Bapatla Engineering College

(*Autonomous*)

BAPATLA

ACADEMIC RULES & REGULATIONS and SYLLABUS (2020-2021)

Electronics and Communications Engineering

B.Tech.

Bapatla Engineering College:: Bapatla

(Autonomous under Acharya Nagarjuna University) ***(Sponsored by Bapatla Education Society)*** **BAPATLA-522102, Guntur District, A.P.**

www.becbapatla.ac.in

BAPATLA ENGINEERING COLLEGE :: BAPATLA
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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Electronics and Communications Engineering
Effective from the Academic Year 2020-2021 (R20 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	
20EC101 / MA01	BS	Linear Algebra and ODE	3	1	0	4	30	70	100	3
20EC102 / PH01	BS	Waves and Modern Physics	3	1	0	4	30	70	100	3
20EC103 / CY01	BS	Engineering Chemistry	3	1	0	4	30	70	100	3
20EC104 / CS01	ES	Problem Solving with Programming	3	1	0	4	30	70	100	3
20EC105/ CE01	MC	Environmental Studies	3	0	0	3	30	70	100	0
20ECL101 / CYL01	BS	Engineering Chemistry Lab	0	0	3	3	30	70	100	1.5
20ECL102	ES	Hardware Lab	0	0	3	3	30	70	100	1.5
20ECL103 / CSL01	ES	Problem Solving with Programming Lab	0	0	3	3	30	70	100	1.5
		TOTAL	15	4	9	28	240	560	800	16.5

CIE: Continuous Internal Evaluation SEE: Semester End Examination
L: Lecture, T: Tutorial, P: Practical
BS: Basic Science Courses ES: Engineering Science Courses
MC: Mandatory Course

BAPATLA ENGINEERING COLLEGE :: BAPATLA
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Electronics and Communications Engineering
Effective from the Academic Year 2020-2021 (R20 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	
20EC201 / MA02	BS	Numerical Methods and Advanced Calculus	3	1	0	4	30	70	100	3
20EC202	ES	Basic Instrumentation	3	1	0	4	30	70	100	3
20EC203 / EL01	BS	Communicative English	3	1	0	4	30	70	100	3
20EC204 / CS02	ES	Programming with C ++	3	1	0	4	30	70	100	3
20EC205	ES	Circuit Theory	3	1	0	4	30	70	100	3
20EC206	PC	Fundamentals of Digital Electronics	3	1	0	4	30	70	100	3
20ECL201 / PHL01	BS	Physics lab	0	0	3	3	30	70	100	1.5
20ECL202 / ELL01	BS	English Communication and Skills Lab	0	0	3	3	30	70	100	1.5
20ECL203 / CSL02	ES	Programming with C ++ Lab	0	0	3	3	30	70	100	1.5
		TOTAL	18	6	9	33	270	630	900	22.5

CIE: Continuous Internal Evaluation SEE: Semester End Examination
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PC: Professional Core

BAPATLA ENGINEERING COLLEGE :: BAPATLA
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
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Effective from the Academic Year 2020-2021 (R20 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	
20MA003	BS	Probability and Statistics	3	0	0	3	30	70	100	3
20EC302	PC	Signals & Systems	3	0	0	3	30	70	100	3
20EC303	PC	Electronic Devices and Circuits	3	0	0	3	30	70	100	3
20EC304	PC	Electromagnetic Field Theory	3	0	0	3	30	70	100	3
20EC305	PC	Digital Logic Design	3	0	0	3	30	70	100	3
20EC306	SOC	Data structures Using Python	1	0	2	3	30	70	100	2
20ECMC31	MC	Constitution of India	2	0	0	2	30	0	30	0
20ECL31	PC	Data Structures using Python Lab	0	0	3	3	30	70	100	1.5
20ECL32	PC	Electronic Devices Lab	0	0	3	3	30	70	100	1.5
20ECL33	PC	Signals & Systems Lab	0	0	3	3	30	70	100	1.5
		TOTAL	18	0	11	29	300	630	930	21.5

CIE: Continuous Internal Evaluation SEE: Semester End Examination
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BAPATLA ENGINEERING COLLEGE :: BAPATLA
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Electronics and Communications Engineering
Effective from the Academic Year 2020-2021 (R20 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	
20MA004	BS	Complex Variables and Special Functions	3	0	0	3	30	70	100	3
20EC402	PC	Electronic Circuit Analysis	3	0	0	3	30	70	100	3
20EC403	PC	EM Waves and Transmission Lines	3	0	0	3	30	70	100	3
20EC404	ES	Analog Communication	3	0	0	3	30	70	100	3
20EC405	SOC	Microprocessor and Microcontroller	2	1	0	3	30	70	100	2
20EC406	HSS	Professional Ethics and Human Values	3	0	0	3	30	70	100	3
20ECL41	PC	Electronic Circuits Lab	0	0	3	3	30	70	100	1.5
20ECL42	PC	Digital Logic Design lab	0	0	3	3	30	70	100	1.5
20ECL43	PC	Microprocessor and Microcontroller lab	0	0	3	3	30	70	100	1.5
		TOTAL	17	1	9	27	270	630	900	21.5
Internship 2 Months (Mandatory) during summer vacation										
Honors/Minor courses (Maximum Two courses can be registered) (The hours distribution can be 3-0-2 or 3-1-0 also)--- Credits 4										

