ECE III Semester ECE B.Tech 2016-17

2016-17

The Papers for S.Y. B. Tech. III Semester classified are as under :-

Sr. No.	Subject Code	Subject Name	L:T:P	Hours / Week	Credits	Examination Schedule (Marks)						
						Sessional	Theory	Min Pass	Practical	Min Pass	Total	Min Pass
1	MAT-201L	Mathematics-III	L:T	4	3.5	30	70	28	-	-	100	40
2	ECE-201L	Analog Electronics-I	L:T	4	3.5	30	70	28	-	-	100	40
3	ECE-203L	Signals and systems	L:T	4	3.5	30	70	28	-	-	100	40
4	ECE-205L	Data Structures & Algorithems	L	3	3	30	70	28	-	-	100	40
5	ECE-207L	Network Analysis and Synthesis	L:T	4	3.5	30	70	28	-	-	100	40
6	ECE-209L	Digital Electronics	L:T	4	3.5	30	70	28	-	-	100	40
7	HUM-201L	Fundamentals of Management	L	3	3	30	70	28	-	-	100	40
8	ECE-201P	Analog Electronics-I Lab	P	2	1	30	-	-	70	28	100	40
9	ECE-207P	Network Analysis and Synthesis Lab	P	2	1	30	-	-	70	28	100	40
10	ECE-209P	Digital Electronics Lab	L	2	1	30	-	-	70	28	100	40
11	PSY-201L	Personality Development	L:T	3	0	30	70	28	-	-	100	40

Note: Please verify the Scheme & Syllabus before final the above list.

CSE III Semester

The Papers for S.Y. B. Tech. III Semester classified are as under :-

Sr. No.	Subject code	Subject Name	L:T:P	Hours / Week	Credits	Examination Schedule (Marks)						
						Sessional	Theory	Min Pass	Practical	Min Pass	Total	Min Pass
1	MAT-201L	Mathematics-III	L:T	4	3.5	30	70	28	-	-	100	40
2	CSE-201L	Data Structures & Algorithms	L:T	4	3.5	30	70	28	-	-	100	40
3	CSE-203L	Discrete Structutes	L:T	4	3.5	30	70	28	-	-	100	40
4	CSE-205L	Object Oriented Programming using C++	L:T	4	3.5	30	70	28	-	-	100	40
5	CSE-207L	Digital Electronics	L:T	4	3.5	30	70	28	-	-	100	40
6	EVS-201L	Environmental Studies	L	3	3	30	70	28	-	-	100	40
7	CSE-201P	Data Structures & Algorithms Lab	P	2	1	30	-	-	70	28	100	40
8	CSE-205P	OOPS using C++ Lab	P	2	1	30	-	-	70	28	100	40
9	CSE-207P	Digital Electronics Lab	P	2	1	30	-	-	70	28	100	40
10	CSE-209P	Skill and Innovation Lab	P	3	0	30	-	-	70	28	100	40

Note: Please verify the Scheme & Syllabus before final the above list.

Proposed Scheme
for

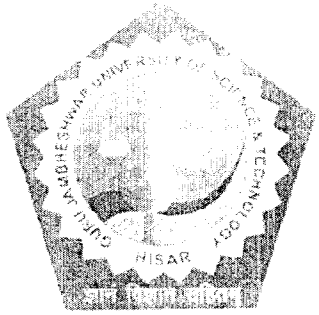
Bachelor of Technology

3rd to 4th Sem.

(Electronics & Communication Engg.)

w.e.f.

2016-17 batch



DM 19/7/17

Ramesh 19/07/17

Department of Electronics & Communication Engg.
Guru Jambheshwar University of Sc. & Tech.
HISAR

25/7/17
Dean (PGT)

B. Tech., ECE- Total Credits	
Semester	Credits
1	25
2	25
3	26.5
4	24.5
5	25.5
6	25.5
7	23
8	25
Total	200

Area	Abbreviation
Humanities & Social Science	HS
Basic Science	BS
Engineering Science	ES
Professional Core	PC
Professional Elective	PE
Open Elective	OE
Project Work, Seminar, Internship in Industry etc.	PW
Mandatory Course	MC

	I	II	III	IV	V	VI	VII	VIII	Total Credits
HS	7	3	3	0	0	0	0	0	13
BS	8.5	13	3.5	0	0	0	0	0	25
ES	9.5	9	7.5	7.5	0	0	0	0	33.5
PC	0	0	12.5	17	20.5	17	12.5	0	79.5
PE	0	0	0	0	0	3.5	3.5	16	23
OE	0	0	0	0	4	4	4	0	12
PW	0	0	0	0	1	1	3	9	14
MC	2 Units	2 Units	2 Units	2 Units	0	0	0	0	0
Total Credits	25	25	26.5	24.5	25.5	25.5	23	25	200

B.Tech. – ECE – Semester-3

Subject Area	Subject Code	Subject Name	Teaching Schedule L	T	P	Hours/ Week	Credits	Duration of Exam (Hrs.)
BS-6	MAT-201-L	Mathematics-III	3	1	0	4	3.5	3
PC-1	ECE-201-L	Analog Electronics-I	3	1	0	4	3.5	3
PC-2	ECE-203-L	Signals and Systems	3	1	0	4	3.5	3
ES-5	ECE-205-L	Data Structures & Algorithms	3	0	0	3	3	3
ES-7	ECE-207-L	Network Analysis and Synthesis	3	1	0	4	3.5	3
PC-3	ECE-209-L	Digital Electronics	3	1	0	4	3.5	3
HS-4	HUM-201-L	Fundamentals of Management	3	0	0	3	3	3
PC-4	ECE-201-P	Analog Electronics-I Lab	0	0	2	2	1	3
ES-7	ECE-207-P	Network Analysis and Synthesis Lab	0	0	2	2	1	3
PC-5	ECE-209-P	Digital Electronics Lab	0	0	2	2	1	3
MC-3*	PSY-201-L	Personality Development	2	1	0	3	2 Units	3
Total			23	6	6	35	26.5	

*MC-Mandatory Course which will be a non-credit subject and the student has to get pass marks in order to qualify for the award of degree.

Note: Students will be allowed to use the scientific calculator only, however sharing of calculator will not be permitted.

B.Tech. ECE, Semester-4

Subject Area	Subject Code	Subject Name	Teaching Schedule			Hours/ Week	Credits	Duration of Exam (Hrs)
			L	T	P			
PC-3	ECE-204-F	Electronic Measurements & Instrumentation	3	1	0	4	3.5	3
PC-5	ECE-206-F	Analog Communication	3	1	0	4	3.5	3
PC-6	ECE-208-F	Analog Electronics-II	3	1	0	4	3.5	3
PC-7	ECE-210-F	Electromagnetic Theory	3	1	0	4	3.5	3
ES-8	ECE-212-F	Control System Engg.	3	1	0	4	3.5	3
ES-9	EVS-200-F	Environmental Studies	3	0	0	3	3	3
PC-4	ECE-202-F	Electronic Measurements & Instrumentation Lab	0	0	2	2	1	3
PC-5	ECE-216-F	Analog Communication Lab	0	0	2	2	1	3
PC-6	ECE-218-F	Analog Electronics-II Lab	0	0	2	2	1	3
ES-8	ECE-220-F	Control System Engg. Lab	0	0	2	2	1	3
MC-4*	ECE-214-F	Skills & Innovation Lab	0	0	3	3	2 Units	3
		Total	18	5	11	34	24.5	

Note: The students will have to undergo Practical Training -I of 6 weeks duration during summer vacations which will be evaluated in 5th sem.

*MC-Mandatory Course which will be a non-credit subject and the student has to get pass marks in order to qualify for the award of degree.

*A group of students are required to carry out a study related to current research & development in the field of Electronics and Communication Engineering. Each group of students will try to propose a novel idea/modified technique/new interpretation after identifying an existing research work. They will work towards finding solutions to the identified problem such as cost reduction, enabling new processes and/or materials creating a higher impact than the existing practices etc. using their innovative ideas and concept generation abilities. The topic of the study will be decided by the students in consultation with the course coordinator. The project report will be submitted by a group at the end of semester. The students may use the equipment's/ machines/ instruments available in the labs/workshops with the due permission of Chairperson on recommendation of the course coordinator.

