

UNIVERSITY OF KERALA

B. TECH. DEGREE COURSE

(2013 SCHEME)

SYLLABUS FOR

III SEMESTER

APPLIED ELECTRONICS and INSTRUMENTATION ENGINEERING

SCHEME -2013

III SEMESTER

APPLIED ELECTRONICS and INSTRUMENTATION ENGINEERING (A)

Course No	Name of subject	Credits	Weekly load, hours			C A Marks	Exam Duration Hrs	U E Max Marks	Total Marks
			L	T	D/P				
13.301	Engineering Mathematics-II (ABCEFHMNPRSTU)	4	3	1	-	50	3	100	150
13.302	Signals & Systems (AT)	4	3	1	-	50	3	100	150
13.303	Network Analysis (AT)	4	3	1	-	50	3	100	150
13.304	Basic Instrumentation (A)	3	2	1	-	50	3	100	150
13.305	Functional Electronics (A)	4	3	1	-	50	3	100	150
13.306	Digital Circuit Design (A)	4	3	1	-	50	3	100	150
13.307	Electronic Devices Lab (AT)	3	-	-	3	50	3	100	150
13.308	Electronics Circuits & Simulation Lab (A)	3	-	-	3	50	3	100	150
Total		29	17	6	6	400		800	1200

13.301 ENGINEERING MATHEMATICS - II (ABCEFHMNPRSTU)

Teaching Scheme: 3(L) - 1(T) - 0(P)

Credits: 4

Course Objective:

This course provides students a basic understanding of vector calculus, Fourier series and Fourier transforms which are very useful in many engineering fields. Partial differential equations and its applications are also introduced as a part of this course.

Module – I

Vector differentiation and integration: Scalar and vector functions-differentiation of vector functions-velocity and acceleration - scalar and vector fields - vector differential operator- Gradient-Physical interpretation of gradient - directional derivative – divergence - curl - identities involving ∇ (no proof) - irrotational and solenoidal fields - scalar potential.

Vector integration: Line, surface and volume integrals. Green's theorem in plane. Stoke's theorem and Gauss divergence theorem (no proof).

Module – II

Fourier series: Fourier series of periodic functions. Dirichlet's condition for convergence. Odd and even functions. Half range expansions.

Fourier Transforms: Fourier integral theorem (no proof) –Complex form of Fourier integrals-Fourier integral representation of a function- Fourier transforms – Fourier sine and cosine transforms, inverse Fourier transforms, properties.

Module – III

Partial differential equations: Formation of PDE. Solution by direct integration. Solution of Lagrange's Linear equation. Nonlinear equations - Charpit method. Homogeneous PDE with constant coefficients.

Module – IV

Applications of Partial differential equations: Solution by separation of variables. One dimensional Wave and Heat equations (Derivation and solutions by separation of variables). Steady state condition in one dimensional heat equation. Boundary Value problems in one dimensional Wave and Heat Equations.

References:

1. Kreyszig E., *Advanced Engineering Mathematics*, 9/e, Wiley India, 2013.
2. Grewal B. S., *Higher Engineering Mathematics*, 13/e, Khanna Publications, 2012.

3. Ramana B.V., *Higher Engineering Mathematics*, Tata McGraw Hill, 2007.
4. Greenberg M. D., *Advanced Engineering Mathematics*, 2/e, Pearson, 1998.
5. Bali N. P. and M. Goyal, *Engineering Mathematics*, 7/e, Laxmi Publications, India, 2012.
6. Koneru S. R., *Engineering Mathematics*, 2/e, Universities Press (India) Pvt. Ltd., 2012.

Internal Continuous Assessment (Maximum Marks-50)

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Five Short answer questions of 4 marks each. All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

Part B (80 Marks) - Candidates have to answer one full question out of the two from each module. Each question carries 20 marks.

Course Outcome:

At the end of the course, the students will have the basic concepts of vector analysis, Fourier series, Fourier transforms and Partial differential equations which they can use later to solve problems related to engineering fields.

