TEACHING AND EVALUTION SCHEME

DISPLENE: ELECTRONICS & TELECOMMUNICATION ENIGINEERING **SEMESTER : III**

	Subject	Evolution Scheme								
	Theory & Practical				Theory			Practical		
Sl. No.	Theory	Lecturer	Tuterial	Practical	End Exam	Class Test	Assignment	End Exam	Sessional	Total Marks
1.	Analog Electronics-I	4	1	-	80	15	5	-	-	100
2.	Circuit Theory	4	1	-	80	15	5	-	-	100
3.	Digital Electronics	4	1	-	80	15	5	-	-	100
4.	Electronics Measurement & Instrumentations	4	1	-	80	15	5	-	-	100
5.	Engineering Mathematic-III	4			80	15	5	-	-	100
	Practical									
1.	Analog Electronics-I Lab			4	-	-		25	25	50
2.	Circuit Simulation Lab Using (P-SPICE) Software			4	-	-	-	50	50	100
3.	Digital Electronics Lab			4	-	-	-	25	25	50
4.	Electronics Measurement & Instrumentations Lab			3	-	-	-	25	25	50
		20	04	15	400	75	25	125	125	750

ANALOG ELECTRONICS-I

THIRD SEMESTER

Theory & Tutorial : 5 P/W
Total Theory& Tutorial: 75 P

Examination: 3Hr
Total Marks: 100
Theory: 80
I.A.: 15+5

A: RATIONALE:

The concept of Analog Electronics is very essential for the study of the Electronics Engineering. This subject covers the properties of basic Electronics components and their application. The concept of semiconductors, different electronics circuits & different amplifiers have discussed in this chapter.

B: OBJECTIVS:

On completion of the study the student will able to:

1. Explain working of P-N junction and effect of temperature on P-N junction diode.
2. Explain working of zener diode & varactor diode.
3. Explain working of different types rectifier and filters.
4. Concept of multiplier circuit.
5. Explain working of PNP and NPN transistor.
6. Understand different transistor connections.
7. Define ALPHA, BETA, and GAMMA.
8. Explain necessity of biasing and study of different biasing circuits.
9. Define Simplified h-parameters of transistor.
10. Explain working of different types of coupled amplifier.
11. Classify audio power amplifier.
12. Explain principle of negative feedback and classify and advantage of negative feedback amplifier.
13. Understand oscillator and working of different types of oscillators.
14. Define tuned amplifier and explain different types of tuned amplifier.
15. Understand different applications of Diode & Transistors.

C: Topic wise distribution of periods:

Sl.No.	Topics to the covered	Periods
1.	Diode and Circuits	10
2.	Transistor and Circuit Analysis	14
3.	Audio Power Amplifier	08
4.	Field Effect Transistor and Circuits	08
5.	Feed Back Amplifier	08
6.	Oscillators	09
7.	Tuned Amplifiers	08
8.	Common Aplication of Diode & Transistor& Wave Shaping Circuit	10
	Total	**75**

D: COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES.

1. DIODE AND CIRCUITS.

1.1 Discuss construction working principle and use of p-n junction diode.
1.2 Explain effect of temperature of dependence of junction diode.
1.3 Explain concept of breakdown of diode (Avlance & Zener Breakdown) and describe construction, working, Characteristics and use of Zener diode & Varactor Diode.
1.4 Define and classify the rectifiers and explain working of different types of Rectifiers
1.5 Derive efficiency, advantages & disadvantage of Half-Wave Rectifier and Full-Wave Rectifier
1.6 Define ripple factor & PIV of a diode.
1.7 Derive expression for ripple factor, TUF, for half-wave and full-wave rectifier.
1.8 Explain necessary of filter and classify them.
1.9 Explain working of different types of filters.