B.Tech. , ECE, Semester 5

Subject Area	Subject Code	Subject Name	Teaching Schedule L	T	P	Hours/ Week	Credits	Duration of Exam (h)
PC-8	ECE-301-T	Digital Communication	3	1	0	4	3.5	3
PC-9	ECE-303-T	VLSI Design	3	1	0	4	3.5	3
PC-10	ECE-305-T	Microwave and Radar Engg.	3	1	0	4	3.5	3
PC-11	ECE-307-T	Microprocessors and Interfacing	3	1	0	4	3.5	3
PC-12	ECE-309-T	Antenna & Wave Propagation	3	1	0	4	3.5	3
OE-1	OE-1	OE-1	3	1	0	4	4	3
PC-8	ECE-301-P	Digital Communication Lab	0	0	2	2	1	3
PC-10	ECE-305-P	Microwave and Radar Engg. Lab	0	0	2	2	1	3
PC-11	ECE-307-P	Microprocessors and Interfacing Lab	0	0	2	2	1	3
PW-1*	ECE-311-P	Practical Traning-I Presentation	0	0	1	1	1	3
Total			18	6	7	31	25.5	

*Assement of Practical Training-I will be based on presentation/seminar, viva-voce, report and certificate for the practical training taken at the end of 4th sem.

Note: Students will be allowed to use the scientific calculator only. However sharing of calculator will not be permitted

B.Tech. ECE Semester

Subject Area	Subject Code	Subject Name	L	T	P	Hours/ Week	Credits	Duration of Exam (Hrs.)
PC-13	ECE-302-T	Computer Networks and Data Communication	3	1	0	4	3.5	3
PC-14	ECE-304-T	Linear Integrated Circuits & Applications	3	1	0	4	3.5	3
PC-15	ECE-306-T	Microcontroller and Embedded System Design	3	1	0	4	3.5	3
PC-16	ECE-308-T	Digital System Design	3	1	0	4	3.5	3
PE-1	PE-1	PE-1	3	1	0	4	3.5	3
OE-2	OE-2	OE-2	3	1	0	4	4	3
PC-14	ECE-304-P	Electronics Circuits Simulation Lab	0	0	2	2	1	3
PC-15	ECE-306-P	Microcontroller and Embedded System Design Lab	0	0	2	2	1	3
PC-16	ECE-308-P	Digital System Design Lab	0	0	2	2	1	3
PW-2*	ECE-310-P	Seminar	0	0	1	1	1	3
		Total	18	6	7	31	25.5	

*Assement of Seminar will be based on presentation, viva-voce and report.

Note: The students will have to undergo Practical Training -II of 6 weeks duration during summer vacations which will be evaluated in 7th sem.

Note: Students will be allowed to use the scientific calculator only, however sharing of calculator will not be permitted

B.Tech. [illegible]

Subject Area	Subject Code	Subject Name	Teaching Schedule L	T	P	Hours/ Week	Credits	Duration of Exam (Hrs.)
PC-7	ECE-401-L	Digital Signal Processing	3	1	0	4	3.5	3
PC-8	ECE-403-L	Opto Electronics and Optical Comm.	3	1	0	4	3.5	3
PC-9	ECE-407-L	Wireless & Mobile Communication	3	1	0	4	3.5	3
OE-3	OE-3	OE-3	3	1	0	4	4	3
PE-2	PE-2	PE-2	3	1	0	4	3.5	3
PC-10	ECE-401-P	Digital Signal Processing Lab	0	0	2	2	1	3
PW-3*	ECE-409-P	Minor Project	0	0	6	6	2	3
PW-4**	ECE-413-P	Practical Training-II Presentation	0	0	2	2	1	3
US-10***	ECE-415-P	General Proficiency	0	0	0	0	1	3
Total			18	5	10	30	23	

Open Electives 1, 2 & 3 are to be offered by other Departments.

* The project should be initiated by the student in the beginning of 7th sem and will be evaluated at the end of the semester on the basis of a presentation delivered, viva-voce and report

**Assesment of Practical Training-II will be based on presentation/seminar delivered, viva-voce, report and certificate for the practical training taken at the end of 6th sem.

*** A viva of the students will be taken by external examiner (Principal/Director/Professor/or any senior Person with Experience more than 10 years) at the end of the semester.

Note: Project load will be treated as 2 hours for project co-ordinator and 1 hour for each participating teacher.

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B.Tech. ECE Semester-8

Subject Area	Subject Code	Subject Name	Teaching Schedule L	T	P	Hours/ Week	Credits	Duration of Exam (Hrs)
PE-3	PE	PE-3	3	1	0	4	4	3
PE-4	PE-4	PE-4	3	1	0	4	4	3
PE-5	PE-5	PE-5	3	1	0	4	4	3
PE-6	PE-6	PE-6	3	1	0	4	4	3
PW-5*	ECE-452-P	Major Project	2		16	18	9	3
Total			12	4	18	34	25	

* The project should be initiated by the student in continuation of the 7th sem and will be evaluated at the end of the 8th semester on the basis of its implementation/software/hardware/ presentation/ deliverable/ viva-voce and report.

OR

Subject Area	Subject Code	Subject Name	Teaching Schedule L	T	P	Hours/ Week	Credits	Duration of Exam (Hrs)
PW-6**	ECE-452-P	Full Semester Industrial Training	—	—	—	—	25	—

**The student will be required to submit to the department, the offer letter for the full semester industrial training, at-least 15 days before the commencement of 8th semester. The options shall be according to the following conditions:

A student may opt for one semester industrial training in lieu of attending the courses of 8th semester. The credit/marks for industrial training will be equals to the total credits/marks of courses offered in 8th semester study. A student will be allowed to join the industrial training under following conditions:

a. If the student gets selected for the job through campus placements and the employer is willing to take the student for the training for a period of full semester.

b. If the student gets offer of pursuing training from reputed Research organization/Govt. sponsored project/Govt. research institution/ Multinational corporations (MNCs)/ Public sectors. For pursuing this training, the student shall require prior approval from Dean of Faculty of Engineering & Technology through the Chairperson of the respective department. To ensure the fruitfulness of this training, a list of companies, beside the Govt. organizations/ Public sectors, will be provided. The student will be allowed to go for training only to the companies/organizations mentioned in the list. The list can be modified (addition/deletion) from time to time subject to approval from Dean of Faculty of Engineering and Technology.

List of Programme Electives

Programme Elective-1

S.No	Course-Code	Subject
1	ECE-312-L	VLSI Technology & Applications
2	ECE-314-L	Consumer & Industrial Electronics
3	ECE-316-L	Information Theory & Coding
4	ECE-318-L	Bio-Medical Engg. & Instrumentation
5	ECE-320-L	Data Acquisition System

Programme Elective-2

S.No	Course-Code	Subject
1	ECE-417-L	Power Electronics
2	ECE-419-L	DBMS
3	ECE-421-L	Probability Theory & Stochastic Design
4	ECE-423-L	Telecommunication Switching Systems
5	ECE-425-L	Computer Architecture & Organisation

Programme Elective-3

S.No.	Course-Code	Subject
1	[illegible]-502-L	Introduction to Nano-Technology
2	ECL-404-L	Digital Control System
3	ECL-406-L	Audio & Speech Processing
4	ECL-408-L	Advanced Microprocessors
5	[illegible]-410-L	TV & Radio Engg.
6	[illegible]-412-L	Internet on Things

Programme Elective-4

S.No.	Course-Code	Subject
1	ECE-414-L	Digital Image Processing
2	ECL-416-L	FPGA Design
3	ECE-418-L	Non-Linear Fibre Optics
4	ECE-420-L	Intelligent Instrumentation
5	ECE-422-L	Electromechanical Energy Conversion
6	ECE-424-L	Operating Systems

Programme Elective-5

S No.	Course-Code	Subject
1	ECE-426-L	Industrial Process Control & Instrumentation
2	ECE-428-L	Nano-Electronics
3	ECE-430-L	Satellite Communication
4	ECE-432-L	Computational Techniques
5	ECE-434-L	Photonics
		Any one MOOC Subject not studied earlier

Programme Elective-6

S No.	Course-Code	Subject
1	ECE-436-L	MEMS & Nano-Technology
2	ECE-438-L	Artificial Intelligence
3	ECE-440-L	Advanced DSP
4	ECE-442-L	Verilog HDL
5	ECE-444-L	Fuzzy Logic & ANN
6	ECE-446-L	Personal Communication Systems
		Any one MOOC Subject not studied earlier

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MATHEMATICS-III

Course Code: MAT-201-L
Course Credits: 3.5
Mode: Lecture(L) and Tutorial(T)
Type: Compulsory
Contact Hours: 3 hours (L) + 01 hour (T) [illegible]
[illegible]
[illegible] Duration: 03 hours.

Course Assessment Methods (Internal: 30; External: 70) Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments, quiz etc. (6 marks) and end semester examination of 70 marks.

For the end semester examination, nine question are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type question. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Prerequisite: Basic knowledge of calculus, complex analysis and statistics.

Course outcomes:
CO 1 Problems of Fourier series and Fourier transforms used in engineering applications
CO 2 Calculation of improper/ singular integrals with the help of complex analysis
CO 3 Statistical tests for system goodness.
CO 4 Problems of LPP and their interpretation.

Unit-I

Fourier Series and Fourier Transforms: Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series. Fourier integrals. Fourier transforms, Shifting theorem (both on time and frequency axes). Fourier transforms of derivatives. Fourier transforms of integrals. Convolution theorem. Fourier transform of Dirac delta function.

Unit-II

[illegible] Definition, Exponential function, Trigonometric and Hyperbolic functions, [illegible] limit and Continuity of a function. Differentiability and Analyticity.Cauchy-Riemann [illegible] and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations, harmonic functions. Integration of complex functions, Cauchy Theorem, Cauchy- Integral formula.

Unit-III

Power series, radius and circle of convergence. Taylor's Maclaurin's and Laurent's series.Zeroes and singularities of complex functions, Residues.Evaluation of real integrals using residues (around unit and semi circle only)

Unit-IV

Probability Distributions and Hypothesis Testing: Expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions. Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (applications only), Chi-square test of goodness of fit. **Linear Programming:** Linear programming problems formulation. Solving linear programming problems using (i) Simplex method.

Text books:

1. Advanced Engg. Mathematics : F Kreyszig.
2. Higher Engg. Mathematics : B.S. Grewal

Reference books:

1. [illegible] Engg. Mathematics : R.K. Jain, S.R.K. Iyenger.
2. [illegible] Engg. Mathematics : Michael D. Greenberg.
3. Operation Research : H.A. Taha.
4. Probability and statistics for Engineers : Johnson. PHI.

ANALOG ELECTRONICS - I

General Course Information:

Course Code: ECE-201-I Course Credits: 3.5 Contact Hours: 4/week. (L-T-P: 3-1-0) Mode: Lectures and Tutorials Examination Duration: 3 hours	**Course Assessment Methods (internal: 30; external: 70)** Two minor tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks), Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: Basics of Electronics Engineering

Course Objectives:

1. To familiarize with the semiconductor properties, P-N diodes and its applications.
2. To implement circuit design using transistors.
3. To explain the high frequency analysis of the transistors.
4. To analyze AC as well as DC parameters of the circuits.

Course Outcomes:

1. Understand the significance of the diode in electronics system design.
2. Understand the analysis of transistor at low and high frequencies.
3. To have a better understanding of major topics/projects for the forthcoming semesters.
4. To understand the design & implementation of minor/major projects using power supply.

Course Contents

UNIT 1

Conduction in Semiconductor: Conductivity of a semiconductor, Carrier concentration in an intrinsic semiconductor, Fermi level in intrinsic and extrinsic semiconductor, Carrier lifetime, Continuity equation, Hall Effect.

Semiconductor diode characteristics: Qualitative theory of PN junctions, PN junction as diode, band structure of an open circuited p-n junction, current components in a PN diode, PN diode switching times, tunnel diode, rectifier with filter circuits.

UNIT 2

BJT : Review of BJT : construction – operation - characteristics, Eber's moll model, BJT as an amplifier and switch, limits of operation, thermal runaway, stability factor, bias stability of self bias, emitter bias, collector to base bias , bias compensation: thermistor and sensistor.

Low frequency analysis: AC and DC load line for a CE amplifier, Transistor hybrid model, h-parameter (CE, CB, CC), analysis of transistor amplifier circuit using h-parameter, simplified CE hybrid model, frequency response of RC coupled amplifier.

UNIT 3

MOSFET: Review of device structure- operation and V-I characteristics of JFETs and MOSFET (depletion and enhancement). MOSFET as a switch and amplifier. FET small signal model. V-MOSFET. Common source amplifier, source follower, biasing the FET, FET as a voltage variable resistor.

UNIT 4

Transistor at High Frequencies: Miller's theorem, Hybrid Pi model, CE emitter short circuit current gain, frequency response, beta cut-off frequency, gain bandwidth product.

Regulated power supplies: Series and shunt voltage regulators, three terminal fixed IC voltage regulators, 78xx, 79xx, variable voltage regulator (LM317), SMPS.

1. Books & Reference Books:
2. Integrated Electronics: Jacob Millman, Halkias and Jit ; McGrawHill
3. Electronic Devices & Circuits: Boylestad & Nashelsky ; Pearson
4. Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH
5. Electronics Principles: Malvino ; McGrawHill
6. Electronics Circuits: Donald L. Schilling & Charles Belove ; McGrawHill
7. Electronic devices and circuits (3e): S.salivahanan, N suresh Kumar

SIGNALS AND SYSTEMS

General Course Information:

Course Code: ECE-203-I

Course Credits: 3-1

Contact Hours: 4/week, (L-I-P: 3-1-0)

Mode: Lectures and Tutorials

Examination Duration: 3 hours

Course Assessment Methods (internal: 30; external: 70) Two minor tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks.

For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: Basics of Electronics Engineering

Course Objectives:

1. To understand basic signals used to represent any complex signal and Systems.
2. To understand continuous-time and discrete-time linear systems.
3. Students can apply Fourier analysis to important problems in communication and signal processing applications.
4. To understand the conversion of analog signal into digital signal using Sampling theoren.

Course Outcomes:

1. The Student will be able to understand the classification of signals and systems.
2. [illegible] the concepts of Fourier series, Fourier Transform.
3. [illegible] and analyzed with the behavior of Linear Time Invariant System.
4. [illegible] concepts with sampling and Reconstruction of Analog Signals, Digital
5. [illegible] Laplace and Z-transforms.

Course Contents

UNIT I

Introduction to Signal

Signal Definition, Classification of Signals, Basic/Singularity Continuous and Discrete-Time Signals, Basic operations: Time Shifting, Time Reversal, Time Scaling on signals, Signal Representation in terms of singular functions, Correlation of Signals and its Properties, Representation of a Continuous-Time Signal by its Samples: The Sampling Theorem, Reconstruction, Aliasing.

UNIT II

System & its Properties

System, classification of Systems, Linear & Nonlinear Systems: Static & Dynamic Systems, Causal & Non-causal System, Invertible & Noninvertible, Stable & Unstable System, Time Variant & Time Invariant Systems with examples. Linear Time-Invariant Systems: Definition and Properties, Impulse Response, Convolution Sum/Integral and its Properties. Representation of LTI systems using Differential and Difference equations.

UNIT III

Fourier Series & Fourier Transform

Introduction to Frequency domain Representation, Fourier Series Representation of Periodic Signals, Convergence of Fourier Series, Properties of Fourier Series, Fourier Transform for Periodic and Aperiodic signals, Convergence of Fourier Transform, Properties of Fourier Transform, Applications of Fourier Transform.

Discrete-Time Fourier Transform:

Fourier Transform representation for Discrete Time Aperiodic & Periodic Signals, Properties of Discrete – Time Fourier Transform, Basic Fourier Transform Pairs.

UNIT IV

Z-Transform

Introduction to Z-Transform, Region of Convergence (ROC) for Z-Transform, Z-Transform Properties, Inverse Z-Transform, Analysis of LTI Systems Using Z-Transform, Application of z-transform, Introduction to Hilbert Transform.

Text Books:

1. A. V. Oppenheim, A. S. Willsky, with S. Nawab "Signals & Systems", Prentice –Hall India.
2. Hari M. K. Rawat, "Signal & Systems", Oxford University Press.
3. Mahmood Hussain, "Signals & Systems", Umesh Publications.

Reference Books:

1. S. Salivahanan, A. Vallavaraj, C. Gnanapriya, "Digital Signal Processing", Tata McGraw Hill.
2. J. G. Proakis, D. G. Manolakis, "Digital Signal Processing, Principles, Algorithms, & Applications", Prentice –Hall India
3. B. Kumar, "Signals and Systems", New Age International Publishers.

DATA STRUCTURES & ALGORITHMS

General Course Information:

Course Code: ECE-205-L

Course Credits: 3

Contact Hours: 4/week, (L-T-P: 3-0-0)

Mode: Lectures and Tutorials

Examination Duration: 3 hours

Course Assessment Methods (internal: 30; external: 70) Two minor tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks), Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks.

For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: C Language

Course Objectives:

1. To understand major algorithms and data structures.
2. To analyze the performance of algorithms.
3. To be familiar with writing recursive methods.
4. To determine which algorithm or data structure to use in different scenarios

Course Outcomes:

1. Demonstrate the abstract properties of various data structures like stacks, queues, lists, trees and graphs and their use effectively in application programs.
2. Able to understand the various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.
3. Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths
4. Understand the Trace and code recursive functions.

Course Contents

UNIT-I

Basic Terminology: Elementary Data Organization, Data Structure Operations.
Arrays: Array Definition and Analysis, Representation of Linear Arrays in Memory, Traversing Linear Arrays, Insertion and Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays, Sparse Matrix.
Stacks and Queues: Operations on Stacks- Push, Pop, Peep, Representation of stacks. Application of stacks - polish expression and their compilation conversion of infix expression to prefix and postfix expression, Tower of Hanoi problem, Representation of Queues, Operations on queues: Create, Add, Delete, Priority Queues, Dequeues, Circular Queue.