13.302 SIGNALS & SYSTEMS (AT)

Teaching Scheme: 3(L) - 1(T) - 0(P)

Credits: 4

Course objectives:

To study the theory of signals and system. To study the interaction of signals with physical system. To study the properties of Fourier transform, Laplace transform, signal transform through linear system, relation between convolution and correlation of signals, sampling theorem and techniques, and transform analysis of LTI systems.

Module – I

Classification and Representation of Continuous time and Discrete time signals. Elementary signals, Signal operations. Continuous Time and Discrete Time Systems - Classification, Properties. Representation - Differential Equation representation of Continuous Time Systems. Difference Equation Representation of Discrete Systems.

Continuous Time LTI systems and Convolution Integral, Discrete Time LTI systems and linear convolution. Stability and causality of LTI systems. Correlation between signals, orthogonality of signals.

Module – II

Laplace Transform – ROC – Inverse transform – properties – unilateral Laplace Transform. Frequency Domain Representation of Continuous Time Signals- Continuous Time Fourier Series and its properties Convergence. Continuous Time Fourier Transform: Properties. Relation between Fourier and Laplace Transforms. Analysis of LTI systems using Laplace and Fourier Transforms. Concept of transfer function, Frequency response, Magnitude and phase response. Energy and power spectral densities. Condition for distortionless transmission.

Module – III

Sampling of continuous time signals, Sampling theorem for lowpass signals, aliasing. Sampling techniques, Ideal sampling, natural sampling and Flat-top sampling. Reconstruction, Interpolation formula. Sampling of bandpass signals.

Hilbert Transform, Continuous time Hilbert transform, properties, Pre-envelope of continuous time signals. Discrete time Hilbert transform.

Module – IV

Z transform – ROC – Inverse transform – properties –unilateral Z transform.

Frequency Domain Representation of Discrete Time Signals- Discrete Time Fourier Series and its properties, Discrete Time Fourier Transform (DTFT) and its properties. Relation

between DTFT and Z-Transform. Analysis of Discrete Time LTI systems using Z transforms and DTFT. Transfer function, Magnitude and phase response.

References

1. Oppenheim A. V. and A. Willsky, *Signals and Systems*, 2/e, PHI, 2009.
2. Rawat T. K., *Signals and Systems*, Oxford University Press, 2010.
3. Haykin S., *Signals & Systems*, 2/e, John Wiley, 2003.
4. Ziemer R. E., *Signals & Systems - Continuous and Discrete*, 4/e, Pearson, 2013.
5. Lathi B. P., *Principles of Signal Processing & Linear systems*, Oxford University Press, 2010.
6. Hsu H. P., *Signals and Systems*, 3/e, McGraw Hill, 2013.
7. Roberts M. J., *Signals and Systems*, 3/e, Tata McGraw Hill, 2003.
8. Kumar A., *Signals and Systems*, 3/e, PHI, 2013.
9. Chaparro L. F., *Signals and system using MATLAB*, Elsevier, 2011.
10. Yang W. W. et. al., *Signals and Systems with MATLAB*, Springer, 2009.

Internal Continuous Assessment (Maximum Marks-50)

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Ten Short answer questions of 2 marks each. All questions are compulsory. There should be at least two questions from each module and not more than three questions from any module.

Part B (80 Marks) - Candidates have to answer one full question out of the two from each module. Each question carries 20 marks.

Note: Question paper should contain minimum 60% and maximum 80% Problems and Analysis.

Course outcome:

After completion of the course students will have a good knowledge in signals, system and applications.

13.303 NETWORK ANALYSIS (AT)

Teaching Scheme: 3(L) - 1(T) - 0(P)

Credits: 4

Course Objectives :

- *To make the students capable of analyzing any given electrical network.*
- *To study the transient response of series and parallel A.C. Circuits.*
- *To study the concept of coupled circuits and two port networks.*
- *To make the students learn how to synthesize an electrical network from a given impedance / admittance function.*

Module – I

Network Topology, Network graphs, Trees, Incidence matrix, Tie-set matrix, Cut-set matrix and Dual networks.

Solution methods: Mesh and node analysis, Star-Delta transformation.

Network theorems: Thevenin's theorem, Norton's theorem, Superposition theorem, Reciprocity theorem, Millman's theorem, Maximum Power Transfer theorem.