2. TRANSISTORS AND CIRCUIT ANALYSIS.

2.1 Discuss construction and working principle of p-n-p and n-p-n transistor.
2.2 Explain different types of transistor connection (CB, CE and CC)
2.3 Explain input and output characteristics of transistor in different connections.
2.4 Define ALPHA, BETA, and GAMMA.
2.5 Establish relation between ALPHA, BETA, GAMMA of transistors in various modes.
2.6 Explain the necessity of transistor biasing and methods of transistor Biasing.
2.7 Define stabilization, and stabilization factor explain necessity of it.
2.8 Discuss working of different methods of transistor biasing
2.9 Draw the load line(AC & DC) and determine the Q-point.
2.10 Draw Re transistor model of CE, CC circuit of a Transistor.
2.11 Define simplified method of transistor circuits using h-parameter.
2.12 Simple problems in Transistor
2.13 Explain various Types of Coupling
2.14 Explain principle working, characteristics and use of Direct, R-C & Transformer Coupled Amplifier including advantages and Disadvantages.
2.15 Explain the Frequency Responses of R-C coupled Amplifier & draw the curve.

3. AUDIO POWER AMPLIFIERS.

3.1 Differentiate between Voltage and Power Amplifier.
3.2 Classify Power Amplifier.
3.3 Explain the working principle of different types of Power Amplifier (class-A, class-AB, class-B and class-C & Class D amplifier).
3.4 Derive collector efficiency of class-A and class-B power amplifiers.
3.5 Explain construction and working principle and advantages of Push Pull (Class-B) amplifiers and Complementary Symmetry Amplifiers.

4. FIELD EFFECT TRANSISTOR (FET).

4.1 State concept of FET & its classifications.
4.2 Differentiate between JFET & BJT.
4.3 Explain construction, working principle & characteristics of JEFT.
4.4 Explain JEFT as an amplifier.
4.5 Define parameters of JFET & Establish relation among JFET parameters.

4.6 Explain JFET biasing method and connection.
4.7 Define MOSFET & its classification & characteristics (Drain & Transfer)
4.8 Explain construction, working principle of Enhanance type & Depletion type MOSFET.
4.9 Explain the construction & operation of CMOS, VMOS & LDMOS.

5. FEED BACK AMPLIFIER.

5.1 Define & classify Feedback Amplifier.
5.2 Explain principle of negative feed back with the help of block diagram.
5.3 Define gain of an amplifier with feedback.
5.4 Discuss the advantages & Effects of negative feed back in amplifier.
5.5 Discuss input & output impedance of negative feed back amplifier.
5.6 Explain principle of working, characteristics and use of Emitter Follower& Darlington Amplifier.

6. OSCILLATOR.

6.1 Define and classify Oscillators.
6.2 State and explain the principle of working of Oscillator.
6.3 Explain Bark – Kuasen criteria of an Oscillator.
6.4 Explain the construction and working principle & use of Hertley, Collpits, Phase shift, and Wein bridge & Crystal Oscillator.

7. TUNED AMPLIFIER.

7.1 Defined and classify Tuned amplifier.
7.2 Explain advantages of Tuned amplifier.
7.3 State limitations of Tuned amplifier for low frequency applications.
7.4 Explain working principle of single tuned & saw filter circuit

8. COMMON APPLICATION OF DIODE, TRANSISTOR & WAVE SHAPING CIRCUIT

8.1 Explain different type of clippers circuit & its application.
8.2 Explain different type of clamper circuit & its application.
8.3 Explain working of a voltage multiplier circuit.
8.4 Explain the working of voltage Doubler & Trippler Circuit
8.5 Explain the working of Astable, Monostable & Bistable and Multivibrator with Circuit diagram.
8.6 Explain the working & use of Integrator and Differentiator circuit using R- C Circuit.

RECOMMENDED BOOKS:

A) Text Book

1. A Text Book of Electronics by R.S. Sedha, S.chand Pub.
2. Electronics Devices & Circuit theory By Robert Boyelstsd.

B) Reference Book

1. Electronic devices – by Flody Person Education.
2. Principle of Electronics by Raxit & Chattopadhya.

SUBJECT : CIRCUIT THEORY

THIRD SEMESTER

Theory & Tutorial : 5 P/W
Total Theory & Tutorial: 75 P

Examination: 3Hr
Total Marks: 100
Theory: 80
I.A.: 15+5

A: RATIONALE:

Circuit theory is one of the core subjects in Electrical & Electronics Engineering. The subject covers basic elements of network, AC fundamentals, Filter circuit & network sysenthes.

B: OBJECTIVES:

On completion of the course, the student will able to

1. Different Network elements.
2. Different current & voltage.
3. Star & Delta formation & Universe.
4. Know different Network theorems.
5. Know the AC fundamentals.
6. Know Laplace Transform.
7. Know different filters.
8. Know the Resonance.
9. Know different types of filters.