UNIT - II

Linked Lists: Singly linked lists: Representation of linked lists in memory, Traversing, Searching, Insertion into, Deletion from linked list, Header Linked List, Doubly linked list. **Trees:** Definition of trees and Binary trees, Properties of Binary trees and Implementation, Binary Traversal pre-order, post order, In- order traversal, Binary Search Trees, implementations, Threaded trees, Balanced multi way search trees, AVL Trees, Implementations

UNIT - III

Graphs: Definition of Undirected and Directed Graphs and Networks, The Array based representations of graphs, Adjacency matrix, path matrix, implementation, The Linked List representation of graphs, Shortest path Algorithm, Graph Traversal – Breadth first Traversal, Depth first Traversal, Tables: Definition, Hash function, Implementations and Applications

UNIT - IV

Sorting Algorithms: Introduction, Sorting by exchange, selection, insertions: Bubble sort, Straight selection sort, Efficiency of above algorithms., Shell sort, Performance of shell sort, Merge sort, Merging of sorted arrays& Algorithms; Quick sort Algorithm analysis.
Heap sort: Heap Construction, Heap sort, bottom – up, Top – down Heap sort approach:
Searching Algorithms: Straight Sequential Search, Binary Search (recursive & non-recursive Algorithms)

Text Book:
Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augenstein, PHI Pub.

Reference Books:

1. R. B. Patel: Expert Data Structures With C, Khanna Publications, Delhi, India, 3rd Edition, 2008.
2. Data Structures and Algorithms by A. Aho, J.E. Hopcroft and J.D. Ullman, Original Edition, Addison Wesley Publication, Indian Reprint Edition.2
3. Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub. 1983, AW
4. Fundamentals of Computer algorithms by Horowitz Sahni and Rajasekaran
5. R.L. Kruse, B.P. Leary, C.L. Tondo, Data structure and program design in C, PHI
6. Data Structures and Program Design in C By Robert Kruse, PHI.
7. Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline by TMH
8. Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H
9. Data Structure and the Standard Template library – William J. Collins, 2003, T.M.H

NETWORK ANALYSIS AND SYNTHESIS

General Course Information:

Course Code: ECE-207-1

Credits: 3.0

Hours/week: (L-T-P: 3-1-0)

Lectures and Tutorials

Examination Duration: 3 hours

Course Assessment Methods (internal: 30; external: 70) Two minor tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks), Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks.

For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: Mathematics, Physics, Electrical Technology

Course Objectives:

1. To make the students capable of analyzing any given electrical network.
2. To familiarize students with different types of two port parameters.
3. To make the students learn how to synthesize an electrical network from a given impedance/admittance function.
4. To familiarize students with graph theory of network solving.

Course Outcomes:

1. Students will be able to analyze the various electrical and electronic networks using the techniques they learned during the course.
2. Students will be able to infer and evaluate transient response, Steady state response, network functions and two-port network parameters.
3. Students will be able to synthesize electrical networks from its immittance function.
4. Students will be able to solve networks using graph theory.

Course Contents

UNIT I

LAPLACE TRANSFORM: Introduction to Laplace transform & its properties. Laplace transform of special signal waveforms, Inverse Laplace transform, Use of Laplace Transform in solving electrical networks.

TRANSIENT RESPONSE: Initial Conditions of resistive, inductive & capacitive Elements, Time domain analysis of simple linear circuits. Transient & Steady state Response of RC, RL, RLC circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

UNIT 2

NETWORK FUNCTIONS: Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behaviour from the pole-zero plot.

PARAMETERS OF TWO PORT NETWORKS: Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance parameters, Transmission parameters, Hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

UNIT 3

NETWORK GRAPH THEORY: concept of network graph , terminology used in network graph, relation between Twigs and Links, properties of tree in a graph, formation of incidence Matrix[A], number of trees in a graph, Graph matrices: cut-set matrix, tie set matrix, formulation of network equilibrium equations network analysis using graph theory.

UNIT4

NETWORK SYNTHESIS: Concept & significance of Positive real functions, concept of network synthesis, driving point immittance function structure of LC network, LC network synthesis using foster and cauer form, driving point immittance function structure of RC & RL network, RC & RL network synthesis by Foster and Cauer form.

FILTERS: Introduction to filters, Characteristics of filters, Filter Classification, Passive Filters: Analysis & Design of prototype HPF, LPF, BPF, & BSF, introduction to m-derived filters, Active Filters: Introduction of active filters.

REFERENCE BOOKS

1. Network Analysis & Synthesis:F.F.Kuo; John Wiley & Sons Inc.
2. Network Analysis & synthesis: S.P Ghosh, McGraw Hill
3. Circuit Theory: A chakraburty; Dhanpat Rai Publication
4. Engineering Network Analysis & Filter Design: G.G Bhise, P.R Chadha, D.C Kulshreshtha,Umesh Publication
5. Network Analysis: Van Valkenburg; PHI

DIGITAL ELECTRONICS

General Course Information:

Course Code: ECE-209-L Course Credits: 3.5 Contact Hours: 4/week. (L-T-P: 3-1-0) Mode: Lectures and Tutorials Examination Duration: 3 Hours	**Course Assessment Methods (internal: 30; external: 70):** Two minor tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks. For the end semester examination, nine questions are to be set in the examination question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: Basics of Electronics

Course Objectives:

1. To learn basic concepts of digital electronics which are used to build all electronics devices like phones, controllers and computers etc.
2. The subject uses a bottom-up approach to teach a beginner about digital electronics and to design very simple to complex digital circuits.
3. To introduce with state machines
4. To give the basic knowledge for digital automation systems

Course Outcomes:

1. Analyze and design basic combinational SOP and POS logic systems and apply various simplification techniques to combinational logic.
2. Distinguish between the various programmable logic devices and draw logic using the short hand logic symbols used in PLDs.
3. Develop state tables and state diagrams with SR, D, JK and T flip flops. Analyze and design basic sequential logic systems including counters.
4. Design finite state machines in an efficient manner.

Course Contents

Unit I

Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR. Boolean algebra. Review of Number systems

Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCII. Binary arithmetics. Error detection and correction codes.

Karnaugh map and Quine Mcluskey methods of simplification.

Digital Logic Families: Switching mode operation of p-n junction, bipolar and MOS devices, Bipolar logic families: RTL, DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic.

Unit II

Combinational Circuit Design: Circuit design using gates, adder, subtractor, comparator, [illegible] code converters etc.

Design Using MSI Devices: Multiplexers and Demultiplexers and their use as logic circuits, Decoders, Encoders, Adders, Subtractors, BCD arithmetic circuits.

Unit III

Flip Flops: S-R, J-K, T, D, master-slave, edge triggered, flip flop conversions.
Shift registers, bidirectional shift register, sequence generators, Ring counters and Johnson Counter, Design of Asynchronous and Synchronous Counters.
Finite State Machines: Timing diagrams (synchronous FSMs), Moore versus Mealy, FSM design procedure- State diagram, State-transition table, State minimization, State encoding, Next-state logic minimization, Implement the design.

Unit IV

A/D and D/A Convertors: Weighted resistor and R -2 R ladder D/A Converters, specifications for D/A converters.
A/D converters: Quantization, parallel -comparator, successive approximation, counting type, dual slope ADC, specifications of ADCs.
PLDs: ROM, PLA, PAL, FPGA and CPLDs, Implementation of combinational circuits using ROM, PLA and PAL.

TEXT BOOK :

1. Modern Digital Electronics(Edition III) : R. P. Jain; TMH

REFERENCE BOOKS :

1. Digital Integrated Electronics : Taub & Schilling; MGH
2. Digital Principles and Applications : Malvino & Leach; McGraw Hill.
3. Digital Design : Morris Mano; PHI.

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ANALOG ELECTRONICS - I LAB

General Course Information:

Course Code: ECE-201-P, Course Credits: 1, Contact Hours: 2/week per group(L-T-P: 0-0-2) Mode: Lab Work	**Course Assessment** **(Internal: 30; External: 70)**

Course Objectives:

1. To understand the use of diode for designing various circuits.
2. To make familiar with the various characteristics of transistor and its applications.
3. To familiarize the students with the use of regulator ICs.
4. To familiarize the students with minor/major project design.

Course Outcomes:

1. To apply the knowledge of diode and its applications.
2. Student is expected to be comfortable with the design of different electronics circuits.
3. To have understanding of circuit design using FET/MOSFET.
4. To understand the voltage power supply design & testing.