Signal representation - Impulse, step, pulse and ramp function, waveform synthesis.

Module – II

Laplace Transform in the Network Analysis: Initial and Final conditions, Transformed impedance and circuits, Transform of signal waveform. Transient analysis of RL, RC, and RLC networks with impulse, step and sinusoidal inputs. Analysis of networks with transformed impedances and dependent sources.

S-Domain analysis: The concept of complex frequency, Network functions for the one port and two port - Poles and Zeros of network functions, Significance of Poles and Zeros, properties of driving point and transfer functions, Time domain response from pole zero plot.

Module – III

Parameters of two-port network: impedance, admittance, transmission and hybrid parameters, Reciprocal and Symmetrical two ports. Characteristic impedance, Image Impedance and propagation constant.

Resonance: Series resonance, bandwidth, Q factor and Selectivity, Parallel resonance. Coupled circuits: single tuned and double tuned circuits, dot convention, coefficient of coupling, analysis of coupled circuits.

Module – IV

Network Synthesis: Introduction, Elements of Realisability Theory: Causality and Stability, Hurwitz Polynomial, Positive Real Functions. Properties and Synthesis of R-L networks by the Foster and Cauer methods, Properties and Synthesis of R-C networks by the Foster and Cauer methods.

References:

1. Valkenburg V., *Network Analysis*, 3/e, PHI, 2011.
2. Sudhakar A. and S. P. Shyammohan, *Circuits and Networks- Analysis and Synthesis*, 3/e, TMH, 2006.
3. Choudhary R., *Networks and Systems*, 2/e, New Age International, 2013.
4. Kuo F. F., *Network Analysis and Synthesis*, 2/e, Wiley India, 2012.
5. Gupta B. R. and V. Singhal, *Fundamentals of Electrical Networks*, S. Chand, 2009.
6. Sinha U., *Network Analysis & Synthesis*, 7/e, Satya Prakashan, 2012.
7. Ghosh S., *Network Theory – Analysis & Synthesis*, PHI, 2013.
8. Somanathan Nair B., *Network Analysis and Synthesis*, Elsevier, 2012.

Internal Continuous Assessment (Maximum Marks-50)

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Ten Short answer questions of 2 marks each. All questions are compulsory. There should be at least two questions from each module and not more than three questions from any module.

Part B (80 Marks) - Candidates have to answer one full question out of the two from each module. Each question carries 20 marks.

Note: Question paper should contain minimum 60% and maximum 80% Problems and Analysis.

Course outcome:

- At the end of the course students will be able analyse the electrical circuits and synthesize the electrical circuits.

13.304 BASIC INSTRUMENTATION (A)

Teaching Scheme: 2(L) - 1(T) - 0(P)

Credits: 3

Course Objectives:

This course provides students an insight on various electronic instruments, their configuration and measurements using them. Transducers and their principle of operation are also introduced as a part of this course.

Module – I

Generalized configurations of instruments - Functional elements. Classification of instruments - examples, I/O Configuration, Methods of Correction. Generalized performance characteristics of instruments - Static characteristics and Dynamic characteristics. Measurement of resistance, inductance and capacitance using bridges - Wheatstone, Kelvin, Maxwell, Hay and Shering's bridges.

Module – II

Transducers - Classification, Selection of transducers. Resistance transducers - Principle of operation, resistance, potentiometers. Inductive Transducers - Induction potentiometer, variable reluctance transducers, LVDT, eddy current transducers, synchros and resolvers. Capacitive transducers - different types, capacitor microphone. Hall Effect transducer, proximity transducer, magnetostrictive transducers.

Module – III

Megger and Q meter. Electronic Multimeter, Audio Power Meter, RF power meter, True RMS meter. Digital Instruments - Basics, digital measurement of time, phase, frequency, Digital LCR meter and digital voltmeter. Function generator, sweep frequency generator, Frequency synthesizer (block diagram only).

Module – IV

Cathode Ray Tube, Cathode ray oscilloscope, Dual trace oscilloscope, Dual beam and Split beam. Oscilloscope controls - measurements of voltage, frequency and phase. Lissajous figures, Z axis modulation, oscilloscope probes. Special oscilloscopes - operation, controls and application of analog storage. Sampling and digital storage oscilloscopes.