C: TOPIC WISE TISTRUBUTION OF PERIODS:

Sl.No.	Topics	Periods
1.	NETWORK ELEMENTS	06
2.	NETWORK THEOREMS	15
3.	A.C. FUNDAMENTALS	10
4.	RESONANCE	10
5.	TRANSIENT RESPONSE OF SIMPLE CKTS (DC)	08
6.	LAPLACE TRANSFORM AND ITS APPLICATIONS	08
7.	NETWORK FUNCTIONS AND PARAMETERS	10
8.	FILTERS	08
	TOTAL	75

D: COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES:

1. NETWORK ELEMENTS

1.1 Define Network elements
1.2 Explain scope of network analysis & synthesize
1.3 Define Electric charge, electric current, Electrical energy, Electrical potential, R-L-C parameters, Energy Source & Passive Elements.
1.4 Explain current and voltage source, their transformation & mutual inductance

2. NETWORK THEOREMS

2.1 Explain Star – Delta transformation,
2.2 Explain method of Analysis (Mesh, Nodal) with simple problem.
2.3 State, Explain & Prove Superposition Theorem, Millman Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power transfer Theorem, Reciprocity Theorem. and their all applications.

3. A.C FUNDAMENTALS

3.1 Define frequency, Cycle, Time period, Amplitude, Average value, RMS value & Form factor of AC Wave.
3.2 Define Phasor representation of alternating quantities
3.3 Explain the behavior of A.C. through pure resistor, inductor & capacitor.
3.4 Explain the behavior of R-L, R-C, R-L-C series circuit & draw the phasor diagram and voltage triangle
3.5 Solve numerical problems of above Circuit.
3.6 Explain the behavior of R-L, R-C, R-L-C parallel circuit (with numerical problems.)

4. RESONANCE

4.1 State & Explain Series resonance,
4.2 Derive the following expression for series resonance
a. Condition for Resonance
b. Frequency of Resonance
c. Impedance, Current, Voltage, Q Factor and Power Factor of Resonance.
d. Bandwidth interm of Q.
4.3 State Explain Parallel Resonance & derive the expression
4.4 What are the comparison of Series & Parallel resonance.

5. TRANSIENT RESPONSE OF SIMPLE CKTS (DC)

5.1 Define Network equations & initial conditions for resistor, inductor & capacitor
5.2 Analysis and derive the equation for circuit parameters of R-L, R-C, R-L-C circuit to DC
5.3 Find Time Constant of the each Circuit

6. LAPLACE TRANSFORM AND ITS APPLICATIONS

6.1 Define Laplace Transformation
6.2 Analysis and derive the equations for circuit parameters of R-L, R-C, R-L-C

7. NETWORK FUNCTIONS AND PARAMETERS

7.1 Define Network functions for one port & two port networks.
7.2 Define & Explain Open circuit (Z-Parameter)& Short Circuit(Y-Parameter) Parameters.
7.3 Calculate open & short Circuit Parameters for Simple Circuits
7.4 Define & Explain h-parameter (hybrid parameter)
7.5 Define T-Network & PI – Network

8. FILTERS

8.1 Define filters.
8.2 Define cutoff frequency, passband and stop board.
8.3 Classify filters; low pass, high pass, band pass, band stop filters & study their Characteristics.
8.4 Define Attenuation and Gain
8.5 Define Bel, Decibel & neper & they relations.

RECOMMENDED BOOKS:

a) TEXT BOOKS

1. Electrical Network by Ravish R Singh, Tata Mc Graw-Hill
2. Electrical Circuit Analysis by P.Ramesh Babu - Scitech Publication.

b) REFERENCE BOOKS:

1. Circuit Theory & Networks by Sujit Bagchi, S.Chand.
2. Circuit theory – A.Chkrabati, Dhampat Rai & Co.
3. Circuit Theory & Sudhakar & Shyam Mohan.

DIGITAL ELECTRONICS

THIRD SEMESTER

Theory & Tutorial : 5 P/W
Total Theory & Tutorial: 75 P

Examination: 3Hr
Total Marks: 100
Theory: 80
I.A.: 15+5

A: RATIONALE :

The tremendous power and usefulness of digital electronics can be seen from the wide variety of industrial and consumer products, such as automated industrial machinery, computers, microprocessors, pocket calculators, digital watches and clocks, TV games, etc. Which are based on the principles of digital electronics. The areas of applications of digital electronics have been increasing every day. In fact, digital systems have invaded all walks of life. This subject will very much helpful for student to understand clearly about the developmental concept of digital devices.