CIE: Continuous Internal Evaluation SEE: Semester End Examination
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BAPATLA ENGINEERING COLLEGE :: BAPATLA
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Electronics and Communications Engineering
Effective from the Academic Year 2020-2021 (R20 Regulations)
Third Year B. Tech (SEMESTER – V)

		Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EC501	PC	Linear Integrated Circuits	3	0	0	3	30	70	100	3
20EC502	PC	Antennas and wave propagation	3	0	0	3	30	70	100	3
20EC503	PC	Digital communication	3	0	0	3	30	70	100	3
20ECJ11,..14	JOE	Elective-1	2	0	2	4	30	70	100	3
20ECD11,..,14	PEC	Elective-1	3	0	0	3	30	70	100	3
20EC504	SAC	Machine Learning	1	0	2	3	30	70	100	2
20ECMC51	MC	Essence of Indian Traditional Knowledge	2	0	0	2	30	0	30	0
20ECL51	PC	Analog & Digital Communications Lab	0	0	3	3	30	70	100	1.5
20ECL52	PC	Linear Integrated Circuits Lab	0	0	3	3	30	70	100	1.5
		TOTAL	17	0	10	27	270	560	830	20
Summer Internship 2 Months (Mandatory) after second year (to be evaluated during V semester										1.5
Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)										4

CIE: Continuous Internal Evaluation SEE: Semester End Examination
L: Lecture, T: Tutorial, P: Practical
BS: Basic Science Courses ES: Engineering Science Courses
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JOC Elective-I
20ECJ11: Embedded System & Design
20ECJ12: Data Communication & Computer Networks
20ECJ13: Programming with JAVA
20ECJ14:
PEC Elective-I
20ECD11: Information Theory & Coding
20ECD12:Telecommunication Switching Systems and Networks
20ECD13: Pulse and Switching Circuits
20ECD14: Optical Communications

BAPATLA ENGINEERING COLLEGE :: BAPATLA
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
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Effective from the Academic Year 2020-2021 (R20 Regulations)
Third Year B. Tech (SEMESTER – VI)

		Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EC601	PC	VLSI Design	3	0	0	3	30	70	100	3
20EC602	PC	Linear Control Systems	3	0	0	3	30	70	100	3
20EC603	PC	Digital signal Processing	3	0	0	3	30	70	100	3
20ECJ21,..24	JOE	Elective-2	2	0	2	4	30	70	100	3
20ECD21,..,14	PEC	Elective-2	3	0	0	3	30	70	100	3
20EC604	SAC	Internet of Things	1	0	2	3	30	70	100	2
20ECMC61	MC	Innovation, IPR and Entrepreneur ship	2	0	0	0	30	0	30	0
20ECL61	PC	DSP lab	0	0	3	3	30	70	100	1.5
20ECL62	PC	IOT Lab	0	0	3	3	30	70	100	1.5
20ECL63	PC	VLSI Design Lab	0	0	3	3	30	70	100	1.5
		TOTAL	17	0	13	30	300	630	930	21.5
		Honors /Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)								4
Industrial/Research Internship (Mandatory) 2 Months during summer vacation										

CIE: Continuous Internal Evaluation SEE: Semester End Examination
L: Lecture, T: Tutorial, P: Practical
BS: Basic Science Courses ES: Engineering Science Courses
PC: Professional Core
JOCElective-2
- 20ECJ21: Digital Design Using Verilog HDL
- 20ECJ22: Artificial intelligence
- 20ECJ23: Biomedical instrumentation
- 20ECJ24: Advanced Microcontrollers

PECElective-2
- 20ECDC21: Microwave Engineering
- 20ECDC22: Mobile & Cellular Communications
- 20ECDC23: Global Positioning Systems
- 20ECDC24: Pattern Recognition and Application

BAPATLA ENGINEERING COLLEGE :: BAPATLA
(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
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Effective from the Academic Year 2020-2021 (R20 Regulations)
Fourth Year B. Tech (SEMESTER – VII)

		Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20ECD31, …34	PC	Professional Elective: III	3	0	0	3	30	70	100	3
20ECD41, …44	PC	Professional Elective: IV	3	0	0	3	30	70	100	3
20EC703	PC	Professional Elective: V (MOOC)	3	0	0	3	30	70	100	3
20ECJ31, …34	JOE	JOC-Elective III	2	0	0	2	30	70	100	3
20ECD21,.. ,14	JOE	JOC-ElectiveIV(MOOC)	2	0	0	2	30	70	100	3
	HSS	Industrial Management and Entrepreneurship Development	3	0	0	3	30	70	100	3
	SOC	Artificial neural networks	1	0	2	3	30	70	100	2
		Industrial/Research Internship 2 Months (Mandatory) after third year (to be evaluated during VIII semester)								3
		TOTAL	17	0	2	19	210	420	630	23
	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)									4

CIE: Continuous Internal Evaluation SEE: Semester End Examination
L: Lecture, T: Tutorial, P: Practical
BS: Basic Science Courses ES: Engineering Science Courses
PC: Professional Core