LIST OF EXPERIMENTS

1. To study V-I characteristics of diode.
2. To study the characteristics of half wave & full wave rectifiers with filter circuit.
3. To design and observe the output waveform of the clipper circuits.
4. To design and observe the output waveform of the clamper circuits.
5. To study of Zener diode as a voltage regulator.
6. To study the characteristics of CB and CE configurations of transistor.
7. To study of CC amplifier as a buffer.
8. To calculate the frequency response of RC coupled amplifier.
9. To study of Electronic IC regulators.
10. Study of transistor as a constant current source in CE configuration.
11. To design the dc voltage doubler.
12. To study the I-V characteristics of FET in CS/CD configurations.

NOTE: At least eight experiments are to be performed in the semester, out of which at least six experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

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FUNDAMENTALS OF MANAGEMENT

Course Code: BUM-[illegible]
[illegible]
[illegible]
[illegible]
Examination Duration: 03 hours

Course Assessment Methods (Internal: 30; External: 70) Two minor tests each of 20 marks, class performance measured on such percentage of lecture attended (4 marks), assignments, quiz etc. (6 marks) and end semester examination of 70 marks.

For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus; it will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Prerequisite: The students should have basic understanding of the concept of management and business organizations.

Objectives:

- To enhance knowledge skills and attitude to Management.
- To understand management and its relationship with organisation.

Course Outcomes:

[illegible] develop the basic understanding of the concept of management and functions of management.
[illegible] students will come to know about Human Resource management and Marketing management functions of [illegible]
[illegible] students will come to know about the production activities of any manufacturing organisations.
[illegible] know that how finances are arranged and disbursed for all the activities of business organisations.

Unit-I

[illegible] Management: Definitions, Characteristics, Significance, Practical Implications, Management Vs. Administration; Management- Art, Science and Profession; Development of Management Thoughts; Managerial Functions.

Unit-II

Concept of Human Resource Management: Human resource planning; Recruitment, Selection, Training and Development, Compensation. Concept of Marketing Management: Objectives and functions of Marketing, Marketing Research, Advertising, ConsumerBehaviour.

Unit-III

[illegible] Production Management, Production Planning and Control, Material management, Inventory [illegible] Factory location and Production Layout.

Unit-IV

[illegible] Financial Management: Capital Structure and various Sources of Finance, Working Capital, Short [illegible] Long Term Finances, Capital Budgeting.

TEXT BOOK:

Principles and Practices of Management: R. S. Gupta, B. D. Sharma, N. S. Bhatla: Kalyani Publishers.
Organisation and Management: R. D. Aggarwal, Tata McGraw Hill.

REFERENCE BOOKS:

1. Marketing Management: S. A. Sherlekar: Himalaya Publishing House
2. Financial Management: I.M. Pandey, Vikas Publishing House.
3. Production Management: B. S. Goel: Pitambar Publishing House

NETWORK ANALYSIS AND SYNTHESIS LAB

General Course Information:

Course Code: ECE-207-P, Course Credits: 1, Contact Hours: 2 week per group(L-T-P: 0-0-2) Mode: Lab Work	**Course Assessment** **(Internal: 30; External: 70)**

Course Objectives:

1. To familiarize with the response of RL, & RC circuits.
2. To verify the theoretical parameters calculation with measurement on hardware.
3. To familiarize with the response of active filters.
4. To verify the theoretical concepts of resonance of RLC circuit on hardware.

Course Outcomes:

1. Students shall be able to relate theoretical concepts with practical experiments.
2. Students shall be able to verify theoretical concepts related to transient response, active filters & two port network parameters on hardware.
3. To verify theoretical concepts related to two-port network parameters on hardware.
4. Able to analyze behaviour of active filters.

LIST OF EXPERIMENTS

1. Transient response of RC circuit.
2. Transient response of RL circuit.
3. To find the resonance frequency, Band width of RLC series circuit.
4. To calculate and verify "Z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To calculate and verify "ABCD" parameters of a two port network.
7. To calculate and verify "H" parameters of a two port network.
8. To determine equivalent parameter of parallel connections of two port network.
9. To plot the frequency response of low pass filter (LPF) and determine half-power frequency.
10. To plot the frequency response of high pass filter (HPF) and determine the half-power frequency.
11. To plot the frequency response of band-pass filters (BPF) and determine the band-width.
12. To synthesize a network of a given network function and verify its response.

NOTE: At least eight experiments are to be performed in the semester, out of which at least six experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

DIGITAL ELECTRONICS LAB

General Course Information:

Course Code: EC-209-P, Course Credits: 1
Contact Hours: 2/week per group(L-T-P: 0-0-2)
Mode: Lab Work

Course Assessment
(Internal: 30; External: 70)

Pre-requisites: Basic Electronics

Course Objective:

1. To understand the digital logic
2. To create various systems by using these logics
3. To find faults in digital circuits
4. To make the base for digital automation

Course Outcomes:

1. Understanding of digital circuits
2. Ability of implementation of digital circuits on bread board.
3. Ability to detect & and debug the connection related problems.
4. Ability to design and realize the digital circuits

LIST OF EXPERIMENTS

1. Study of TTL gates - AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR. Realization of basic gates using Universal logic gates.
2. Design & realize a given function using K-maps and verify its performance.
3. Design and realize adder and subtractor circuits.
4. Design and realize comparator and parity generator circuits.
5. Design and realize 3 bit binary to gray code converter.
6. Implementation of multiplexer/encoder using logic gates.
7. Implementation and verification of Decoder/De-multiplexer
8. To verify the truth tables of S-R, J-K, T & D type flip flops.
9. Design a 4-bit shift-register and verify its operation.
10. Design, and verify the 4-bit synchronous counter.
11. Design, and verify the 4-bit asynchronous counter
12. Design, and verify the 4 bit ring counter and twisted ring counter
13. To design and verify the operation of synchronous decade counter using J-K flip-flops.
14. To design and verify the operation of asynchronous decade counter using T flip-flops.
15. Mini Project: Implementation of any digital circuit on multipurpose board.

NOTE: At least eight experiments are to be performed in the semester, out of which atleast six experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

PERSONALITY DEVELOPMENT

Course Code: PSY-201-L
Course Credit: 0.0
Contact Hours: 03hrs/week
Mode: Lectures (L-2;T-01)
Examination Duration: 3 Hours

Course Assessment Methods (Internal: 30; External: 70) Two minor test each of 20marks, class performance measured through percentage of lecture attended (3 marks), assignments, quiz etc. (6 marks) and end semester examination of 70 marks.

For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus; it will contain seven short answer type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Objectives:

1. Holistic development of the students.
2. Make the students to understand self and personality through the interactive task based sessions.
3. To develop the life skills required to lead an effective personal and professional life.

Expected outcomes:

CO-1 Understand the concept of self and personality.
CO-2 Developthe life skills required to lead an effective personal and professional life.

Unit-I

Understanding the concept of self, Self-Esteem, Characteristics of individuals with high and low self-esteem, Self-Confidence, Strategies of building self-confidence. Case Study.

Unit-II

Understanding Personality, Factors affecting Personality: Biological, Psychological
Psychodynamic Theories of Personality: Freud, Allport
Trait Theories: Assessment- Neo-3 Five Personality Test, T.A.T

Unit-III

Stress: Causes of Stress and its impact, Strategies of stress management.

Unit-IV

Emotional Intelligence: Concept, emotional quotient why Emotional Intelligence matters, Measuring EQ, Ways to healthy emotions.
Management of anger and interpersonal relations. Case study.

TEXT BOOK:

1. Burger, J. M. (1990). Personality. Wardsworth: California.
2. Hall C.S., Lindzey, G.(1978), Theories of Personality, New York: Wiley Eastern Limited.
3. Morgan, C.T King R.A, Weisz, J.R., and Schopler, J. (1987). Introduction to Psychology, Singapore: Tata McGraw Hill.
4. Munn, N.L. and Kadel, A. (1967). Introduction to Personality: Prentice Hall.
5. Baron, R.A. & Byrne, D. (2003). Social Psychology (9th Ed). New Delhi: Tata McGraw-Hill Publishing Company

ELECTRONIC MEASUREMENTS & INSTRUMENTATION

General Course Information:

Course Code: ECE-202 [illegible] Course Credits: 3 [illegible] Contact Hours / week: (L-T-P: 3-1-0) Mode: Lectures and Tutorials Examination Duration: 3 hours	Course Assessment Methods (internal: 30; external: 70) Two minor tests each of 20 marks. Class Performance measured through percentage of lectures attended (4 marks), Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: Basic of Electronics Engineering

Course Objective:

1. To understand the working and performance criterion of measuring instruments.
2. [illegible] of the different signal generators and its analysis techniques.
3. To understand the working principle of the transducers.
4. To understand state of the art measurement instruments.

Course Outcomes:

1. An ability to apply knowledge of electronic instrumentation for measurement of electrical quantities.
2. Ability to select and use latest hardware for measurements and instrumentation.
3. An ability to design and conduct experiments for measurement and ability to analyze and interprets data.
4. An ability to analyze and interpret data.

