Minutes of the meeting, BOS of Electronics & Communication Engineering
(Held on 13.04.2019)

The ECE Department Board of Studies (BOS) meeting was conducted on 13.4.2019 at 10.30 A.M. at ECE Seminar hall. The following external members attended the meeting along with internal faculty members.. The ECE HOD, Dr E. Kusuma Kumari, BOS Chairman headed the meeting.

Details of members attended:

S.No	Name of the BOS Member	Nominee	Address
1.	Dr.E.Kusuma Kumari	Chair person	Professor & Head, ECE, SVEC
2.	Prof.I.Santhi Prabha	University Nominee	Prof.in ECE Dept., University College of Engg.,JNTUK, Kakinada
3.	Prof. M. Venugopala Rao	Subject Expert	Prof., ECE Dept., K.L.University, Vijayawada.
4.	Sri. Sunkavalli Siva Kumar	Alumni Nominee	Sr.Engineer,Qualcomm,Bangalore.
5.	Dr. P. Kishore Kumar	Invited Member	Asst.Professor, HOD, ECE,NIT, A.P
6.	All Faculty Members in Dept.	Members	ECE Dept., SVEC

The following are the key points discussed in the meeting.

Key Discussions:

- **Item No.1: Review of the B. Tech ECE Course Structure**

- The Chairman and BOS members reviewed the course structure of B. Tech ECE and suggested modifications in the structure.
- Members suggested to combine Analog Communication(V18ECT07) in IV sem and Digital communication(V18ECT11) in V Sem courses as a single course as Analog & Digital Communication Course (V18ECT07)
- Members suggested to include Advanced communication course (V18ECT16) in the VI Semester.
- Members suggested to combine the lab courses Analog Comm. Lab (V18ECL05) & Digital Communications Lab (V18ECL07) as a Communications Lab (V18ECL05) and to be included in IV Semester.
- In 5th Semester theory course Digital Communication (V18ECT11) & Digital Comm. Lab Course (V18ECL07) are replaced with Digital Signal Processing (V18ECT11) & Lab Courses (V18ECL07)
- Members suggested to include lab Course Mini Project using IOT(V18ECL12) and Theory Course Artificial Intelligence (V18ECT24) as program Elective Course in the course structure
- English BOS has renamed the titles of mandatory Courses Employability

Skills I (V18ENT03) & Employability Skills II (V18ENT04) to Professional Communication Skills I (V18ENT03) & Professional Communication Skills II (V18ENT04) respectively in the III & IV Semesters of Course structure.

- It was decided that the mandatory Course Constitution of India (V18ENT11) to be included instead of Indian Traditional Knowledge (V18ENT07) in the III Semester of Course structure.
- The approved course structure for the Academic Year 2019-20 was given in **Appendix-ECE-01**

➢ **Item No.2: Suggest syllabi for proposed III and IV Semester course structure for the Academic year 2019- 2020**

- The approved syllabi for courses offered in III &IV Semesters are given in **Appendix-ECE-02**
- For EEE & CSE Programmes, the following courses and Syllabus are approved and it was given in **Appendix-ECE-03**

S.No.	Programme	SEM	Course Code	Course Name
1	EEE	III	V18ECT05	Analog Electronics
2	EEE	III	V18ECL03	Analog Electronics Lab
3	CSE	III	V18ECT06	Digital Electronics
4	CSE	III	V18ECL04	Digital Electronics Lab

➢ **Item No 3: Approval for Course Structure For New Programme Electronics & Communication Technology**

- The Institution has filed an application with approved authorities for grant of New Programme Electronics & Communication Technology (ECT) for the academic year 2019-20.
- In this connection it is decided to follow the prescribed course structure of ECE I Semester & II Semester for the academic year 2019-20 for the new Programme ECT. Details are given in **Appendix-ECE-04.** Finally, the chairman thanked to all the BOS members and faculty. The meeting ended at 4.30 P.M