PEC Elective-III:
20ECD31:RADAR Engineering
20ECD32:Speech Processing
20ECD33:FPGA Design
20ECD34:MEMS
PEC Elective-IV:
20ECD41:Satellite communication
20ECD42:Wireless communications
20ECD43:Advanced DSP
20ECD44:Cloud computing

Open/JOC Elective-V
20ECJ31:Digital Image Processing
20ECJ32:Biomedical signal processing
20ECJ33:Robotics
20ECJ34:Deep learning

Semester VIII (Fourth Year)

Code		Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
EC461	PC	Project work, Seminar and internship in Industry	-	-	-	3	30	70	100	12

Linear Algebra and ODE
I B. Tech – I Semester (Sub. Code: 20EC101 / MA01)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

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:

1. B. S. Grewal ― Higher Engineering Mathematics‖, 44th edition, 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.

BAPATLA ENGINEERING COLLEGE :: BAPATLA
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WAVES AND MODERN PHYSICS

(Common for ECE, EEE, EIE)

I B. Tech – I Semester (Sub. Code-20EC102 / PH01)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

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.

CO3: To make the students to understand the quantum theory and solving the various Physical problems using quantum mechanics.

CO4: 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: Analyze 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.

SYLLABUS

UNIT – I (ADVANCED OPTICS)

Lasers: Interaction of radiation with matter. Einstein co-efficient, Properties of laser, Population inversion, LASER principle, pumping schemes-Three level and four level laser, types 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 Pointing 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.

TEXT BOOK:

1. Engineering physics M. V. Avadhanulu, P.G.KshirsagarS.Chand& Company Pvt. Ltd.
2. Engineering physics, PalaniSwamy,Scitech publication

REFERENCE BOOKS:

1. Basic engineering physics – Dr.P.srinivasaRao, Dr.K.Muralidhar, Himalaya Publication.
2. Applied physics – Dr. P. Srinivasa Rao, Dr. K. Muralidhar, Himalaya publication.

BAPATLA ENGINEERING COLLEGE :: BAPATLA
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ENGINEERING CHEMISTRY

(Common to all branches)

I B. Tech – I Semester (Sub. Code: 20EC103 / CY01)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

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 andsubstitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.

SYLLABUS

UNIT – I (Water Chemistry)

Introduction: water quality parameters

Characteristics: Alkalinity, Hardness - Estimation & simple numerical 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 process

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

Salinity – Treatment of Brackish water by Reverse Osmosis and Electrodialysis. [15 Periods]

UNIT – II

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. [15 Periods]

UNIT – III (Fuels)

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. [15 Periods]

UNIT – IV

Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution (SN^1, SN^2), addition (Markownikoff‟s and anti-Markownikoff‟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 - Polyhydroxybuterate (PHB), Polyhydroxybuterate – co – β - hydroxyvalerate (PHBV), applications. [15 Periods]

TEXT BOOKS:

1. P. C. Jain and Monica Jain, ―Engineering Chemistry‖ DhanpatRai Pub, Co., New Delhi 17th edition (2017).
2. Seshi Chawla, Engineering Chemistry**,** DhanpatRai Pub, Co LTD, New Delhi 13th edition, 2013.

REFERENCE BOOKS:

1. Essential of Physical Chemistry by ArunBahl, B. S. Bahl, G. D. Tuli, by ArunBahl.
2. B. S. Bahl, G. D. Tuli, Published by S Chand Publishers, 12th Edition, 2012.
3. Text Book of Engineering Chemistry by C. P. Murthy, C. V. Agarwal, A. Naidu, B. S. Publications, Hyderabad (2006).
4. Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015.

BAPATLA ENGINEERING COLLEGE :: BAPATLA
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PROBLEM SOLVING USING PROGRAMMING

(Common for all branches except Civil Engineering)

I B. Tech – I Semester (Sub. Code: 20EC104 / CS01)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: Basic Mathematics

COURSE OBJECTIVES: Students will be able to

CO1: Understand basic concepts of C Programming such as: C-tokens, Operators, Input/output, and Arithmetic rules.

CO2: Develop problem-solving skills to translate _English' described problems into programs written using C language.

CO3: Use Conditional Branching, Looping, and Functions.

CO4: Apply pointers for parameter passing, referencing and differencing and linking data structures.

CO5: 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

CLO1: Choose the right data representation formats based on the requirements of the problem.

CLO2: Analyze a given problem and develop an algorithm to solve the problem.

CLO3: Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.

CLO4: Write the program on a computer, edit, compile, debug, correct, recompile and run it.

CLO5: 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.

SYLLABUS

UNIT – I

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. [17 Periods]

UNIT – II

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. [17 Periods]

UNIT – III

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 [18 Periods]

UNIT – IV

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. [18 Periods]

TEXT BOOK:

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

REFERENCE BOOKS:

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.

Environmental Studies
I B. Tech – I Semester (Sub. Code: 20EC105 / CE01)

Lectures	3	Tutorial	0	Practical	0	Credits	0
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

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.

SYLLABUS
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 Bachao Andolan 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 periods field work / Demostration]

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 vermin composting.