Course Contents

Unit – I

Introduction to Basic: Introduction of Measurement, Precision & accuracy, Characteristics of [illegible]. Measurement of frequency, phase, time - interval, impedance, power measurement, energy [illegible] measurement of distortion. Errors in Measurement, Classification of Errors, Remedy to [illegible]. Special purpose instruments for measurement of voltage, current & other circuit parameters. Q-[illegible] power measurements, introduction to Analog and digital meters. Block diagram of pulse [illegible] signal generators, function generators wave analysers, distortion analysers, spectrum analyser, [illegible] analyser, introduction to power analyser.

Unit – II

GENERATION & ANALYSIS OF WAVEFORMS: Block diagram of pulse generators, signal generators, function generators wave analysers, distortion analysers, spectrum analyser, Harmonic analyser, introduction to power analyser. Block Diagram based Study of CRO, Specifications, Controls, Sweep Modes, Role of Delay Line, Single and Dual-Beam Dual-Trace CROs, Chop and Alternate Modes. Measurement using Oscilloscope-Measurement of Voltage, Frequency, Rise Time, Fall Time and Phase Difference, Lissajous Figures in Detection of Frequency and Phase, Digital Storage Oscilloscope (DSO).Features like Roll, Refresh, Storage Mode and Sampling Rate. Applications of DSO

Unit – III

Basics of Transducers/Sensors : Characteristics of Transducers, Requirement of Transducers, Classification of transducers, Selection Criteria of Transducers, Transducers of types: R.L.C, photocell, strain gauges etc. Basic schemes of measurement of displacement, velocity, acceleration, strain, pressure, liquid level & temperature. Digital Transducers, Digital displacement transducers, Digital Encoders.

Unit – IV

Data Acquisition and advances in Instrumentation Systems: Analog and Digital Data Acquisition Systems, Multiplexing, Spatial Encoders, Telemetry, Components of Analog and Digital Data Acquisition System, Types of Multiplexing Systems, Uses of Data Acquisition System, Use of recorders in Digital systems, Modern Digital Data Acquisition System.

TEXT BOOK

1. A course in Electrical & Electronics Measurements & Instrumentation : A.K.Sawhney; Dhanpat Rai & Sons.
2. Electronics Instrumentation & Measurement Techniques : Cooper; PHI

REFERENCE BOOKS:

1. Helfrick & Cupper : Modern Electronic Instrumentation & Measuring Techniques – PHI
2. W.D. Cooper : Electronic Instrumentation And Measuring Techniques – PHI
3. [illegible] Measurement Systems
4. [illegible] Instrumentation, TMH 2nd Edition

ANALOG COMMUNICATION

General Course Information:

Course Code: ECE-204-L

Course Credits: 3.5

Contact Hours: 3 Lectures (1 hr. each) + 1 Tutorial

Duration of Examination: 3 hours

Course Assessment Methods (internal: 30; external: 70) Two minor tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks) Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks.

For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: Basic Electronics, Signal & Systems

Course Objectives:

1. To make the students familiar with the elements of electrical communication and modulation techniques
2. To explain the concept, waveforms, modulators and demodulators of various analog and pulse communication systems.
3. To explain the concept and features of radio transmitters and receivers.
4. To familiarize with the effects of noise in analog and pulse modulation techniques.

Course Outcomes:

1. Understand the important elements of electrical communicationsystems.
2. Develop the understanding of analog as well as pulse modulation and demodulation.
3. Develop the understanding of noise and its effects in communication systems.
4. Become capable of understanding and performing lab experiments related to analog communication

Course Contents

UNIT-I

Introduction to Communication Systems

Terminologies in Communication Systems, Electromagnetic spectrum and typical application, concept of electrical communication, modes and media's of Communication, Elements of analog Communication system, Need for modulation.

Amplitude Modulation

Definition, AM wave, Mathematical expression, waveforms, spectrum, modulation index, power relations, types of AM, generation of AM, Square law modulation, Switching modulator, Transistor modulator, Balanced modulator, SSB Generation: Filter method, Phase shift method, Third Method: Quadrature Amplitude Modulation.

UNIT-II

Angle Modulation

Theory of Angle Modulation (FM, PM): mathematical expression, waveforms, spectrum, modulation index; Relationship between FM and PM; Frequency spectrum of FM wave, Narrowband and Wideband FM, Noise and FM, Pre-emphasis and De-emphasis, Comparison between AM and FM; Generation of FM: Direct Methods – Reactance Modulator, Varactor diode modulator, Stabilized Reactance Modulator; Indirect method – Armstrong FM system

Radio Transmitters and Receivers

Radio Transmitters: AM, SSB, FM; Receiver Types: TRF, Superheterodyne; AM Receivers: RF section, Frequency changing and tracking, Intermediate frequencies, Image Frequency; FM Receivers: Common circuits, Amplitude Limiting; AM Demodulators: Envelope Detector, SSB reception with Pilot Carrier; FM Demodulators: Slope detector, Balanced Slope Detector, Foster Seeley Discriminator, Ratio Detector, PLL demodulator.

UNIT-III

Pulse Modulation

Sampling theory: Sampling theorem for low pass and bandpass signals, Time division (TDM) and frequency division (FDM) multiplexing, Pulse Amplitude Modulation (PAM) and Pulse Time modulation; Concept, Modulation and Demodulation,Elements of Pulse Code Modulation, Quantization Error, Companding, Differential Pulse Code Modulation (DPCM), Delta modulation (DM), Adaptive Delta Modulation.

UNIT-IV

Noise and its Effects

Types of Noise, SNR, Noise Figure and its calculations, Mathematical representation of noise, AM reception performance under noise, FM reception performance under noise, Noise in PCM and Delta Modulation Systems.

Text and Reference Books:

1. George Kennedy, Bernard Davis&SRM Prasanna, "Electronic Communication Systems", 5th Edition, McGraw Hill
2. [illegible] Schilling & G. Saha, "Principles of Communication Systems", [illegible] McGraw Hill
3. R.P. Singh, S.D. Sapre,"Communication Systems: Analog and Digital", 3rd Edition, McGraw Hill
4. V. Chandra Sekar, Communication Systems, Oxford University Press.
5. Simon Haykin, "Communication Systems", 4thEdition, Wiley.

ANALOG ELECTRONICS - II

General Course Information:

Course Code: EC E-206-L

Course Credits: 3

Course Assessment Methods (internal: 30; external: 70) Two minor tests each of 20 marks, Class Performance measured through percentage of marks attended (4 marks), Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks.

The end semester examination shall be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions are to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: Basics of Electronics Engineering, Analog Electronics I

Course Objectives:

1. To provide explanation about the operation of all the important electronic devices.
2. To explain different types of feedback circuits and their applications.
3. To introduce the students with the special semiconductor devices.
4. To introduce students to multistage & power amplifier characteristics & applications.

Course Outcomes:

- [illegible] & circuits and their usage in electronics
- [illegible] special semiconductor devices for electronic applications
- [illegible] multistage & power amplifiers for various applications
- [illegible] characteristics & their applications

Course Contents

UNIT 1

Single Stage Amplifier : distortions in amplifier, General frequency consideration, frequency response of an amplifier (low and high frequency response), ac analysis of a small signal low frequency common emitter transistor amplifier, RC coupled amplifier, low frequency response of an RC coupled stage, effect of emitter bypass capacitor on low frequency response, emitter follower.

Multi Stage Amplifier: Different coupling schemes used in amplifiers, general analysis of a cascade amplifier (Voltage gain, current gain, power gain, frequency effects), direct coupled amplifier, darlington amplifier, cascode amplifier, current mirror circuit.

UNIT 2

Feedback Amplifiers: Classification of amplifiers, Feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output resistance, voltage & current feedback, voltage series feedback, current shunt feedback, voltage shunt feedback, [illegible] oscillator, Barkhausen's criterion, R-C phase shift oscillator, resonant circuit oscillators, general form of oscillator circuit, Hartley and Colpitt's oscillator, Wien-Bridge oscillator, Crystal oscillator.

UNIT 3

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Power Amplifiers: Class A, B, and C operations; Class A large signal amplifiers, Second and higher order harmonic distortion, efficiency, transformer coupled power amplifier, Class B amplifier : efficiency & distortion; class A and Class B push-pull amplifiers; class AB and C power amplifier, cross over distortions.