References :

1. Murthy D. V. S., *Transducers and Instrumentation*, PHI, 1995.
2. Doebelin E., *Measurement Systems*, 5/e, McGraw Hill, 2003.
3. Helfrick A. D. and W. D. Cooper: *Modern Electronic Instrumentation and Measurement Techniques*, 5/e, PHI, 2003.

4. Bell D. A., *Electronic Instrumentation and Measurements*, PHI, 2003.
5. Patranabis D., *Principles of Electronic Instrumentation*, PHI, 2008.
6. Coombs Jr C. F., *Electronic Instrument Hand book*, 3/e, McGraw Hill, 1999.
7. Carr J. J., *Elements of Electronic Instrumentation and Measurements*, 3/e, Pearson Education, 1995.
8. Patranabis D., *Sensors and Transducers*, 2/e, PHI, 2003.
9. Kishore K. L., *Electronic Measurements and Instrumentation*, 3/e, Pearson, 2009.
10. Kalsi H. S., *Electronic Instrumentation*, 3/e, Tata McGraw Hill, 2010.

Internal Continuous Assessment (Maximum Marks-50)

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Ten Short answer questions of 2 marks each. All questions are compulsory. There should be at least two questions from each module and not more than three questions from any module.

Part B (80 Marks) - Candidates have to answer one full question out of the two from each module. Each question carries 20 marks.

Course Outcome:

At the end of the course, the students will be familiar with various electronic instruments, their configuration and measurements using them. They'll also become acquainted with the principle operation of transducers and their working.

13.305 FUNCTIONAL ELECTRONICS (A)

Teaching Scheme: 3(L) - 1(T) - 0(P)

Credits: 4

Course Objectives :

- *Developing skills to perform analysis and design of RC Circuits*
- *Developing skills for analyzing small signal and high frequency equivalent circuits of BJTs and MOSFETs*
- *Developing skills for the analysis and design of various amplifiers, oscillators and multivibrators*

Module – I

RC Circuits: Integrator, differentiator, clipping and clamping circuits.

DC analysis of BJTs - graphical analysis, BJT as amplifier, RC coupled amplifier, Frequency Response.

Small signal equivalent circuits - h parameter model and low frequency model. Transistor Biasing circuits, stability factors, thermal runaway.

Small signal analysis of CE, CB, CC configurations - gain, input and output impedance, (using low frequency π model).

Module – II

MOSFET I-V relation, graphical analysis, load lines, small signal parameters, small signal equivalent circuits, body effect, biasing of MOSFETs amplifiers.

Analysis of Single stage discrete MOSFET amplifiers - small signal voltage and current gain, input and output impedance of basic CS amplifier, CS amplifier with source resistor, CS amplifier with source by pass capacitor, source follower amplifier, CG amplifier.

Module – III

High frequency equivalent circuits of MOSFETs, Miller effect, short circuit current gain. Low frequency and high frequency response of CS, CG, CD amplifiers.

Multistage MOSFET amplifiers – cascade and cascode amplifiers and its dc analysis, small signal analysis. Frequency response of cascade and cascode amplifiers.

Feedback amplifiers - Properties of negative feedback. The four basic feedback topologies.

Module – IV

BJT as switch: – switching circuits – astable, monostable, bistable multivibrators and schmitt trigger circuits.

Low frequency Oscillators using BJT: Barkhausen criterion, RC phase shift and Wien bridge oscillators - analysis. High frequency oscillators using BJT - Hartley, Colpitts, Clapp, Crystal oscillators and UJT Oscillators.

Power amplifiers using BJT: Class A, B, AB, C circuits - efficiency and distortion. Biasing of class AB circuits. Transformerless power amplifiers.