B: OBJECTIVES:

On completion of the subject , the student will able to

-Comprehend the systems and codes
-Familiar with logic gates
-Realise logic expressions using gates
-Construct and verify the operation of arithmetic & logic circuits
-Understand and appreciate the relevance of combinational circuits
-Know various logic families & flip-flops
-Know the concept of D/A & A/D.

C: TOPIC WISE TISTRUBUTION OF PERIODS:

Sl.No.	Topics	Periods
1.	NUMBER SYSTEMS AND CODES	8
2.	LOGIC GATES	7
3.	BOOLEAN ALGEBRA	7
4.	COMBINATIONAL CIRCUITS	10
5.	SEQUENTIAL CIRCUITS	8
6.	LOGIC FAMILIES	6
7.	COUNTERS	7
8.	REGISTERS	7
9.	DIGITAL TO ANALOG CONVERTERS	5
10.	ANALOG TO DIGITAL CONVERTERS	5
11.	DISPLAY DEVICES	5
	TOTAL	**75**

D: COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1 NUMBER SYSTEMS AND CODES

1.1 List different number system & their relevance :binary, octal, decimal, Hexadecimal
1.2 Study the Conversion from one number system to another
1.3 Perform Arithmetic operations of binary number systems
1.4 Represent the Concept of complemently numbers: 1's & 2's complement of Binary numbers

1.5 Perform Subtraction of binary numbers using complymentary numbers
1.6 Perform multiplication and division of binary numbers.
1.7 Define concept of Digital Code & its application.
1.8 Distinguish between weighted & non-weight Code.
1.9 Study Codes: definition, relevance ,types(BCD,Gray,Excess-3,ASCII & EBCDIC) and applications.
1.10 Generation of Error Detection & Correction Code using parity bit.

2 LOGIC GATES

2.1 Illustrate the Different between analog signals & systems and digital signals & Systems
2.2 Discuss the Types of logic & representation using electric signals
2.3 Learn the Basic Logic gates (NOT,OR,AND,NOR,NAND,EX-OR & EX-NOR)-Symbol, function, expression, truth table & example IC nos.
2.4 Define Universal Gates with examples & realisation of other gates
2.5 Discuss the concept Threshold Gate.

3 BOOLEAN ALGEBRA

3.1 Understand Boolean: constants, variables & functions
3.2 Comprehend the Laws & details of Boolean algebra
3.3 State and prove Demorgan's Theorems
3.4 Represent Logic Expression: SOP & POS forms & conversion
3.5 Simplify the Logic Expression /Functions(Maximum of 4 variables): using Boolean algebra and Karnaugh's map methods
3.6 What is don't care conditions?
3.7 Realisation of simplified logic expression using gates
3.8 Illustrate with examples the above

4 COMBINATIONAL CIRCUITS

4.1 Define a Combinatinational Circuit and explain with examples
4.2 Arithmetic Circuits(Binary)
a) Realise function ,functional expression, logic circuit, gate level circuit, truth table & applications of Half-adders, Half-Subtractor, Full-adder & Full-Subtractor
b) Explain Serial & Parallel adders: concept comparison & application
c) Working of 2&4 bit parallel adders with logic circuit & example IC nos.
d) Construct 2 bit Magnitude Comparator: logic expression ,truth table ,gate level circuit & example IC
4.3 Discuss Decoders: definition, relevance, gate level of circuit of simple decoders, Logic circuit of high order encoders, truth table & example IC nos.
4.4 Explain the working of Binary –Decimal Encoder & Decoder
4.5 Discuss Multiplexers: definition, relevance, gate level circuit of simple Multiplexers (4:1) logic circuit .
4.6 Discuss Demultiplexers: definition ,relevance,gate level circuit of simple Demultiplexers (1:4) logic circuit with truth Table & example IC nos.

5 SEQUENTIAL CIRCUITS

5.1 Define Sequential Circuit: Explain with examples
5.2 Know the Clock-definition ,characteristics, types of triggering & waveform
5.3 Define Flip-Flop
5.4 Study RS ,clocked RS,D,T,JK, MS-JK flip-flop with at level circuit, logic Circuit and truth table know their IC nos.

5.5 Concept of Racing and how it can be avoided.
5.6 Applications of flip-flops & its conversion.

6 LOGIC FAMILIES

6.1 list of various logic families & standard notations
6.2 Explain propagation Delay, fan-out, fan-in, Power Dissipation & Speed with Reference to logic families.
6.3 List out Features & various of TTL, CMOS & ECL
6.4 Describe the Interfacing between TTL & CMOS
6.5 Compare TTL & CMOS

7 COUNTERS

7.1 List the different types of counters-Synchronous and Asynchronous
7.2 Explain the modulus of a counter
7.3 Compare Synchronous and Asynchronous counters and know their IC's nos.
7.4 Explain the working of 4 bit ripple counter with truth table and timing diagram
7.5 Explain the Synchronous decade counter
7.6 List out applications of counters

8 REGISTERS

8.1 Explain the working of buffer register
8.2 Explain the working of various types of shift registers- SISO,SIPO,PISO PIPO with truth table using flip flop
8.3 Explain the working of bidirectional and universal shift register
8.4 Explain the applications of Shift Registers

9 DIGITAL TO ANALOG CONVERTERS

9.1 Explain the performance parameters of DAC-Resolution, Accuracy and Conversion time
9.2 Explain Binary Weighted resistor DAC
9.3 Explain R-2R Ladder type DAC

10 ANALOG TO DIGITAL CONVERTERS

10.1 Explain the performance parameters of ADC-Resolution, Quantization Error and conversion time
10.2 Explain the Ramp type and Dual Slope ADC's
10.3 Explain the Successive –Approximation type ADC

11 DISPLAY DEVICES

11.1 Explain the operation of LED and concept of seven segment display
11.2 Explain the LCD and its types
11.3 Compare between LED's and LCD's
11.4 Explain LED driver using IC 7447 decoder
11.5 Explain 7 segment decoder/driver for LCD display

RECOMMENDED BOOKS:

A: TEXT BOOKS

1. Funadamental of Digital Electronics – Ananda Kumar , PHI.
2. Modern Digital Electronics by R.P. Jain Mc.Graw-Hill Education India PVT.
3. Digital Electronics – P.Raja, SciTech.

B: REFERENCE BOOKS

1. Digital Eletronics – Principal & Application by S.K.Mondal (Mc.Graw-Hill).
2. Digital Electronics by B.R.Gupta & V singhal,S.K.Katteria & Sons
3. Digital Electrode & Microprocessor by Anoksh Singh & A.K. Chhabra.
4. Test book of Digital Electronics by R.S.Sedha.

ELECTRONIC MEASUREMENT & INSTRUMENTATIONS

THIRD SEMESTER

Theory & Tutorial : 5 P/W
Total Theory & Tutorial: 75 P

Examination: 3Hr
Total Marks: 100
Theory: 80
I.A.: 15+5

A: RATIONALE:

This subject Electronics measurement deals with technique of measurement of voltage, current, frequency and time period with the help of Analog & Digital instruments. The measurement of inductance and capacitance through bridges, study of wave forms through different types of CRO & sensing devices have been included.

B: OBJECTIVES:

On competition of the subject, the student will able to understand:

1. Performance characteristics of an instrument.
2. Operation of PMMC & moving iron instrument and principle of working of voltmeter, ammeter, Ohmeter .
3. Operation of Digital voltmeter, display of $3^{1/2}$, $4^{1/2}$– Digital Multimeter,
4. Resolution and Sensitivity of Digital Meters
5. Operation of Digital multimeter
6. Operation and working principle of simple CRO, Dual Trace CRO, Storage Oscillscope
7. Use of Lissajous Figures for Phase & frequency Measurement & application of CRO
8. Measurement of inductance, capacitance and Q factors by different bridge circuits
9. Method of Selecting a Transducer, the parameter & advantage of Electrical Transducer
10. The operation of Strain Gauges ,LVDT,capacitive pressure transducers ,Resistance thermometer & Thermister, pyrometer ,thermocouple & Load Cell (Pressure Cell)

C: TOPIC WISE TISTRUBUTION OF PERIODS :