UNIT 4

Special Semiconductor devices: Tunnel diodes, Schottky diodes, power diodes, p-i-n diodes, point contact diode, photoconductive cell, IR emitters, LCD
PNPN devices: Thyristor, SCR, SCS, light activated SCR, DIAC, TRIAC, GTO, UJT

Text Book and Reference Books:

1) Electronics devices and circuits(4e): Millman, Halkias and Jit ; McGrawHill
2) Electronics Devices & Circuits: Boylestad & Nashelsky ; Pearson
3) Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH
4) Electronics Circuits: Donald L. Schilling & Charles Belove : McGrawHill
5) Electronic devices and circuits (3e): S Salivahanan, N Suresh Kumar

ELECTROMAGNETIC THEORY

General Course Information:

Course Code: ECE-208-1 Course Credits: [illegible] Contact Hours: [illegible] Mode: Lectures and Tutorial Examination Duration: 3 hours	Course Assessment Methods (internal: 30; external: 70) Two minor tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks), Assignments (4 marks) and class performance (2 marks), and end semester examination of 70 marks. For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: Physics, Basics of Electronics Engineering

Course Objectives:

1. To gain knowledge in the field of electromagnetic waves.
2. To acquire the knowledge of Maxwell's equations and their time varying behavior
3. To provide the students with a solid foundation in engineering fundamentals required to solve problems and also to pursue higher studies
4. To acquire the knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission, propagation and reception of electro- magnetic wave systems.

Course outcomes:

1. Ability to Solve Electromagnetic Relation using Maxwell Formulae.
2. Gain a comprehensive knowledge on basic concepts of static & time varying Electric and Magnetic fields.
3. Ability to Design circuits using Conductors and Dielectrics.
4. Ability to analyze moving charges on Magnetic fields.

Course Contents

UNIT-I

STATIC ELECTRIC FIELDS: Coulomb's Law, Gauss's Law, potential function, field due to continuous distribution of charges, equi-potential surfaces, Gauss's Theorem, Poison's equation, Laplace's equation, method of electrical images, capacitance, electro-static energy, boundary

conditions, the electro-static uniqueness theorem for field of a charge distribution, Dirac-Delta representation for a point charge and an infinitesimal dipole.

UNIT-II

STEADY MAGNETIC FIELDS : Faraday Induction law, Ampere's Work law in the differential vector form, Ampere's law for a current element, magnetic field due to volume distribution of current and the Dirac-delta function, Ampere's Force Law, magnetic vector potential, vector potential (Alternative derivation), far field of a current distribution, equation of continuity.

UNIT-III

TIME VARYING FIELDS : Equation of continuity for time varying fields, inconsistency of Ampere's law, Maxwell's field equations and their interpretation, solution for free space conditions, electromagnetic waves in a homogeneous medium, propagation of uniform plane-wave, relation between E & H in a uniform plane-wave, wave equations for conducting medium, Maxwell's equations using phasor notation, wave propagation in a conducting medium, conductors, dielectrics, depth of penetration, polarization, linear, circular and elliptical.

UNIT-IV

REFLECTION AND REFRACTION OF E M WAVES: Reflection and refraction of plane waves at the surface of a perfect conductor & perfect dielectric (both normal incidence as well as oblique incidence), Brewester's angle and total internal reflection, reflection at the surfaces of a conductive medium, surface impedance, poynting theorem, interpretation of E x H, power loss in a plane conductor.

TRASMISSION LINE THEORY: Transmission line as a distributed circuit, transmission line equation, travelling ,standing waves , characteristic impedance, input impedance of terminated lines, reflection coefficient, VSWR, Smith's chart and its applications.

TEXT BOOKS :

1. Electro-magnetic Waves and Radiating System : Jordan & Balmain, PHI.
2. Antenna & Wave Propagation: K D. Prasad, Satya Prakashan.
3. Field and Wave Electromagnetics: David K. Cheng, Pearson, Second Edition.

REFERENCE BOOKS:

1. Engineering Electromagnetics : Hayt: TMH.
2. Engineering Electromagnetics: Umran S. Inan & Aziz S. Inan, Pearson.
3. Electro-Magnetics : Krauss J.DF: Mc Graw Hill.

CONTROL SYSTEM ENGINEERING

General Course Information:

Course Code: ECE-210 L

Course Credits: 3.5

Course Contact Hours: L: 3 T: 1 P: 0

Course Duration: 1 Semester

Course Assessment Methods (internal: 30; external: 70): Two mid-term tests each of 20 marks, Class Performance measured through percentage of lectures attended (4 marks), Assignments (4 marks) and class performance (2 marks) and end semester examination of 70 marks.

In the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answers type questions. Rest of the eight questions is to be given by setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the remaining four units. All questions carry equal marks.

Pre-requisites: Signals and Systems; Differential equations; Laplace transforms; basic Electrical circuits

Course Objectives & Outcomes:

The main objectives of this course are:

1. Students will apply the knowledge gained in basic mathematics, physical sciences and engineering courses to derive mathematical models of typical engineering processes.
2. To provide an introduction to various types of systems and their feedback control mechanisms.
3. To introduce the tools for the analysis of linear control systems.
4. To introduce the frequency response domain tools to design and study linear control systems.

By the end of the course a student is expected to:

1. Acquire a working knowledge of system science-related mathematics.
2. Students will be able to recognize and analyze feedback control mechanisms.
3. Identify, formulate and solve control engineering problems.
4. Students can describe various time domain and frequency domain tools used for analysis and design of linear control systems.
5. Students can describe the methods to analyze the stability of systems with use of transfer functions.

Course Contents

UNIT I

INPUT / OUTPUT RELATIONSHIP: Open loop & closed loop control systems & their illustrative examples, Mathematical modeling and representation of physical systems, Concept of transfer function, relationship between transfer

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...sfer function and impulse response, order of a system, block diagram algebra, signal flow graphs: Mason's gain formula & its application, characteristic equation, derivation of transfer functions of electrical and electromechanical systems.

UNIT II

TIME DOMAIN ANALYSIS:
Typical test signals, time response of first order systems to various standard inputs, time response of 2nd order system to step input, time domain specifications, steady state error and error constants, concept of stability, pole-zero configuration and stability, necessary and sufficient conditions for stability, Hurwitz stability criterion, Routh stability criterion and relative stability. Root locus concept, development of root loci for various systems, stability considerations.

UNIT III

FREQUENCY DOMAIN ANALYSIS:
Relationship between frequency response and time-response for 2nd order system, polar, Nyquist, Bode plots, stability, Gain-margin and Phase Margin, relative stability, frequency response specifications.

UNIT IV

COMPENSATION:
Necessity of compensation, compensation networks, application of lag and lead compensation, basic modes of feedback control, proportional, integral and derivative controllers.

CONTROL COMPONENTS:
Synchros, servomotors, stepper motors, magnetic amplifier.

TEXT BOOK:

1. Control System Engineering: I.J. Nagrath & M. Gopal, New Age Publishers.

REFERENCE BOOKS:

1. Automatic Control Systems: B.C. Kuo, PHI Publishers.
2. Modern Control Engg: K. Ogata, PHI Publishers.
3. Control Systems - Principles & Design: Madan Gopal: Tata Mc Graw Hill Publishers.
4. Feedback Control Engineering: R.C. Dorf & Bishop: Addison-Wesley Publishers.

Environmental Studies

Course Code: EVS-201-L
Course Credits: 3
Mode: Lecture(L) and Tutorial(T)
Type: Compulsory
Contact Hours: 3 hours (L) + 01 hour (T) per week.
Examination Duration: 03 hours.

Course Assessment Methods (Internal: 30; External: 70) Two minor test each of 20marks, class performance measured through percentage of lecture attended (4 marks), assignments, quiz etc. (6 marks) and end semester examination of 70 marks.

For the end semester examination, nine questions are to be set by the examiner. Question number one will be compulsory and based on the entire syllabus. It will contain seven short answer type question. Rest of the eight questions is to be given as setting two questions from each of the four units of the syllabus. A candidate is required to attempt any other four questions selecting one from each of the four units. All questions carry equal marks.

Prerequisite: Student should have prior knowledge of basic environment science.

Objectives:

- To enhance knowledge skills and attitude to environment.
- To understand natural environment and its relationship with human activities.

Course outcomes:

CO-1 Students will be able to enhance and analyze human impacts on the environment.
CO-2 Integrate concepts & methods from multiple discipline and apply to environmental problems.
CO-3 Design and evaluate strategic terminologies and methods for sustainable management of environmental systems.
CO-4 Field studies would provide students first-hand knowledge on various local environment aspects which forms an irreplaceable tool in the entire learning process.

Unit-I

Multidisciplinary nature of Environmental studies. Definition, scope and importance, need for public awareness. Ecosystem: Structure and function of an ecosystem, Producers, consumers and decomposers. Energy flow in the ecosystem, Ecological succession. Food chains, Food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystem (ponds, Stream, lakes, rivers, oceans, estuaries); Biodiversity: Introduction, Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India, Value of biodiversity, consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, national and local level, India as a mega-diversity nation, Hot-spot of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit-II

Renewable and non-renewable resources, Natural resources and associated problems ,Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, mining, dams and their effects on forests and tribal people, Water resources: Use and over utilization of surface and ground water, floods, droughts, conflicts over water, dams-benefits and problems, Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies, Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyle.