[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 periods]

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 – Erach Bharucha

REFERENCE BOOKS:

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

ENGINEERINGCHEMISTRY LABORATORY

(Common to all branches)

I B. Tech – I Semester (Sub. Code: 20ECL101 / CYL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

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:

1. Practical Engineering Chemistry by K. Mukkanti, Etal, B.S. Publicaitons, Hyderabad, 2009.
2. Inorganic quantitative analysis, Vogel, 5th 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.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

HARDWARE LAB
I B. Tech – I Semester (Sub. Code: 20ECL102)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30		Semester End Examination (3 Hours)		:	70

Prerequisites: None

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.

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Problem Solving With Programming Lab
I B. Tech – I Semester (Sub. Code: 20ECL103 / CSL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: None

LIST OF LAB EXPERIMENTS

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 (using loops):
   a) $1 + x^2/2! + x^4 / 4!+ \ldots$upto ten terms
   b) $x + x^3/3! + x^5/5!+ \ldots$ upto ten terms
3. Write a C program to check whether the given number is
   a) Prime or not.
   b) Perfect or Abundant or Deficient.
4. Write a C program to display statistical parameters (using one – dimensional array).
   a) Mean
   b) Mode
   c) Median
   d) Variance.
5. WriteaCprogramtoreadalistofnumbersandperformthefollowingoperations
   a) Print the list.
   b) Delete duplicates from the list.
   c) Reverse the list.
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 the List".

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

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(Reg.no, 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.

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Numerical Methods and Advanced Calculus
I B. Tech – II Semester (Sub. Code: 20EC201 / MA02)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

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-5: Evaluate the double and triple integrals using change of variables.
CLO-6: Transformline 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:

1. B. S. Grewal, Higher Engineering Mathematics‖, 44th edition, 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 – II Semester (Sub. Code: 20EC202)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

COURSE OBJECTIVES: To learn
CO1: To learn Basic concepts of measurement and Instrumentation.
CO2: To study working of various bridges and their applications.
CO3: To study the uses of CRO in measurements.
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 used for different applications.
CLO-4: Identify the suitable Sensors and Transducers for different applications.

SYLLABUS
UNIT – I
Measurement and Error
Definitions: Measurement, Standard, Instrument, Calibration, Instrumentation Accuracy, Precision, Significant figures, Sensitivity, Resolution, Threshold, and Linearity. Types of errors. **Limiting Errors:** Definition, Combination of Limiting errors, Statistical analysis, Probability of errors.
Electromechanical Indicating Instruments
Permanent Magnet Moving Coil Mechanism, DC Ammeters, DC Voltmeters, Voltmeter Sensitivity, Series type Ohmmeter, Shunt type Ohmmeter.

UNIT – II
Bridge Measurements
Introduction, Wheatstone Bridge, Kelvin Bridge, Kelvin's Double Bridge, **AC Bridges:** Maxwell Bridge, Hay Bridge, Schering Bridge, Wein Bridge.
Electronic Instruments for measuring Basic Parameters
AC voltmeter using rectifiers, True RMS-Responding voltmeter, **Q Meter:** Basic Q-meter circuit, Measurement methods, Sources of error**.**

UNIT – III
Oscilloscopes
Introduction, Block diagram and working of CRO and Cathode Ray Tube (CRT), **Oscilloscope Techniques:** Frequency determination, Phase angle and Time delay measurement, **Special Oscilloscopes**: Working of Storage Oscilloscope, Sampling Oscilloscope, and Digital Storage Oscilloscope.

UNIT – IV

Transducers as Input Elements to Instrumentation Systems

Classification of Transducers, Selection criteria of Transducer, **Strain gauges:** Principle of Strain gauge, Derivation for gauge factor of a strain gauge, **Displacement Transducers:** Resistive potentiometers, LVDT, Capacitive transducers (i) Variable gap type (ii) Variable area type (iii) Variable dielectric type. **Temperature Measurements:** Principle and operation of RTD, Thermistor, Thermocouples

Analog and Digital Data Acquisition Systems

Introduction to Instrumentation systems, Block diagram and working of Digital data acquisition system

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.

Communicative English
I B. Tech – II Semester (Sub. Code: 20EC203 / EL01)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

SYLLABUS

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:

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

PROGRAMMING WITH C++
I B. Tech – II Semester (Sub. Code: 20EC204 / CS02)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

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.

SYLLABUS

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

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

CIRCUIT THEORY
I B. Tech – II Semester (Sub. Code: 20EC205)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

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.

SYLLABUS

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**. [CHAPTER-3]**

UNIT – II

Basic Nodal and Mesh Analysis: Nodal analysis, the super node, Mesh analysis, and The super mesh, Nodal vs. Mesh analysis: A comparison. **[CHAPTER-4]**

UNIT – III

Useful circuit analysis techniques: Linearity and superposition, source transformations, Thevenin and Norton equivalent circuits, maximum power transfer Theorem, Reciprocity Theorem, and delta-wye conversion. **[CHAPTER-5]**

UNIT – IV

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. **[CHAPTER-8]**

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.

Fundamentals of Digital Electronics
I B. Tech – II Semester (Sub. Code: 20EC206)

Lectures	3	Tutorial	1	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

COURSE OBJECTIVES:

CO1: To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronic circuits.

CO2: To impart how to design Digital Circuits.

COURSE OUTCOMES: Students will be able to

CLO1: Perform binary arithmetic operations and Conversion of numbers from one base to another base.

CLO2: Simplify logical functions using K-map method and Tabulation method.