References :

1. Sedra A. S. and K. C. Smith, *Microelectronic Circuits*, 6/e, Oxford University Press, 2013.
2. Neamen D., *Electronic Circuit Analysis and Design*, 3/e, TMH, 2006.
3. Boylestad R. L. and L. Nashelsky, *Electronic Devices and Circuit Theory*, 10/e, Pearson, 2009.
4. Spencer R. R. and M. S. Ghausi, *Introduction to Electronic Circuit Design*, Pearson, 2003.
5. Howe R. and C. Sodini, *Microelectronics: An Integrated Approach*, Pearson, 2008.
6. Kumar B. and S. B. Jain, *Electronic Devices & Circuits*, PHI, 2008.

Internal Continuous Assessment (Maximum Marks-50)

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Ten Short answer questions of 2 marks each. All questions are compulsory. There should be at least two questions from each module and not more than three questions from any module.

Part B (80 Marks) - Candidates have to answer one full question out of the two from each module. Each question carries 20 marks.

Note: *Question paper should contain minimum 50% and maximum 70% Analysis, Design and Problems.*

Course Outcome:

After the completion of this course, students will get necessary foundation for analysing and designing of various electronic circuits with BJTs as well as MOSFETS. The study of small signal circuits equips students with fundamental concepts and various parameters that should be borne in mind while designing electronic circuits.

13.306 DIGITAL CIRCUIT DESIGN (A)

Teaching Scheme: 3(L) - 1(T) - 0(P)

Credits: 4

Course Objectives :

- *To study the concepts of number systems.*
- *To study the design of combination logic and sequential logic.*
- *To make the student familiar with internal structure of various digital logic families.*
- *To provide students the fundamentals to the design and analysis of digital circuits*

Module – I

Review of Boolean algebra, Binary arithmetic and Binary codes: BCD, Gray codes, Excess-3 codes.

Logic function representation in Sum of product and product of sum form, Canonical forms, Logic reduction using Karnaugh map and Quine McCluskey method, Introduction to hazards and hazard free design using K-map.

Combinational circuits: Adders, Subtractors, Adder/Subtractor (4 bit) circuit, ripple carry and look ahead carry adders, BCD adder, decoders, BCD to seven-segment decoder, encoders, key board encoder, multiplexers, de-multiplexers, Function realization using MUX and DEMUX.

Module – II

Sequential circuits- Latches and flip flops, SR, JK, D, T, race around, edge triggering, Master slave, Excitation table and characteristic equations, state diagram representation, flip flop timing specifications.

Design of binary counters - Synchronous, Asynchronous, Mod-N counters, Random sequence generators, BCD counter, counter IC's (7490, 7492, and 7493).

Shift Registers, Shift register counters (Ring and Johnson).

Timing circuits- astable and monostable multivibrators using 555, 74121.

Module – III

Mealy and Moore models, state machine notation, state diagram, state table, transition table, excitation table and equations, state equivalence, state reduction, state assignment techniques.

Analysis of synchronous sequential circuits.

Asynchronous sequential circuit - basic structure, equivalence and minimization, minimization of completely specified machines.

Module – IV

Logic families - comparison of logic families in terms of fan-in, fan-out, speed, power, noise margin etc. Basic circuit and working of gates NOT, NAND, AND, and OR in CMOS and NAND in TTL logic, interfacing of TTL and CMOS.

Programmable logic devices: PAL, PLA, FPGA, CPLD

Introduction to VHDL- VHDL description for basic gates, flip flops.

References:

1. Roth (Jr.) C. H., *Fundamentals of Logic Design*, 6/e, Cengage Learning, 2010.
2. Anand Kumar A., *Fundamentals of Digital Circuits*, 2/e, PHI, 2012
3. Yarbrough J. M., *Digital logic- Application and Design*, Thomson Learning, 2006.
4. Wakerly J., *Digital Design Principles and Practice*, 4/e, Pearson, 2012.
5. Floyd T. L., *Digital Fundamentals*, 10/e, Pearson, 2011.
6. Mano M. M. And M. D. Ciletti, *Digital Design*, 4/e, Pearson, 2009.
7. DeMessa T. A., Z. Cieccone, *Digital Integrated Circuits*, Wiley India, 2007.

Internal Continuous Assessment (Maximum Marks-50)

50% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, literature survey, seminar, term-project, software exercises, etc.

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

The question paper shall consist of 2 parts.

Part A (20 marks) - Ten Short answer questions of 2 marks each. All questions are compulsory. There should be at least two questions from each module and not more than three questions from any module.