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CHAIRPERSON
... of Environmental Scien...

ELECTRONIC MEASUREMENTS & INSTRUMENTATION LAB

General Course Information:

Course Code: ECE-202-P, Course Credits: 1. Contact Hours: 2/week per group(L-T-P: 0-0-2) Mode: Lab Work	**Course Assessment** **(Internal: 30; External: 70)**

Course Objectives:

1. To gain the knowledge of measurement methods and instruments of electrical quantities.
2. To aware the students about the advances in Instrumentation.
3. To provide knowledge of various instruments and their testing capabilities.
4. To understand principle of operation & working of different measuring devices.

Course Outcomes:

1. Ability to apply the principles and practices for instrument design and development to real world problems.
2. Gain knowledge on data acquisition and conversion.
3. Develop skills to analyze sensors & advance instruments.
4. Able to know about Industrial based automation.

LIST OF EXPERIMENTS

1. To study the front panel controls of storage CRO.
2. To analyze analog and digital multi meter for various measurements.
3. Measurement of displacement using LVDT.
4. Measurement of distance using LDR.
5. Measurement of temperature using R.T.D.
6. Measurement of temperature using Thermocouple.
7. Measurement of pressure using Strain Gauge.
8. Measurement of pressure using Piezo-Electric Pick up.
9. Measurement of distance using Capacitive Pick up.
10. Measurement of distance using Inductive Pick up.
11. Measurement of speed of DC Motor using Magnetic Pick up.
12. Measurement of speed of DC Motor using Photo Electric Pick up.

NOTE: Minimum eight experiments are to be performed in the semester, out of which atleast six experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

ANALOG COMMUNICATION LAB

General Course Information:

Course Code: ECE-204-P Course Credits: 1 Contact Hours: 2 week per group (L-T-P: 0-0-2) Mode: Lab Work	**Course Assessment** **(Internal: 30; External: 70)**

Course Objectives:

1. To provide practical experience to the students on the basic measuring instruments.
2. To provide hands on experience to the students on the practical trainer boards/kits.
3. To provide students an opportunity to understand the practical concept of analog and pulse modulation techniques.
4. To familiarize students with the simulation of analog communication systems using MATLAB or other related software tool.

Course Outcomes:

1. The students will have practical understanding of the modulation and demodulation process in analog communication system.
2. The students will have an exposure to software tools for simulation of analog communication system.
3. The students will be in a position to develop simple analog communication systems.
4. The students should be able to simulate a communication system on software platform as well.

LIST OF EXPERIMENTS

1. Familiarization with the control panel and various measurements using CRO & Function Generator.
2. Study of Amplitude Modulation & Demodulation and determination of Modulation index.
3. Study of Frequency Modulation and Demodulation.
4. Study of Pulse Amplitude Modulation and Demodulation.
5. Study of Pulse Width Modulation and Demodulation.
6. Study of Pulse Code Modulation.
7. Simulation Study of AM using Software Tool.
8. Simulation Study of FM using Software Tool.
9. Simulation Study of PAM using Software Tool.
10. Simulation Study of PWM using Software Tool.
11. Simulation Study of PCM using Software Tool.
12. Simple Project (AM receiver / FM receiver / topic related to the scope of the course).

NOTE: At least eight experiments are to be performed in the semester, out of which at least six experiments should be performed from above list. Remaining experiments may either be set by the teacher from the above list or designed & set by the concerned institution as per the scope of the course.

ANALOG ELECTRONICS - II LAB

General Course Information:

Course Code: ECE-206-P, Course Credits: 1, Contact Hours: 2/week per group(L-T-P: 0-0-2) Mode: Lab Work	**Course Assessment** (Internal: 30; External: 70)

Course objectives:

1. To explain the effect of feedback in various electronic circuits.
2. To familiarize with the characteristics of different semiconductor devices.
3. To make familiar with the design of various oscillator circuits.
4. To make familiar with working of single stage, multi-stage & power amplifiers.

Course outcomes:

1. To verify the working of transistor and their applications.
2. Become familiar with the operation and characteristics of semiconductor devices.
3. To verify the working of multistage and power amplifiers.
4. To verify the working of FET and circuit design.

LIST OF EXPERIMENTS

1. To study the effect of BJT voltage series feedback amplifier and determine the gain, frequency response, input and output impedance with and without feedback.
2. To study the effect of FET voltage series feedback amplifier and determine the gain, frequency response, input & output impedance with and without feedback.
3. To design and study the frequency response of two stage RC coupled amplifier and determine the effect of cascading on gain and bandwidth.
4. To design a BJT darlington emitter follower and determine the gain.
5. To plot the characteristics of UJT.
6. To plot the characteristics of DIAC and TRIAC.
7. To study the RC phase shift oscillator circuit.
8. To study the Wein bridge oscillator circuit.
9. To study the Hartley and Colpitt's oscillator circuit.
10. To plot the characteristics of SCR.
11. To study and draw the characteristics of FET in common drain configuration.
12. To study and draw the characteristics of FET in common source configuration.

NOTE: At least eight experiments are to be performed in the semester, out of which at least six experiments should be performed from above list. Remaining experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

CONTROL SYSTEM ENGINEERING LAB

General Course Information:

Course Code: ECE-210-P, Course Credits: 1, Contact Hours: 2/week per group(L-T-P: 0-0-2) Mode: Lab Work	Course Assessment (Internal: 30; External: 70)

COURSE OBJECTIVES:

1. To provide a platform for verifying the theoretical aspects of Control systems and feedbacks.
2. To introduce students to MATLAB simulink for control system designing.
3. To aid the students in developing various control structures and analyzing them for improving their performances.
4. To investigate the Servo-Motor speed and position control principles by designing and selecting P, I and PI gains for specific response.

COURSE OUTCOMES:

1. The students will be able to design various control systems using MATLAB simulink.
2. The students will be able to analyze steady state analysis of control systems.
3. The student can generate new control system scenarios and can evaluate their performances.
4. The students will be able to do various engineering projects.

LIST OF EXPERIMENTS

1. To study A.C. servo motor and to plot its torque-speed characteristics.
2. To study D.C. servo motor and to plot its torque speed characteristics.
3. To study the magnetic amplifier and to plot its load current v/s control current characteristics for:
a) series connected mode
b) parallel connected mode
4. To plot the load current v/s control current characteristics for self excited mode of the magnetic amplifier.
5. To study the synchro & to:
a) Use the synchro pair (synchro transmitter & control transformer) as an error detector.
b) Plot stator voltage v/s rotor angle for synchro transmitter i.e. to use the synchro transmitter as position transducer.
6. To use the synchro pair (synchro transmitter & synchro motor) as a torque transmitter.
7. (a) To demonstrate simple motor-driven closed-loop position control system.
(b) To study and demonstrate simple closed loop speed control system.
8. To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots.
9. To study a stepper motor & to execute microprocessor or computer-based control of the same by changing number of steps, direction of rotation & speed.
10. To implement a PID controller for level control of a pilot plant.
11. To implement a PID controller for temperature control of a pilot plant.
12. To study the MATLAB package for simulation of control system design.

NOTE: At least eight experiments are to be performed in the semester, out of which at least six experiments should be performed from above list. Remaining experiments may either be performed from [illegible] as per the scope of the syllabus.

SKILLS AND INNOVATION LAB

Course Code: ECE-214-P
Course Credits: 0.0
Mode: Practical
Contact Hours: 03 hours per week
Examination Duration: 03 hours

Course Assessment Methods (internal: 30; external: 70): This is a non-credit course of qualifying nature. Internal practical evaluation is to be done by the course coordinator. The end semester practical examination will be conducted jointly by external and internal examiners.

Prerequisite: Basic knowledge of Physics & Digital Electronics.

Objectives:

- Understand and identify research topics related to Electronics & Communication Engineering through brain storming sessions.
- Develop the knowledge to analyze new interpretation after identifying the existing research work.
- Identify the skills to formulate identified issues/problems in the form of research objectives.
- Develop and communicate effectively the research topic though presentation and/or brain storming.

Course Outcomes:

CO-1 Understand the research analysis of issues/problems on topics related to Electronics & Communication Engineering.
CO-2 Understand the techniques and tools used for research analysis.
CO-3 Understand literature related to a research topic.
CO-4 Communicate effectively the research topic though presentation and/or brainstorming.

Brief Contents:

A group of students are required to carry out a study related to current development and emerging trends in the field of Electronics & Communication Engineering. Each group of students will also try to improve their basic skills in their respective field. The students may use the equipment's/machines/instruments available in the laboratories/workshops with the due permission of Chairperson/Director on recommendation of the Course Coordinator.

The students in consultation with the course coordinator will decide the topic of the study. The study report will be submitted by each group at the end of semester and will be evaluated by Course Coordinator.