CLO3: Design various combinational logic circuits and realize using logic gates.

CLO4: Design combinational logic circuits using MSI circuits.

SYLLABUS

UNIT – I

Number Systems and Codes: Decimal, Binary, Octal and Hexadecimal number systems and their conversion. Number systems arithmetic; Complements: The r's Complement, The (r-1)'s Complement, Subtraction using method of complements. Sign-magnitude representation, 1's & 2's complement representations, Codes: Introduction, Classification of Binary codes; BCD code, Excess-3 code, Gray code, Error detection and Correction codes.

UNIT – II

Boolean Algebra and Logic gates: Boolean Postulates & theorems, Digital Logic gates, Simplification of Boolean expressions, Implementation of Boolean expressions using logic gates, Canonical and Standard forms.

Minimization of Switching Functions: Simplification of logical functions using Karnaugh map method (Up to five variables), Don't-Care conditions, Quine-McCluskey minimization technique.

UNIT – III

Combinational Logic Design: General design Procedure, Design of: Half-Adder, Full-Adder, Half - Subtractor, Full – Subtractor. Design of Code converters, Ex-OR and Ex-NOR circuits, NAND and NOR implementation of Boolean functions.

UNIT – IV

Combinational Logic Design Using MSI Circuits: Multiplexer, Combinational logic design using multiplexers, Demultiplexers / Decoders and their use in combinational logic design, Design of BCD to 7 segment decoder, Magnitude comparator, Encoders.

TEXT BOOK:

1. M.Morris Mano, "Digital Logic and Computer Design", PHI 2003.

REFERENCE BOOKS:

1. A.Anand Kumar, "Fundamentals of Digital Circuits", PHI 2006.
2. R P Jain "Modern Digital Electronics", IVth ed., TMH.

BAPATLA ENGINEERING COLLEGE :: BAPATLA
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Physics Laboratory

(COMMON TO ALL BRANCHES)

I B. Tech – II Semester (Sub. Code: 20ECL201 / PHL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: None

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 apparatus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Determination of radius of curvature of a Plano convex lens by forming Newton's rings.
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.

ENGLISH COMMUNICATION SKILLS LABORATORY
I B. Tech – II Semester (Sub. Code: 20ECL202 / ELL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30		Semester End Examination (3 Hours)		:	70

Prerequisites: None

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:

1. Communication Skills, Sanjay Kumar and Pushpa Lata. Oxford University Press. 2011.
2. Better English Pronunciation, J.D. O‘ Connor. Cambridge University Press: 1984.
3. New Interchange (4rth Edition), Jack C Richards. Cambridge University Press: 2015.
4. English Conversation Practice, Grant Taylor. McGraw Hill: 2001.

SOFTWARE:

1. Buzzers for conversations, New Interchange series.
2. English in Mind series, Telephoning in English.
3. Speech Solutions, A Course in Listening and Speaking.

PROGRAMMING WITH C++ LAB
I B. Tech – II Semester (Sub. Code: 20ECL203 / CSL02)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: None

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 20MA003

II B.Tech, III Semester

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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.

SIGNALS & SYSTEMS

II B.Tech – III Semester (Code: 20EC302)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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 continuous 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.

ELECTRONIC DEVICES AND CIRCUITS
II B.Tech – III Semester (Code: 20EC303)

Lectures	3	Tutorial	0		Practical	0	Credits	3			
Continuous Internal Assessment			:	30	Semester End Examination (3 Hours)				:	70	

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,TataMc-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 – III Semester (Code: 20EC304)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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 Logic Design
II B. Tech – I Semester (Sub. Code: 20EC305)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)			:	70

Prerequisites: Fundamentals of Digital Electronics

COURSE OBJECTIVES:

CO1: To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronic circuits.

CO2: To impart how to design Digital Circuits.

COURSE OUTCOMES: Students will be able to

CLO1: Design synchronous sequential circuits and understand use of flip-flops.

CLO2: Design asynchronous sequential circuits, counters and understand the importance of registers

CLO3: Operation of various logic families and their comparison.

CLO4: Operation of various memory devices and implementation

SYLLABUS

UNIT – I

SYNCHRONOUS SEQUENTIAL LOGIC : Architectural Distinctions between Combinational and Sequential circuits, Latches, Flip-Flops, RS- Latch Using NAND and NOR Gates, Truth Tables, Excitation Tables, characteristic Tables and equations of SR, JK, D, T and Master slave JK flip-flop, Conversion from one type of Flip-Flop to another.

UNIT – II

ASYNCHRONOUS SEQUENTIAL CIRCUITS -Introduction, Analysis procedure, Circuits with latches, Design procedure.

REGISTERS AND COUNTERS: Registers, shift Registers, Left shift, Right shift, SISO, SIPO, PIPO, PISO, Bidirectional Shift Register, Universal Shift Register, Design of Asynchronous and Synchronous Counters, Modulus of the Counters, Ripple Counters, Ring Counter, Johnson Counter, up-down counter.

UNIT – III

Logic Families: Significance of families, Characteristic parameters, types of Logic families: RTL, DTL, I^2L, TTL, TTL NAND gate with totem pole output, TTL TRI STATE logic ECL, MOS, CMOS, NMOS and PMOS Comparison between various logic families.

UNIT – IV

Memory and Programmable Logic Devices: Classification of memories – ROM: ROM organization, PROM, EPROM, EEPROM, RAM: RAM organization, Write operation, Read operation, Static RAM, Programmable Logic Devices: Programmable Logic Array (PLA) Programmable Array Logic, Implementation of Combinational Logic circuits using ROM, PLA, PAL.

TEXT BOOK:

2. M.Morris Mano, "Digital Logic and Computer Design", PHI 2003.

REFERENCE BOOKS:

3. A.Anand Kumar, "Fundamentals of Digital Circuits", PHI 2006.
4. R P Jain "Modern Digital Electronics", IVth ed., TMH.

Data Structures using 'Python

II B.Tech – III Semester (Code: 20EC306)

Lectures	1	Tutorial	0	Practical	2	Credits	2
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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

CONSTITUTION OF INDIA

II B.Tech – III Semester (Code: 20ECM31)

Lectures	2	Tutorial	0	Practical	0	Credits	0
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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 center – 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, Directive Principles 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 and Council of ministers, Cabinet and Central secretariat, Lok Sabha, Rajya Sabha.

UNIT – III

STATE GOVERNMENT AND ITS ADMINISTRATION: Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions.

UNIT – IV

LOCAL ADMINISTRATION: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, 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.

DATA STRUCTURES USING PYTHON LAB
II B.Tech Semester-III 20ECL31

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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 Lab
II B. Tech – III Semester (Sub. Code: 20ECL32)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30		Semester End Examination (3 Hours)		:	70

Prerequisites: None

LIST OF LAB EXPERIMENTS (Simulation/Hardware)

1. Characteristics of Silicon and Germanium diodes (**Hardware**)
2. Characteristics of Zener diode and its regulation characteristics (**Hardware**)
3. Characteristics of BJT in Common Base configuration. (**Hardware**)
4. Characteristics of BJT in Common Emitter configuration. (**Simulation /Hardware**)
5. Characteristics of Emitter follower circuit. . (**Simulation /Hardware**)
6. Output and Transfer Characteristics of JFET.(**Hardware**)
7. Characteristics of UJT. (**Hardware**)
8. Design and verification of self-bias circuit for BJT. . (**Simulation /Hardware**)
9. Design and verification of collector to base bias circuit for BJT. . (**Simulation /Hardware**)
10. Design and verification of Fixed bias circuit for BJT. (**Hardware**)
11. Voltage Regulator using BJT. . (**Simulation /Hardware**)
12. Characteristics of SCR.
13. Study of CRO.
14. Characteristics of Triac.
15. Characteristics of Photo Transistor.

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

SIGNALS & SYSTEMS LAB

II B.Tech – III Semester (Code: 20ECL33)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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 PROGRAMS

1. Basic Operations on Matrices.
2. Program to show how to create a variety of 2-D plots in MATLAB.
3. Generation of basic continuous time signals namely unit impulse, step, ramp, exponential and Sinusoidal signals.
4. Generation of basic discrete time signals namely unit impulse, step, ramp, exponential and Sinusoidal signals.
5. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
6. Finding the Even and Odd Parts of Signal or Sequence and Real and Imaginary Parts of Signal.
7. Verification of linearity and time invariance properties of a given Continuous/discrete system.
8. Convolution between Signals and Sequences.
9. Autocorrelation and Cross-correlation between Signals and Sequences.
10. Sampling Theorem Verification.

Complex Variables and Special functions

II B.Tech, IV Semester (Code: 20MA004)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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.

BAPATLA ENGINEERING COLLEGE :: BAPATLA
(Autonomous)

ELECTRONIC CIRCUIT ANALYSIS
II B.Tech.–IV Semester (Code: 20EC402)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: Electronic Devices and circuits

Course Objectives: The objective of this course is to
CO 1: Understand the behavior of the various amplifier circuits at Low frequencies.
CO 2: Design and analyze single stage and multistage Amplifiers
CO 3: Understand the concept of power amplifier and identify different power amplifiers.
CO 4: Interpret the concept of feedback and classify various types of feedback amplifiers.
CO 5: Understand the principle of oscillation and design different types of oscillators.

Course Outcomes: Students will be able to

1. Design various amplifier circuits using Bipolar Junction Transistors in Common Emitter, Common Base and Common Collector configurations.
2. Understand the effect of coupling and bypass capacitances on frequency response of single stage amplifiers.
3. Analyze various BJT amplifier circuits and their frequency responses at low frequencies.
4. Develop the ability to analyze and design common amplification circuits using FET at Low frequencies using discrete components.
5. Analyze the frequency response of cascaded amplifiers and deduce Bode plots for different amplifier circuits.
6. Understand types of power amplifiers based on position of Quiescent or operating point on load lines and also understand its parameters.
7. Design different types of power amplifiers for practical applications of desired specifications like efficiency, output power, distortion etc.
8. Analyze the importance of positive feedback and negative feedback in connection in electronic circuits.
9. Analyze various types of feedback amplifiers like voltage series, current series, current shunt and voltage shunt.
10. Understand and remember the conditions required by an electronic circuit using Bipolar Junction Transistor to act like an Oscillator.
11. Design various sinusoidal Oscillators like RC Phase shift, Wien bridge, Hartley and Colpitts oscillator for various frequency ranges

UNIT – I

BJT at low frequency: Transistor Hybrid model, Determination of h-parameters from characteristics, Analysis of transistor amplifier using h-parameter model, Emitter follower, Millers theorem and its dual, Cascading transistor amplifiers, Simplified CE & CC Hybrid models, CE Amplifier with an Emitter Resistance, High Input Resistance Transistor Circuits – Darlington pair, Boot strapped Darlington pair.

FET at low frequency: FET Small signal model, Common Source and Common Drain configurations at low frequencies.

UNIT-II

Multistage amplifiers: Classification of amplifiers, Distortion in amplifiers, Frequency response of an amplifier, Methods of Coupling (Direct, Transformer, RC Coupling), RC-coupled amplifier, Effect of emitter bypass capacitor on low-frequency response.
Power amplifiers: Class-A large-signal amplifier, Second-harmonic distortion, Higher-order harmonic distortion, Transformer coupled audio power amplifier, Efficiency, Push-pull amplifiers, Class-B amplifier, Class-AB operation.

UNIT – III

Feedback amplifiers: Classification of amplifiers, The feedback concept, Transfer gain with feedback, General Characteristics of Negative Feedback Amplifiers, Input & Output resistance, Method of analysis of a feedback amplifier, Voltage-series feedback, Voltage-series feedback pair, Current- series feedback, Current- shunt feedback, Voltage-shunt feedback.

UNIT – IV

Oscillators: Barkhausen criterion for sinusoidal oscillators, RC-Phase shift oscillator using FET and BJT, Wien-bridge Oscillator. General form of LC oscillators, Hartley, Colpitts oscillators using BJT, Crystal oscillator, Frequency stability criterion for oscillators.

TEXT BOOKS:

1. Integrated Electronics: Analog and Digital Circuits and Systems, Jacob Millman and Christos C Halkias, Tata McGraw-Hill Education, 2003.

REFERENCE BOOKS:

1. Basic Electronics and Linear Circuits by N. N. Bhargava, D. C. Kulshrestha and S.C. Gupta, TTTI Series, Tata McGraw-Hill Education, 2003.
2. Electronic Devices and Circuits by S. Salivahanan and N. Suresh Kumar, 3rd Edition, Tata McGraw-Hill Education, 2012.

EM waves and Transmission Lines
II B.Tech – IV Semester (20EC403)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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 Refraction of Plane Waves: Reflection by a perfect conductor-Normal incidence, Reflection by a perfect conductor-oblique incidence, Reflection by a perfect dielectric-Normal incidence, Reflection by a perfect insulator-oblique incidence, Reflection at the surface of a conductive medium, surface impedance.

UNIT II

Microwave Transmission Lines: Introduction, transmission line equations and solutions, reflection coefficient and transmission coefficient, standing wave and standing wave ratio, line impedance and admittance, smith chart, impedance matching-single stub matching.

UNIT III

Rectangular Waveguides: Solutions of wave equations in rectangular coordinates, TE modes in rectangular waveguides, TM modes in rectangular waveguides, power transmission in rectangular waveguides, power losses in rectangular waveguides, excitations of modes in rectangular waveguides, characteristics of standard rectangular waveguides.

UNIT IV

Circular Waveguides: Solutions of wave equations in cylindrical coordinates, TE modes in circular waveguides, TM modes in circular waveguides, TEM modes in circular waveguides, power transmission in circular waveguides or coaxial lines, power losses in circular waveguides, excitations of modes in circular waveguides, characteristics of standard circular waveguides.

Text Books:

1. Electromagnetic Waves and Radiating Systems, Edward Jordan, Keith G. Balmain, 2nd edition, PHI India. (Unit I)

2. Microwave Devices & Circuits, Samuel Y Liao,, 3rd edition, PHI India (Unit II,III,IV)

Reference Books:

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

Analog Communication
II B.Tech – IV Semester (20EC404)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: Signals &. Systems

CO1 Distinguish between different Amplitude Modulation schemes with their advantages, disadvantages and applications.

CO2 Analyze generation and detection of Continuous Wave Modulation schemes

CO3 Relate Random signals representation to define noise

CO4 Evaluate the noise performance of different modulation techniques in analog communications

UNIT – I

AMPLITUDE MODULATION: Time domain description, Frequency domain description, Single tone modulation, Generation of AM wave, Square law modulator, Switching Modulator, Detection of AM waves, Square law detector, Envelope detector, DSB-SC Modulation, Timedomain and frequency domain descriptions of DSB-SC, Generation of DSB-SC: Balanced modulator, Coherent detection of DSBSC modulated waves, Costas loop, Quadrature-Carrier multiplexing.

UNIT – II

SSB AND VSB MODULATIONS: Band-pass transmission, Complex low-pass representation of Narrow-band signals, Concepts of pre-envelope, Complex envelope and Natural envelope, Equivalent low-pass transmission model, Single side band modulation: Frequency domain description, Generation of SSB-SC wave, Frequency-discrimination method, Phase discrimination method, Demodulation of SSB-SC waves, Vestigial side-band modulation, Frequency domain description, Generation of VSB modulated wave, Envelope detection of VSB wave plus carrier, Comparison of AM techniques, Frequency Division Multiplexing (FDM).

UNIT – III

ANGLE MODULATION: Introduction to Angle modulation, Relation between frequency Modulation and phase modulation, Single tone frequency modulation, Spectrum analysis of sinusoidal FM wave, Narrow Band FM and Wide Band FM, Transmission bandwidth of FM waves, Carson's Rule, Generation of FM waves, Indirect FM (Armstrong Method), Direct FM, Demodulation of FM waves, Balanced frequency discriminator – Zero-crossing detector, Linearized model of PLL, FM demodulation employing first order PLL, Practical Considerations, FM limiters, Applications.

UNIT – IV

DISCRETE MODULATION: Generation and Demodulation of PAM, PWM and PPM;TDM, Comparison of Discrete Modulation Techniques. NOISE IN ANALOG MODULATION: AM Receiver model, Signal to noise ratios for coherent reception. DSB-SC receiver, SSC-SC receiver, Noise in AM receivers using envelope detection. AM threshold effect, FM receiver model, Noise in FM reception, Capture effect in FM, Threshold effect, FM threshold reduction, Pre-emphasis and De-emphasis in FM.

TEXT BOOKS:

1. Simon Haykin, Introduction to Analog and Digital Communication Systems, JohnWiley and Sons, 3rd Edition, 2001
2. LeonW Couch II, Digital and Analog Communication Systems, PearsonEducation, 2004

REFERENCE BOOKS:

1. Taub and Schilling, Principles of Communication Systems, TMH, 2nd Edition, 1986
2. Sam Shanmugam, Analog and Digital Communication Systems, John Wiley,1992

Micro Processors and Micro Controllers
Second Year -IV– Semester (Code: 20EC405)

Lectures	1	Tutorial	0	Practical	2	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: Digital Electronics
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, 80386, 80486 and introduction to ARM processor.

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 2 nd 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 2 nd Edition, TMH.
2. The 8051 Microcontroller, 3rd Edition, Kenneth Ayala, Cengage Learning

Professional ethics and human values
II B.Tech – IV Semester (Code: 20EC406)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: None

Course Objectives:

1. To create awareness on professional ethics and Human Values.
2. To create awareness on Engineering Ethics providing basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues.
3. To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards
4. To inculcate knowledge and exposure on Safety and Risk, Risk Benefit
5. Analysis and have an idea about the Collective Bargaining, Confidentiality, Professional, Employee, Intellectual Property Rights
6. 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, NewYork 1996.

REFERENCE BOOK:

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

Electronic Circuits Lab

II B.Tech – IV Semester (Code: 20ECL41)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

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: (Simulation /Hardware)

1. Rectifiers (**Simulation/Hardware)** and Voltage Regulators. (**Hardware**),
2. Clippers and Clampers (**Simulation**/**Hardware**)
3. Drain and Transfer Characteristics of MOSFET **(Hardware)**
4. NMOS Inverter Circuit and A Two-Input NMOS NOR Logic Gate (**Hardware**)
5. Common-Source Amplifier Using MOSFET (**Simulation**/**Hardware**)
6. The Common-Drain (Source-Follower) Amplifier Using MOSFET (**Simulation**/**Hardware**)
7. Frequency response of CE amplifier (**Simulation/Hardware**)
8. Common-Source Amplifier in Cascade with Source Follower. (**Simulation/Hardware**)
9. Class A Power Amplifier (**Simulation**/**Hardware**)
10. Complementary Symmetry Push pull Power Amplifier **(Hardware)**
11. Op-Amp Series–Shunt Feedback Circuit

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:

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

Digital Logic Design LAB
II B. Tech – IV Semester (Sub. Code: 20ECL42)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: None

LIST OF LAB EXPERIMENTS

1. Realization of Gates using Discrete Components.
2. Realization of Gates using Universal Building Block (NAND only).
3. Design of Combinational Logic Circuits like Half – adder, Full – adder, Half–subtractor
   and Full-Sub tractor.
4. Verification of 4-bit Magnitude Comparator.
5. Design of Encoders like 4:2 and 8:3 encoder.
6. Design of Decoders like BCD to Decimal decoder.
7. Design of Code Converters (Binary to Gray).
8. Design of Multiplexers/De Multiplexers.
9. Verification of Truth Table of Flip-Flops using Gates.
10. Design of Shift register (To Verify Serial to parallel, parallel to Serial, Serial to Serial and parallel to parallel Converters) using Flip-Flops.
11. Design of Ring & Johnson Counters using Flip-Flops.
12. Conversion of Flip-Flops (JK-T, JK – D).
13. Design of Binary/Decade Counter.
14. Design of Asynchronous Counter, Mod Counter, Up Counter, Down Counter & Up/Down Counter.
15. Design of Synchronous Counter, Mod Counter, Up Counter, Down Counter & Up/Down Counter.

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

Micro Processors and Micro Controllers Programming Lab
Second Year IV – Semester (Code: 20ECL43)

Lectures	0	Tutorial	0		Practical	3	Credits	1.5	
Continuous Internal Assessment			:	30	Semester End Examination (3 Hours)			:	70

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.
8. Programs on 80386, 80486
9. ARM processor

Experiments Based on Interfacing & Microcontroller (8051)

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

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