III Semester

S. No	Course Code	Course Name	L	T	P	Credits
1	V18ECT01	Electronic Devices & Circuits	3	1	-	4
2	V18ECT02	Digital System Design	3	-	-	3
3	V18ECT03	Signals & Systems	3	1	-	4
4	V18ECT 04	Network Theory	3	-	-	3
5	V18MBT51	Managerial Economics & Financial Analysis	3	-	-	3
6	V18ECL01	Electronic Devices & Circuits LAB	-	-	2	1
7	V18ECL02	Digital System Design LAB	-	-	2	1
8	V18ENT03	Professional Comm. Skills- I	3	-	-	MNC
9	V18ENT11	Constitution of India	2	-	-	MNC
		TOTAL	**20**	**2**	**4**	**19**

Total Contact Hours: 26 **Total Credits : 19**

IV Semester

S. No	Course Code	Course Name	L	T	P	Credits
1	V18ECT07	Analog & Digital Communications	3	1	-	4
2	V18ECT08	Analog Circuits	3	1	-	4
3	V18ECT09	Probability Theory & Stochastic Process	3	1	-	4
4	V18ECT10	Electromagnetic Waves & Transmission Lines	3	1	-	4
5	V18MAT03	Mathematics-III	3	-	-	3
6	V18ECL 05	Communications Lab	-	-	2	1
7	V18CSL32	Object Oriented Programming Through Java Lab	-	-	2	1
8	V18ECL06	Analog Circuits Lab	-	-	2	1
9	V18ENT04	Professional Comm Skills- II	3	-	-	MNC
		TOTAL	**18**	**4**	**6**	**22**

Total Contact Hours: 28 **Total Credits: 22**

III - SEMESTER

Course : Electronic Devices And Circuits

Code : V18ECT01

L	T	P	C
3	1	-	4

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

1. Explain the basic concepts of semiconductor physics and explain the formation of p-n Junction. **[K2]**
2. Discuss special semiconductor diodes. **[K2]**
3. Construct and working principle of rectifiers with and without filters with relevant expressions and necessary comparisons **[K3]**
4. Describe the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations. **[K2]**
5. Explain the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions. **[K2]**
6. Analyze small signal low frequency transistor amplifier circuits using BJT and FET in different configurations. **[K4]**

Syllabus:

UNIT-I:Semi Conductor Physics & Junction diode characteristics: Review of semiconductor physics, continuity equation, law of junction, p-n junction diode, current components in PN junction Diode, derivation of diode equation, V-I Characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode.

UNIT- II: Special Semiconductor Diodes: Zener Diode, Breakdown mechanisms, Zener diode applications, LED, LCD, LDR, Photo diode, Photo transistor, Varactor diode, Tunnel Diode, DIAC, TRIAC, SCR, UJT, Construction, operation and characteristics of all the diodes are required to be considered.

UNIT- III: Rectifiers and Filters: Basic Rectifier setup**,** half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, L-section filter, π-section filter multiple L section and π-section filter, derivation for ripple factor in each case.

UNIT- IV: Transistor Characteristics: BJT: Junction transistor, transistor current components, transistor equation, transistor configurations, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, punch through/ reach through, typical transistor junction voltage values.

FET: FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

UNIT- V: Transistor Biasing and Thermal Stabilization: Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias, Stabilization against variations in VBE, Ic, and β, Stability factors, (S, S', S''), Bias compensation, Thermal runaway, Thermal stability. FET Biasing.

UNIT- VI: Small Signal Low Frequency Transistor Amplifier Models:

BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, Generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers. Generalized analysis of FET amplifier small signal model, analysis of CS amplifier.

Text Books:

1. Electronic Devices and Circuits- J. Millman, C. Halkias, Tata Mc-Graw Hill, Second Edition.
2. Integrated Electronics- Jacob Millman, C. Halkies, C.D.Parikh, Tata Mc-Graw Hill, 2009.
3. Electronic Devices and Circuits – R.L Boylestad and Louis Nashelsky, Pearson publications

References:

1. Electronic Devices and Circuits-K. Satya Prasad, VGS Book Links.
2. Electronic Devices and Circuits-Salivahanan, Kumar, Vallavaraj, Tata Mc-Graw Hill, Second Edition
3. Electronic Devices and Circuits – Bell, Oxford
4. Electronic Devices and Circuits-A.P Godse,U.A.Bakshi , Technical publications

Course: Digital System Design
Code:V18ECT02

L	T	P	C
3	-	-	3

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

1. Explain the various types of number systems and their conversions, codes and logic Gates.(K_2)
2. Apply the minimization techniques to simplify the hardware requirements of digital circuits. (K_3)
3. Develop basic digital circuits with combinational logic using IEEE Standard 1076 Hardware Description Language (VHDL). (K_3)
4. Develop basic digital circuits with sequential logic using IEEE Standard 1076 Hardware Description Language (VHDL). (K_3)
5. Apply the knowledge of flip flops to construct different finite state machines (K_3)
6. Explain the concepts of different programmable logic devices. (K_2)

UNIT – I: NUMBER SYSTEMS & CODES

i) Representation of numbers of different radix, conversion from one radix to another radix, r-1's and r's complements of signed members, problem solving.
ii) 4 bit codes, BCD, Excess-3, 2421, 84-2-1 code etc.,
iii) Basic logic operations -NOT, OR, AND, Universal building blocks, EX-OR, EX-NOR - Gates, Standard SOP and POS forms, Gray code, error detection and correction codes, NAND-NAND and NOR-NOR realizations.

UNIT – II: MINIMIZATION TECHNIQUES

Boolean theorems, principle of complementation & duality, De-Morgan theorems, minimization of logic functions using Boolean theorems, minimization of switching functions using K-Map up to 4 variables, tabular minimization, problem solving (code-converters using K-Map etc..).

COMBINATIONAL LOGIC CIRCUITS DESIGN - I

Design of half adder, full adder, half subtractor, full subtractor, 4-bit adder-subtractor circuit, BCD adder circuit, Look-a-head adder circuit.

UNIT – III: COMBINATIONAL LOGIC CIRCUITS DESIGN -II

Design of decoder, encoder, priority encoder, multiplexer and demultiplexer, 4-bit digital comparator, Higher order multiplexing and demultiplexing, Realization of Boolean functions using decoders and multiplexers, Modeling of combinational logic circuits using VHDL.

UNIT – IV: SEQUENTIAL CIRCUITS-I

Classification of sequential circuits, basic flip-flops, truth tables and excitation tables, Conversion from one flip-flop to another flip-flop.
Design of registers: shift register, bi-directional shift register and universal shift register. Design of ripple counters, design of synchronous counters, Johnson counter, ring counter. Modeling of sequential circuits using VHDL

UNIT – V: SEQUENTIAL CIRCUITS-II

Finite state machine, Analysis of clocked sequential circuits, state diagrams, state tables, reduction of state tables and state assignment, design procedures. Realization of circuits using various flip-flops. Mealy to Moore conversion and vice-versa.

UNIT-VI: INTRODUCTION TO PLDs

PROM, PAL, PLA-Basics structures, merits & demerits, comparison, realization of Boolean functions and programming tables using PROM, PAL, PLA.

TEXT BOOKS:

1. Switching and finite automata theory-Zvi Kohavi,TMH, 2nd edition, 2008
2. Switching Theory and Logic Design - A. Anand Kumar, PHI Learning Pvt. Ltd, 3rd edition, 2016.
3. Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd edition, 2005.
4. Digital Design - M.Morris Mano, Michael D Ciletti, Pearson Education Asia, 4th edition.
5. VHDL Primer – J. Bhasker, Pearson Education/ PHI, 3rd Edition.

REFERENCES:

1. Modern Digital Electronics - RP Jain, TMH Education Pvt., Ltd.,, 4th edition, 2010.
2. Fundamentals of Logic Design - Charles H. Roth Jr, Jaico Publishers.
3. Fundamentals of Digital Logic with VHDL Design- Stephen Brown, ZvonkoVranesic, McGraw-Hill, 3rd Edition.

Course : Signals & Systems
Code : V18ECT03

L	T	P	C
3	1	-	4

Prerequisite: Fundamentals of Electrical Circuits, Linear Algebra and Differential Equations, Ordinary Differential Equations.

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO1: Apply the knowledge of linear algebra to vector space& analogy, orthogonality and basic signals.K3

CO2: Classify systems based on their properties and determine the response of LTI system using convolution K2

CO3: Analyze the spectral characteristics of continuous-time signals and systems using Fourier analysis K4

CO4: Apply sampling theorem concept to convert continuous time signals to discrete time signal and reconstruct.K3

CO5: Apply Laplace transform and inverse Laplace transform to analyze continuous time signals and systems with respect to ROC.K3

CO6: Apply Z transform to analyze discrete time signals and systems with respect to ROC.K3

UNIT-I

BASIC SIGNALS: Introduction to signal and system, Classification of Signals, Elementary signals, Signal properties and operations, Orthogonal signal space, Signal approximation using orthogonal functions.

UNIT-II

LINEAR-TIME INVARIANT SYSTEMS: Properties of Systems, Continuous-Time LTI Systems: The Convolution Integral; Properties of Linear Time-Invariant Systems; Causal LTI Systems Described by Differential and Difference Equations.

UNIT III

FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS: Trigonometric and Exponential fourier series, Fourier Series Representation of Continuous-Time Periodic Signals(Sinusoidal, triangular and square); Convergence of the Fourier Series.

Fourier Transforms: Representation of Aperiodic Signals; The Continuous-Time Fourier Transform; The Fourier Transform for Periodic Signals; Properties of Continuous-Time Fourier Transform.

UNIT-IV

Representation of a Continuous-Time Signal by its Samples; The Sampling Theorem; Reconstruction of a Signal From its Samples; The Effect of Under Sampling; Aliasing; Discrete-Time Processing of ContinuousTime Signals; Sampling of Discrete-Time Signals.

UNIT-V

Laplace Transforms: The Laplace transform; The Region of Convergence for Laplace Transforms; The Inverse Laplace Transform; Properties of the Laplace Transform; Laplace Transform Pairs; Analysis and Characterization of LTI Systems Using the Laplace Transform.

UNIT-VI

Z-Transforms: The Region of Convergence for the Z-Transform; Properties of the Z-Transform; Z-Transform Pairs; Analysis and Characterization of LTI Systems using Z-Transforms.

TEXT BOOKS:

1. Signals and Systems, A.V. Oppenheim and A.S. Willsky with S. H. Nawab, Second Edition, PHI Private limited.
2. Signals and Systems, Second Edition, S. Haykin and B. Van Veen, John Wiley & Sons.
3. B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.

REFERENCES:

1. R.E.Zeimer, W.H.Tranter and R.D.Fannin, "Signals & Systems - Continuous and Discrete", Pearson, 2007.
2. John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007. 40
3. M.J.Roberts, "Signals & Systems Analysis using Transform Methods & MATLAB", Tata McGraw Hill, 2007.
4. ocw.mit.edu › Supplemental Resources › Signals and Systems
5. www.satishkashyap.com/2012/04/iit-video-lectures-on-signals-and.html
6. nptel.ac.in/courses/117104074/1
7. www.cdeep.iitb.ac.in/nptel/.../Signals%20and%20System/TOC-M1.htm
8. freevideolectures.com/Subject/Signals-Systems

Course : Network Theory
Code : V18ECT04

L	T	P	C
3	-	-	3

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

1. Solve the electrical network using mesh and nodal analysis (K3)
2. Apply network theorems to analyze the Electric circuits.(K3)
3. Explain RLC transient circuits and Filters (K2)
4. Describe the steady state analysis of RLC circuits (K2)
5. Analyze the resonance circuits (K4)
6. Solve the two port network parameters (K3)

UNIT – I

Introduction to Electrical Circuits : Network elements classification, Electric charge and current, Electric energy and potential, Resistance parameter – series and parallel combination, Inductance parameter – series and parallel combination, Capacitance parameter – series and parallel combination. Energy sources: Ideal, Non-ideal, Independent and dependent sources, Source transformation, Kirchoff's laws, Mesh analysis and Nodal analysis problem solving with resistances only including dependent sources.

Unit-II

Network theorems: Thevinin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, - problem solving using dependent sources also.

UNIT – III

Transients: Definition of time constants, R-L circuit, R-C circuit with DC excitation, Evaluating initial conditions procedure, problem solving using R-L-C elements with DC excitation. Solutions using Laplace transform method.

UNIT – IV

Steady State Analysis of A.C Circuits: Response to sinusoidal excitation - pure resistance, pure inductance, pure capacitance, impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, problem solving.

UNIT – V

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti resonance, Bandwidth of parallel resonance, anti resonance at all frequencies.

UNIT – VI

Two-port networks: Relationship of two port networks, Z-parameters, Y-parameters, Transmission parameters, h-parameters, Relationship between parameter sets, Parallel connection of two port networks, Cascade connection of two port networks, series connection of two port networks, problem solving.

TEXT BOOKS:

1. Electric Circuit Analysis by Hayt and Kimmarle, TMH Eigth Edition ,2012.
2. Network Analysis by Van-Valkenberg.

REFERENCES:

1. Circuit Theory (Analysis and Synthesis) By ABHIJIT Chakrabarti 7th Revised Edition,Dhanpat Rai &Co.
2. Basic Circuit Analysis by DR Cunninghan, Jaico Publishers.
3. Network Analysis and Filter Design by Chadha, Umesh Publications.
4. Circuits & Network Analysis & Synthesis - A.Sudhakar & Shyam Mohan S.Pillai Tata McGraw Hill, 2nd Edition, 1994.

Course : Managerial Economics and Financial Analysis
Code : V18MBT51

L	T	P	C
3	-	-	3

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO1: Understand the basic concepts of managerial economics, demand, and elasticity of demand and methods of demand forecasting. **[K2]**

CO2: Estimate the production function with one, two and infinite variables. Understand various cost concepts and calculating breakeven point **[K2]**

CO3: Understand and showing a price output determination in different types of market structures and knowing various pricing methods **[K2]**

CO4: Understand various forms of business organizations **[K2]**

CO5: Prepare financial statements and its analysis. **[K3]**

CO6: Appraise the projects by using various capital budgeting methods **[K4]**

UNIT-I Introduction to Managerial Economics and demand Analysis: Definition of Managerial Economics –Scope of Managerial Economics and its relationship with other subjects – Concept of Demand, Types of Demand, Determinants of Demand- Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting..

UNIT – II Production and Cost Analyses: Concept of Production function- Cobb-Douglas Production function- Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total cost –Cost–Volume-Profit analysis-Determination of Breakeven point(simple problems)Managerial significance and limitations of Breakeven point.

UNIT – III Introduction to Markets, & Pricing Policies: Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination – Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing, Flat Rate Pricing, Usage sensitive pricing and Priority Pricing.

UNIT – IV Types of Business Organization and Business Cycles: Features and Evaluation of Sole Trader, Partnership, Joint Stock Company – State/Public Enterprises and their forms – Business Cycles : Meaning and Features – Phases of Business Cycle.

UNIT – V Introduction to Accounting & Financing Analysis: Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis

UNIT – VI Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods and modern methods (simple problems)

TEXT BOOKS

1. Dr. N. AppaRao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis',Cengage Publications, New Delhi – 2011
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011
3. Prof. J.V.Prabhakararao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES:

1. Shailaja Gajjala and Usha Munipalle, Univerties press, 201 Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House, 2014.
2. V. Maheswari: Managerial Economics, Sultan Chand.2014
3. Suma Damodaran: Managerial Economics, Oxford 2011.
4. VanithaAgarwal: Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja: Financial Accounting for Managers, Pearson
6. Maheswari: Financial Accounting, Vikas Publications.
7. S. A. Siddiqui&A. S. Siddiqui: Managerial Economics and Financial Analysis, New Age International Publishers, 2012
8. Ramesh Singh, Indian Economy, 7th Edn., TMH2015
9. Pankaj Tandon A Text Book of Microeconomic Theory, Sage Publishers, 2015

Course: Electronic Devices and Circuits Lab
Code : V18ECL01

L	T	P	C
-	-	2	1

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO-1 : Identify, Test and describe the specifications of various components. **[K2]**
CO-2: Find the unknown Frequency using Cathode Ray Oscilloscope. **[K1]**
CO-3: Interpret the Characteristics of various semiconductor devices. **[K2]**
CO-4: Sketch the Regulation Characteristics of Zener Diode. **[K3]**
CO-5: Examine the Performance of Rectifiers with and without Filters. **[K3]**
CO-6 : Sketch the Frequency Response of Amplifiers and Compute Bandwidth. **[K3]**

Electronic Workshop Practice:

1. Identification, Specifications, and Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices like Diodes, BJTs, JFETs, LEDs, UJT.
3. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO..

List of Experiments:

1. P-N Junction Diode Characteristics
   Part A: Germanium Diode (Forward bias only)
   Part B: Silicon Diode (Forward & Reverse bias)
2. Rectifiers (without and with c-filter)
   Part A: Half-wave Rectifier
   Part B: Full-wave Rectifier
3. Zener Diode Characteristics
   Part A: V-I Characteristics
   Part B: Zener Diode as Voltage Regulator
4. BJT Characteristics (CB Configuration)
   Part A: Input Characteristics
   Part B: Output Characteristics
5. BJT Characteristics (CE Configuration)
   Part A: Input Characteristics
   Part B: Output Characteristics
6. FET Characteristics (CS Configuration)
   Part A: Drain Characteristics
   Part B: Transfer Characteristics
7. UJT Characteristics
8. BJT-CE Amplifier
9. Emitter Follower-CC Amplifier
10. FET-CS Amplifier

Course : Digital System Design Lab
Code : V18ECL02

L	T	P	C
-	-	2	1

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

1. Examine the logic behavior of various IC gates.(K_3)
2. Construct and test combination logic circuits. (K_3)
3. Construct and test synchronous Asynchronous sequential circuits. (K_3)
4. Develop and Simulate Combinational logic circuit and validate its functionality using VHDL on Xilinx Software Package. (K_3)
5. Develop and Simulate Sequential logic circuit and validate its functionality using VHDL on Xilinx Software Package. (K_3)

LIST OF EXPERIMENTS

Part A: USING HARDWARE (Minimum of 5 Experiments to be done)

1. Verification of Basic Logic Gates and implementing all individual gates with Universal Gates.
2. Construct Half Adder and Full Adder using Half Adder and verify the truth table.
3. Design a Combinational Logic circuit for 3X8 Decoder and verify the truth table.
4. Design a Combinational Logic circuit for 4x1 MUX, 1X4 De-MUX and verify the truth table.
5. Verification of truth tables of the basic Flip- Flops with Synchronous and Asynchronous modes.
6. Design a Decade Counter and verify the truth table.

Part B: USING XILINX Tool (Minimum of 5 Experiments to be done)

Note: The students are required to design and draw the internal logical structure of the following Digital Circuits and to develop VHDL/Verilog HDL Source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.

1. Design of Full Adder using 3 modeling systems.
2. 8 to 3 Encoder (with and without parity).
3. 4- Bit comparator-IC 7485.
4. Flip-Flops (D/SR/JK Flip-Flops).
5. 4 bit binary up/down counter-IC74193.
6. Shift registers-IC 7495.

IV SEMESTER

Course : Analog & Digital Communications

Code : V18ECT07

L	T	P	C
3	1	-	4

Pre requisites: Signals and systems, Mathematics.

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

1. Explain the spectral characteristics, generation and detection techniques of Amplitude modulation techniques (K2)
2. Explain the spectral characteristics, generation and detection techniques of angle modulation techniques (K2)
3. Illustrate different types of noise and predict its effect on analog communication Systems.(K3)
4. Describe the generation and detection methods of various digital modulation schemes.(K2)
5. Analyze Optimal Reception of Digital Signal and explain various multiple access techniques.(K4)
6. Describe the concepts of error control coding (K2).

UNITI

Analog Modulation: Need for modulation, Frequency Division Multiplexing, **Linear Modulation Techniques** - AM, DSB-SC, SSB, VSB - Time domain and frequency domain description, single tone modulation, power relations - Generation & Detection.Applications, AMTransmitters, AM Receivers - Super-heterodyne receiver, IF, AGC.

UNIT II

Angle Modulation: Phase and Frequency Modulation, Narrow band and Wide band FM, Carsons rule, Indirect and direct method of FM generation, Detection of FM, Applications, Phase locked loop, Comparison of FM and AM. FMTransmitters, FM Receivers.

UNIT III

Noise in Analog Communication system: Noise in DSB &SSB system, Noise in AM system, Noise in Angle Modulation system,Pre-emphasis and de-emphasis.

Pulse Modulation: Time Division Multiplexing,PAM, PWM, PPM-Generation and Detection.

UNIT IV

Digital Modulation Systems: Pulse Modulation: Baseband signals. Sampling process; Quantization Process; Quantization Noise; Pulse-Code Modulation; Noise Considerations in PCM Systems; Differential Pulse-Code Modulation, Delta modulation, adaptive delta modulation, Amplitude, phase and frequency shift keying schemes (ASK, PSK, FSK), M-array modulation schemes.

UNIT V

Optimal Reception of Digital Signal: Matched filter receivers, optimum receiver - bandwidth consideration and probability of error calculations for these schemes.

Multiple Access Techniques: TDMA, FDMA and CDMA

UNIT VI

Information theory and Error control Coding: Measure of information – Entropy, Information rate– Source coding theorem – Channel capacity – Shannon-Hartley law – Shannon's limit-Error, control Codes – Linear codes, Cyclic codes, Convolution Coding.

TEXT BOOKS:

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

2. H Taub& D. Schilling, GautamSahe, “Principles of Communication Systems”, TMH, 3rd Edition, (2007).
3. Tomasi, Wayne, “Electronics Communication Systems- Fundamentals through advanced”, 5th Edition, Pearson Education, 2009
4. Lathi, “Modern Digital & Analog Communications Systems”, 2e, Oxford University Press

REFERENCE BOOKS:

1. Loen W. Couch, “Modern Communication Systems: Principles & Applications”, Prentice Hall, (P621.382/84), (1995)
2. Bruce Carlson, Paul B. Crilly and Janet C. Rutledge, “Communication Systems: An Introduction to Signals and Noise in Electrical Communications”, 4th Edition, McGraw-Hill, (2002).
3. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley & Sons, (2001).
4. NevioBenvenuto, Roberto Corvaja, Tomaso Erseghe, and Nicola Laurenti, “Communication Systems: Fundamentals and Design Methods”, John Wiley & Sons, (2006).
5. Andrew J. Viterbi & Jim K. O, “Principles of Digital Communication and Coding”, McGraw-Hill Book Company.
6. Bernard Sklar, “Digital Communications - Fundamentals and Applications”, 2E, Prentice Hall.
7. Sam Shanmugam, K, “Digital and Analog Communication Systems”, Wiley publisher (2006).

Course: Analog Circuits
Code: V18ECT08

L	T	P	C
3	1	-	4

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

1. Construct wave shaping circuits for various applications
2. Analyze transistor amplifier circuits at low and high frequencies.
3. Explain the operation of Feedback and Power amplifiers
4. Explain the operation of sinusoidal and non sinusoidal oscillators
5. Construct circuits for different applications using ICs.
6. Explain the operation of Active filters and Data Converters

Unit I

Wave shaping circuits: Response of high pass and low pass RC circuits to step, pulse inputs. High pass RC circuit as differentiator, low pass RC circuit as integrator. Series and shunt clippers, clipping at two independent levels, Positive and Negative Clampers.

Unit II

Transistor at High frequencies: Hybrid π CE transistor model, CE short circuit current gain, Current gain with resistive load, Gain bandwidth product.

Multistage amplifiers: Low frequency analysis of cascade and cascode amplifiers.

Unit III

Feedback and Power amplifiers: Voltage series, current series, voltage shunt, current shunt feedback amplifiers, effect of negative feedback. Various classes of operation (Class A, B, AB, C), power efficiency calculations.

Unit IV

Oscillators: Oscillators: Basic concept, Barkhausen criterion, RC oscillators (phase shift, Wien bridge), LC oscillators (Hartley, Colpitts) Non-sinusoidal oscillators: Bistable, Monostable and Astable Multivibrators.

Unit V

Integrated Circuits and applications: Op-amp Block Diagram, Ideal Op-amp, Equivalent Circuit, Power supplies, Ideal voltage transfer curve, open loop op-amp configurations. Inverting and non-inverting amplifiers, summing, scaling, averaging amplifier, integrator and differentiator, 555 timer functional block diagram, Astable and Monostable multivibrators.

Unit VI

Active filters and Data Converters: First order Low pass, high pass, band pass and band stop filters, All pass filter design guidelines. