design rules andlayout, Sheet resistance Rs, Standard unit of capacitance, The Delay unit, Inverter delays,Propagation delays, Wiring capacitances, Scaling models, Scaling factors for deviceparameters.

UNIT – III

Subsystem design and layout: Architectural issues, Switch logic, Gate Logic, examples ofStructured Design (combinational logic and sequential logic). Design of an ALU subsystem.

UNIT – IV

VLSI design flow, Introduction to ASICs, Full Custom ASICs, standard cell based ASICs, Gate array based ASICs, Programmable logic devices, PLAs, PALs, CPLDsand FPGAs.

TEXT BOOKS:

1. Neil H E Weste and Kamran Eshranghian, Principles of CMOS VLSI Design, A system perspective, 2nd Edition, Pearson Education, 2002.
2. John F Wakerly, Digital Design Principles & Practices, 3rd Edition, Pearson Education, 2002.

ARTIFICIAL INTELLIGENCE

VI – Semester (Code: 18ECD21)

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: To learn the difference between optimal reasoning vs human like reasoning

CO2: To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities

CO3: To learn different knowledge representation techniques

CO4: To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems.

Course Outcomes: Students will be able to

CLO1:Possess the ability to formulate an efficient problem space for a problem.

CLO2:Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.

CLO3:Possess the skill for representing knowledge using the appropriate technique

CLO4:Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems.

SYLLABUS

UNIT – I

Artificial Intelligence (AI) - History And Foundation, AI Techniques, Problem Solving With AI Models, Data Acquisition And Learning Aspects In AI.

Problem Solving – Problem Solving Process, Formulating Problems, Problem Types and Characteristics, Problem Analysis and Representation, Performance Measuring, Problem Space and Search, Toy and Real-WorldProblems. General Search Algorithms, Uninformed Search.

UNIT – II

Informed Search – Best First Search, Greedy Search, A* Search, AO* Search, Local Search Algorithm and Optimization Problems.

Intelligent Agents: Rationality and Rational Agent, Performance Measure, Rationality and Performance, Flexibility and Intelligent Agents, Types of Agents.

UNIT – III

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

UNIT – IV

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

TEXT BOOKS:

1. Artificial Intelligence: Building Intelligent Systems By Parag Kulkarni and Prachi Joshi, PHI Publications.
2. Saroj Kaushik. Artificial Intelligence. Cengage Learning. 2011
3. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004.

REFERENCE BOOKS:

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.
2. Introduction to Artificial Intelligence by Eugene Charniak, Pearson.
3. Introduction to Artificial Intelligence and expert systems Dan W.Patterson. PHI.
4. Artificial Intelligence by George Flugerrearson fifth edition.

INFORMATION THEOREY AND CODING
VI – Semester (Code: 18ECD22)

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: Understand mathematical theory related to Information

CO2: Understand error control coding

CO3: Understand encoding and decoding of digital data streams

CO4: Be familiar with the methods for the generation of these codes and their decoding techniques

Course Outcomes: Students will be able to

CLO1: Evaluate different parameters related to information theory.

CLO2: To design and analyze data compression techniques with varying efficiencies as per requirements.

CLO3: To prepare encoder for various coding scheme used.

CLO4: To design an optimum decoder for various coding schemes used.

SYLLABUS

UNIT – I

SOURCE CODING: Mathematical models of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, coding for discrete memory less Sources, Properties of Codes, Huffman Code, Run Length Codes.

UNIT – II

CHANNEL CODING : Introduction to Linear Block Codes, Generated Matrix, Systematic Linear Block Codes, Encoder Implementation of Linear Block Codes, Parity Check Matrix, Syndrome Testing, Error Detecting and Correcting Capability of Linear Block Codes, Hamming Codes.

UNIT – III

CYCLIC CODES: Algebraic Structure of Cyclic Codes, Binary Cyclic Code Properties, Encoding in Systematic Form, Syndrome Computation and Error Detection, Decoding of Cyclic Codes, Cyclic Hamming Codes

UNIT – IV

CONVOLUTIONAL CODES: Encoding of Convolutional Codes, Structural Properties of Convolutional Codes, State Diagram, Tree Diagram, Trellis Diagram, Maximum, Likelihood Decoding of Convolutional Codes, Viterbi Algorithm.

TEXT BOOKS:

1. "Error Control Coding – Fundamentals and Applications," by SHU LIN and Daniel J. Costello, JR., Prentice Hall Inc.
2. "Communication Systems," Simon Haykin 4th edition.

REFERENCE BOOKS:

1. "Digital Communications – Fundamentals and Applications" by Bernard Sklar, Pearson Education Asis, 2003.
2. "Digital Communications – John G. Proakis, McGraw Hill Publications.
3. "Principles of Digital Communication" J. Das, Sk. Mallik, PK Chattergee – NAI (P) Ltd, 2000.

EMBEDDED SYSTEM DESIGN
VI – Semester (Code: 18ECD23)

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

Prerequisites: None.

Course Educational Objective : This course provides the knowledge on typical embedded system design methodologies, characteristics and design metrics, computational models for describing embedded system behavior, standard single purpose processors, various communication protocols and design technology for implementing embedded system.

Course Outcomes (COs): At the end of the course, students will be able to
CLO1: Understand different design methodologies for embedded systemdesign.
CLO2: Different core manufacturing models, importance of synchronization amongprocesses and need for communication interfaces in wired and wireless.
CLO3: To understand different processors and memory architectures.
CLO4: Analyze various communicationprotocols and interfacing techniques and Develop embedded system using IC and Design Technology

SYLLABUS

UNIT - I
Embedded System Introduction: Embedded systems overview, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic(RT level), custom single purpose processor design(RT – level), optimizing custom single purpose processors.

UNIT - II
State Machine and Concurrent Process Models: Introduction, models Vs languages, finite state machines with data path model(FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, Implementation, data flow model, real-time systems.

UNIT - III
Standard Single-Purpose Processors: Introduction, Timers, Counters, and watchdog timers, UART, LCD Controllers, Stepper Motor Controllers, Analog-to-Digital Converters, Real-Time Clocks, **Memory**: Common memory types, Memory hierarchy and cache, Advanced RAM

UNIT - IV
Interfacing: Introduction, Communication basics, Microprocessor Interfacing: I/O Addressing, Interrupts, Direct memory access, architectures, Advanced communication principles, Serial &Parallel Protocols, Wireless Protocols
IC and Design Technology: IC Technology: Full – Custom(VLSI) IC Technology,

Semicustom(ASIC) IC Technology, Programmable logic device(PLD) IC technology, Design technology: automation: synthesis, verification: Hardware/Software Co-Simulation, Reuse: Intellectual Property cores, Design Process Models.

TEXT BOOK:

1. Frank Vahid/Tony Givargis, "Embedded System Design A unified Hardware/Software Introduction" John Wiley &Sons,Inc.

REFERENCE BOOKS:

1. James K Peckol, "Embedded Systems- A Contemporary Design Tool" John Weily.
2. Joseph Yiu, "The Definitive Guide to the ARM Cortex-M3", Newnes, Elsevier.
3. DavidE.Simon,AnEmbeddedSoftwarePrimer,Pearsonedition.

Telecommunication Switching Systems and Networks
VI – Semester (Code: 18ECD24)

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

Prerequisites: None.

Course Objectives:
CO1: Fundamentals of telecommunication systems.
CO2:Working principle of various switching systems in Telecommunication.
CO3: Basics of Modern digital telecommunication switching and networks like PSTN, LAN, MAN etc.
CO4:Comparison of telephone network, data network and integrated service digital network.

Course Outcomes: Students will be able to
CLO1: Describe the fundamentals of telecommunication systems.
CLO2: Explainthe working principle of various switching systems in Telecommunication.
CLO3: Discuss data networks
CLO4: Recognize differences among telephone network, data network and ISDN.

SYLLABUS

UNIT – I

INTRODUCTION: Evolution of Telecommunications, Simple telephone communication, Basics of a switching system,Manual Switching System, Major Telecommunication Networks.
ELECTRONIC SPACE DIVISION SWITCHING: Stored Program Control, Centralized SPC, Distributed SPC, Two stage networks, Three stage networks, n stage networks.

UNIT – II

TIME DIVISION SWITCHING: Basic time division space switching, Basic time division time switching, Combination switching, Three stage combination switching, n stage combination switching.
TELEPHONENETWORKS: Subscriber Loop System, Switching Hierarchy and Routing, Transmission Plan, Transmission Systems, Numbering Plan, Charging Plan, Signaling Techniques, In-channel Signaling, Common Channel Signaling, Cellular Mobile Telephony.

UNIT – III

DATA NETWORKS:Data Transmission in PSTNs, Switching techniques for Data Transmission,Data Communication Architecture,Link-to-Link Layers, End-to-End Layers, Satellite based Data Networks, Local Area Networks, Metropolitan Area Networks,Fibre Optic Networks,Data Network Standards,Protocol Stacks,Internetworking.

UNIT – IV

Integrated Services Digital Network: Motivation for ISDN, New Services, Network and Protocol Architecture, Transmission Channels, User- Network Interfaces, Signaling, Numbering and Addressing, Service Characterization, Interworking, ISDN Standards, Expert Systems in ISDN, Broadband ISDN, Voice Data Integration.

TEXT BOOK:

1. T Viswanathan, "Telecommunication Switching Systems and Networks", PHI, 2004.

REFERENCE BOOKS:

1. "Digital Telephony"- J. Bellamy, 2nd Edition, 2001, John Wiley.
2. "Data Communications and Networks"- Achyut S. Godbole, 2004, TMH.
3. "Principles of Communication Ststems"- H. Taub& D. Schilling, 2nd Edition, 2003, TMH.
4. "Data Communication & Networking"- B. A. Forouzan, 3rd Edition, 2004, TMH.
5. "Telecommunication System Engineering"– Roger L. Freeman, 4th Ed., Wiley-Inter Science, John Wiley & Sons, 2004.

SIGNAL AND IMAGE PROCESSING USING SCILAB
VI – Semester (Code: 18ECL61)

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

Prerequisites: None

Course Objectives: To learn
CO1: The implementation aspects of basic operations on signals (1D, 2D, 3D).
CO2: Development of algorithms using SCI-Lab.

Course Outcomes: Students will be able to
CLO1: Implement the basic operations on various signals (1D, 2D, 3D).
CLO2:Write a program for an algorithm using SCI-Lab.

LIST OF PROGRAMS

1. Amplitude Modulation.
2. Frequency Modulation.
3. Linear and Circular Convolution of two discrete time signals.
4. Histogram and histogram equalization of an image.
5. Kernel processing on images leading to Color image enhancement.
6. Color image histogram manipulation.
7. Display of 2D filters frequency responses and processing the images using these filters.
8. Implementation of arithmetic coding for images.
9. Basic JPEG algorithm implementation.
10. Simple image watermarking algorithms using LSB substitution.
11. Simple content based image retrieval using various distance metrics.
12. Color images manipulations, reading and writing of color images.
13. Special effects implementation on grey and color images.
14. LOG Masks implementation for gray and color images.
15. Simple video reading and writing .avi formats and manipulation of video frames.

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

IOT LAB
VI – Semester (Code: 18ECL62)

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

LIST OF EXPERIMENTS

Design, Developed and implement following using Arduino, Raspberry Pi compiler and Python language in Linux/Windows environment.

1. StudyandInstallPythoninEclipseandWAPfordatatypesinpython.
2. Write a Program for arithmetic operation inPython.
3. Write a Program for looping statement inPython.
4. StudyandInstallIDEofArduinoanddifferenttypesofArduino.
5. Write program using Arduino IDE for BlinkLED.
6. Write Program for RGB LED usingArduino.
7. StudytheTemperaturesensorandWriteProgramfoemonitortemperatureusing Arduino.
8. Study and Implement RFID, NFC usingArduino.
9. Study and implement MQTT protocol usingArduino.
10. Study and Configure RaspberryPi.
11. WAP for LED blink using RaspberryPi.
12. StudyandImplementZigbeeProtocolusingArduino/RaspberryPi.

SOFT SKILLS LABORATORY
VI – Semester (Code: 18ELL02)

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

LIST OF EXPERIMENTS

1. Body Language & Identity Management

a. Facial Expressions – Kinesics - Occulesics
b. Haptics - Proxemics
c. Para Linguistics
d. Appearance
e. Identity Management Communication

2. Emotional Intelligence & Life Skills

a. Self Awareness through Johari Window and SWOC analysis
b. Self Motivation
c. Empathy
d. Assertiveness& Managing Stress
e. Positive Attitude
f. Time Management
g. Goal Setting: Short term, Long Term, Vision, Mission.

3.Business Presentations

a. Preparing effective Presentations Power Point Presentations
b. Power Point Presentations
c. Using Visual Aids
d. Mock Presentations

4.Employability Skills

a. Group Discussion
b. Team Building and Leadership Qualities
c. Interview Skills

Reference Books:

- Personality Development and Soft skills (Second Edition), Barun K. Mithra. Oxford University Press: 2016
- The Definitive Book of Body Language, Allan & Barbara. Pease International:2004
- Working with Emotional Intelligence, Daniel Goleman. Bloomsbury:1998
- English for Jobseekers, Lina Mukhopadhyay. Cambridge University Press:2013
- The 7 Habits of Highly Effective People, Stephen R.Covey. St. Martin's Press:2014