Sl.No.	Topics	Periods
1.	QUALITIES OF MEASUREMENT	10
2.	INDICATING INSTRUMENTS	10
3.	DIGITAL INSTRUMENTS	10
4.	OSCILLOSCOPE	10
5.	BRIDGES	10
6.	TRANSDUCERS & SENSORS.	15
7.	SIGNAL GENERATORS	10
	TOTAL	**75**

D: COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1. Qualities of Measurement

1.1 Discuss the Static Characteristics, dynamic characteristics.
1.2 Define accuracy, sensitivity, reproducibility, & static error of instruments.
1.3 Define speed of instruments.
1.4 Define speed of response, fidelity, lag and dynamic error.
1.5 Define errors of an instrument.

2. Indicating Instruments

2.1 Introduction
2.2 Discuss the basic Principle of meter movement, permanent magnetic moving coil movement
2.3 Discuss the operation of Moving Iron Instrument
2.4 Discuss the principle of operation of DC Ammeter and Multi range Ammeter
2.5 Discuss the principle of operation of AC Ammeter and Multi range Ammeter
2.6 Discuss the operation of Ohm Meter
2.7 Discuss the operation of Analog Multimeter

3. Digital Instruments

3.1 Explain the principle of operation of Ramp type Digital Voltmeter
3.2 Explain the display of $3^{1/2}$, $4^{1/2}$– Digital Multimeter
3.3 Define the Resolution and Sensitivity of Digital Meters
3.4 Explain the principle of operation & working of Digital Multimeters
3.5 Explain the principle of operation & working of Digital Frequency Meter
3.6 Explain the principle of operation & working of Digital Measurement of Time
3.7 Explain Measurement of Frequency.
3.8 Explain the principle of operation & working of Digital Tachometer
3.9 Explain the principle of operation & working of Automation in Digital Instruments (Polarity Indication, Ranging, Zeroing & Fully Automatic)
3.10 Draw the block diagram of LCR meter.

4. Oscilloscope

4.1 Discuss the basic principle of Oscilloscope
4.2 Discuss the Block Diagram of Oscilloscope & simple CRO
4.3 Discuss the block diagram of Dual Trace Oscilloscope
4.4 Discuss the dual trace CRO specification
4.5 Explain the use of Lissajous Figures for Phase & frequency Measurement
4.6 Applications of Oscilloscope (Voltage period & frequency measurement)
4.7 Explain the operation of Digital Storage Oscilloscope

5. Bridges

5.1 Explain the working of Wheatstone's Bridge (Measurement of Resistance)
5.2 Explain the measurement of self inductance by Maxwell's Bridge
5.3 Explain the measurement of self inductance by Hay's Bridge
5.4 Explain the measurement of capacitance by Schering's Bridge
5.5 Explain the measurement of capacitance by a Bridge.
5.6 Discuss the working principle of Q meter
5.7 Explain the measurement of frequency & working principle of Wien Bridge
5.8 Discuss the working principle of LCR Bridge

6. Transducers & Sensors

6.1 Discuss the parameter & advantage of Electrical Transducer
6.2 Discuss the method of Selecting a Transducer
6.3 Discuss Resistive Transducer
6.4 Explain the working principle of Strain Gauges, define Strain Gauge (No mathematical derivation)
6.5 Explain the working principle of LVDT
6.6 Explain the working principle of capacitive transducers (pressure)
6.7 Explain the working principle of Load Cell (Pressure Cell)

6.8 Explain the working of Temperature Transducer (RTD, Optical Pyrometer, Thermocouple, Thermister)

6.9 Explain the working of Current transducer and KW Transducer.

6.10 Explain the working of Proximity & Light sensors.

7. SIGINAL GENERATOR

7.1 Explain the working principle of audio frequency & Square wave generator .

7.2 Explain the working principle of a Function Generator.

RECOMMENDED BOOKS:

a) TEXT BOOKS:

1. Electronic Instrumentation by H S Kalsi Tata Mc Graw-Hall
2. Industrial Instrumentation Control by S.K.Singh
3. Electrical & Electronic measurement & Instrumentation by A.K.Sawheny.

b) REFEERENCE BOOKS:

1. Electrical & Electronic Measurements & Instrumentation by R.K.Rajput, S.Chand.
2. Electrical measurement & measuring Instrument by Golding & Widdis
3. Electronics Instrumentation by Cooper.

ANALOG ELECTRONICS LAB – I

THIRD SEMESTER

Period / Week: 4
Total Contact hrs:60

End Exam.: 25
Sessional: 25
Exam. Time: 4 Hours

A: RATIONATE

In this practical work the students knowledge about the Analog Systems components. They will became capable of developing and implementing Analog Circuit.

B: OBJECTIVE

On complition of the Lab. Course the student will able to

1. Identify the active components
2. Understand the behaviour character of basic semiconductor devices.
3. Understand the concept of oscillator, Amplifier, Rectifier etc.

C: COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1. Determine the input and output characteristics of CE & CB transistor configurations.
2. Determine Drain & Transfer characteristics of JFET.
3. Construct Bridge Rectifier using different filter circuit and to determine Ripple factor & analysed wave form with filter & without filter.
4. Construct Bridge Rectifier using different filters and to determine Ripple factor.
5. Construct & test the regulator using zener diode.
6. Construct different types biasing circuit and analysed the wave form.
   (i) Fixed bias. (ii) Emitter bias (iii) Voltage divider bias
7. Study the single stage CE amplifier & find Gain.
8. Study multi stage R-C coupled amplifier & to determine frequency Response & gain.
9. Construct & Find the gain
   (i) Class A Amplifier. (ii) Class B Amplifier
10. Construct & test Push Pull amplifier & observe the wave form
11. Construct & calculate the frequency of
    (i) Hartly Oscillator (ii) Collpit's Oscillator (iii) Wein Bridge Oscillator (iv) R-C phase shift Oscillator and draw the wave form & Calculate the frequency
12. Construct & Test Differentor and Integrator using R-C Circuit.
13. Study Multivibrator (Astable, Bistable, Monstable) Circuit & Draw its Wave forms using IC555.
14. Mini Project : To collect data like base configuration, Operational characteristics, applications and critical factors etc. on all semiconductor devices studied in theory and compile a project report through out and submit at the end of the semester.
    To assemble and test simple circuit using above components with test points. (e.g. Series Regulator / Oscillators etc)

References:

1. Basic electronic Lab. Manual by Paul B. Zbar.
2. Perform experiment on any ten of the following.

N.B: Perform experiment on any ten including experiment No. 14

CIRCUIT THEORY LAB (USING P-SPICE SOFTWARE)

THIRD SEMESTER

Period / Week: 4
Total Contact hrs:60

End Exam.: 50
Sessional: 50
Exam. Time: 4 Hours

A: Rationale

The response of Electrical Circuit can be verified practically by applying different theorems and fundamental techniques. The students will becom sure that the theoretical tricks which they have learned from books are true. The students will become competent in the field of circuit analysis.

B: Objective

On completion of the Lab course the student will able to

1. Verify the theorems using circuit theorems.
2. Know the various type of filters.
3. Know to draw different circuits using P-SPICE Software.

C: COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1. Verification Of
   (a) Super positions Theorem
   (b) Thevenin's Theorem
   (c) Norton's Theorem
   (d) Milliman's Theorem
   (e) Maximum power theorem
   (f) Maximum Power transfer Theorem
2. Determine resonant frequency of series R-L-C circuit.
3. Study of High Pass filter and determination of cut-off frequency.
4. Study of Low Pass filter and determination of cut-off frequency.
5. Study of Band pass Filter and Band Elimination Filter and determination of its cut-off frequency.
6. Develop the circuit diagram and explain response of series resonant circuit
7. Analysis the charging and discharging of an R-C & R-L circuit with oscilloscope. Compute the time constant from the tabulated data and determine the rise time graphically.
8. Determine the time constant of R-L-C circuit and analysis the transient response (rise time, overshoot, damping factor from the oscilloscope)
9. Circuit simulation using P-SPICE software.
   Construct above circuits using P-SPICE software and compare the measurements and wave forms.
11. Determination of Parameters of Two Port Network (h-parameter)
12. Mini Project: To collect data of catalogues and specification sheet of all the equipment & components used for performing experiment and submit the project on P-SPICE software into Analysis and Plot the graph of each measurement at the end of semester e.g. Butter Worth Filter

N.B: Experiment-1 to 7 using hardware and rest using software
Perform any six from experiment 2 to 11, experiment 1 is compulsory and total number of experiments is 10

DIGITAL ELECTRONICS LAB
THIRD SEMESTER

Period / Week: 4
Total Contact hrs:60

End Exam.: 25
Sessional: 25
Exam. Time: 4 Hours

A: RATIONALE:

In this practical work students knowledge about the Digital systems will be reinforced. They will become capable of developing and implementing Digital Circuits. They will also be able to acquire skills of operating A/D and D/A converters, counters and display system.