Part B (80 Marks) - Candidates have to answer one full question out of the two from each module. Each question carries 20 marks.

Note: Question paper should contain minimum 50% and maximum 60% Analysis and Design.

Course Outcome:

After the completion of this course, students will get necessary foundation for analyzing and designing of various digital electronic circuits with gates and logic families.

13.307 ELECTRONIC DEVICES LAB (AT)

Teaching Scheme: 0(L) - 0(T) - 3(P)

Credits: 3

Course Objective:

- *The purpose of the course is to enable students to have the practical knowledge of different semiconductor electronic devices.*
- *To study the specifications of devices and circuits.*

List of Experiments:

1. Characteristics of diodes and Zener diode.
2. Characteristics of transistors (CE and CB).
3. Characteristics of JFET.
4. Characteristics of MOSFET.
5. Characteristics of SCR.
6. Characteristics of UJT.
7. RC integrating and differentiating circuits.
8. RC low pass and high pass filters - frequency response characteristics.
9. Zener Regulator with and without emitter follower.
10. RC coupled CE amplifier - frequency response characteristics.
11. MOSFET amplifier (CS) - frequency response characteristics.
12. Clipping and clamping circuits.
13. Rectifiers - half wave, full wave, bridge - with and without filter- ripple factor and regulation

Internal Continuous Assessment (Maximum Marks-50)

40% - Test

40% - Class work and Fair Record

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

Questions based on the list of experiments prescribed.

Circuit and design - 25%,

Performance (Wiring, usage of equipment and trouble shooting) - 15%

Result - 35%

Viva voce - 25%

Candidate shall submit the certified fair record for endorsement by the external examiner.

Course Outcome:

On successful completion of the course, students will be able to know the working of semiconductor devices and design of circuits using these devices.

13.308 ELECTRONICS CIRCUITS & SIMULATION LAB (A)

Teaching Scheme: 0(L) - 0(T) - 3(P)

Credits: 3

Course Objectives:

- *Developing skills in designing of various electronic circuits*
- *Developing skills in simulating various electronic circuits through SPICE*

PART - A

List of Experiments:

1. Feedback amplifiers (current series, voltage series). Gain and frequency response.
2. Power amplifiers (transformer less), Class B and Class AB.
3. Cascade amplifier- Gain and frequency- response.
4. Cascode amplifier - Frequency response.
5. Astable, Monostable and Bistable multivibrator circuits.
6. Schmitt trigger.
7. R-C Phase shift Oscillator and Wein bridge oscillator
8. LC Oscillator

PART – B

Introduction to SPICE

1. Models of resistor, capacitor, inductor, energy sources (VCVS, CCVS, Sinusoidal source, pulse, etc) and transformer.
2. Models of DIODE, BJT, FET, MOSFET, etc. sub circuits.

Simulation of following circuits using SPICE

(Schematic entry of circuits using standard packages). Analysis - (transient, AC, DC, etc.):

1. Potential divider.
2. Integrator & Differentiator (I/P PULSE) – Frequency response of RC circuits.
3. Diode Characteristics.
4. BJT Characteristics.
5. FET Characteristics.
6. MOS characteristics.
7. Full wave rectifiers (Transient analysis) including filter circuits.

8. Voltage Regulators.
9. Sweep Circuits.
10. RC Coupled amplifiers - Transient analysis and Frequency response.
11. FET & MOSFET amplifiers.
12. Multivibrators.

Internal Continuous Assessment (*Maximum Marks-50*)

40% - Test (For Part B only)

40% - Class work and Fair Record

20% - Regularity in the class

University Examination Pattern:

Examination duration: 3 hours

Maximum Total Marks: 100

Questions based on the experiments in Part A of the above list.

Circuit and design - 20%,

Performance (Wiring, usage of equipment and trouble shooting) - 20%

Result - 35%

Viva voce - 25% (covering part A & B)

Candidate shall submit the certified fair record for endorsement by the external examiner.

Course Outcome:

After successful completion of the practical, student will be able to analyse and design electronic circuits. Also the students will gain the knowledge to simulate various electronic circuits.