B: OBJECTIVE:

On completion of the Lab course the student will able to

1. Familiarized with use of Digital ICs.
2. Understand and comprehended the simple the Digital design Circuits.
3. Know A/D & D/A conversions.

C: COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1. Familiarization of Digital Trainer Kit, logic Pulser Logic Probe & Digital ICs IE 7400, 7402, 7404,7408, 7432 & 7486.
2. Verify truth tables of AND, OR, NOT, NOR, NAND, XOR, XNOR gates.
3. Implement various gates by using universal properties of NAND,&NOR gates verify and truth table tabulate data.
4. Implement Half adder and Full adder using logic gates.
5. Implement Half subtractor and Full subtractor using logic gates.
6. Implement a 4-bit Binary to Gray code converter.
7. Implement a Single bit digital comparator.
8. Study Multiplexer and demultiplexer.
9. Study of flip-flops
   (i) S-R flip flop (ii) J-K flip flop (iii) D flip flop (iv) T flip flop
10. Realize a 4-bit asynchronous UP/Down counter with a control for up/down counting.
11. Realize a 4-bit synchronous UP/Down counter with a control for up/down counting.
12. Implement Mod-10 asynchronous counters.
13. Study shift registers.
14. Study 8-bit D /A and A/ D conversion.
15. Study display devices, LED, LCD, 7-segment displays.
16. .Mini Project : To collect data like pin configurations, display devices, Operational characteristics, applications and critical factors etc. on all digital ICs studied in theory and compile a project report through out and submit at the end of the semester. To assemble and tests circuits using above digital ICs with test points e.g. Digital Clock / Frequency Counter / Running Glow Light upto 999.

(All the above experiments are to be conducted by through study of ICs)

Perform experiment on any 12 of the following including mini project.

Book: Electronics Lab Premier- Sacikala,Schand

ELECTRONICS MEASUREMENTS & INSTRUMENTATION LAB

THIRD SEMESTER

Period / Week: 3
Total Contact hrs:45

End Exam.: 25
Sessional: 25
Exam. Time: 4 Hours

A: RATIONALE:

In this practical the student will know different measurement of different equipments i.e. CRO, RLC Bridge, Multimeters & Bridges. This Practical will helps for accurate value of different transducer.

B: : OBJECTIVE:

On completion of the Lab course the student will able to

1. know different Bridges & observe its wave form
2. Know the different Measuring equipment
3. Know different Transducers

C: COURSE CONTENT IN TERMS OF SPECIFIC OBJECTIVES

1. Construct RLC Bridge to measure R,L, & C.
2. Observe the wave forms of different frequency by using Function generator and draw its diagram. & measure the amplitude and frequency using dual trace CRO.
3. Measure the unknown frequency and phase angle using CRO by lissajous figure.
4. Measurement of resistance using Wheatstone's Bridge
5. Measure the inductance by Maxwell's Bridge
6. Measure the inductance by Hay's Bridge
7. Measure the capacitance by Schering's Bridge
8. Measure the Resistance, Capacitance of circuit (Series & parallel) by using LCR meter and find the Q factor of the coil.
9. Measure displacement using LVDT Transducer.
10. Measure the temperature using RTD
11. Measure the temperature using Thermister.
12. Measure Resistor, Capacitor, Diode, & Transistor Using CRO
13. Construct & Test the performance of Proximity Sensor.
14. Mini Project : To collect data like base configuration, Operational characteristics, applications and critical factors etc. on all measuring devices & studied in theory and compile a project report through out and submit at the end of the semester
15. Study of the construction of moving coil and moving iron instruments.
16. Study of static and dynamic characteristics of PMMC & moving iron instruments.
17. Study of Resolution, sensitivity of digital instruments.
18. Study of characteristics of strain gauge
19. Study of load cell.
20. Procedure for caliberation of an instrument.

N.B. Perform any 3 from 4 to 8 & any 7 from others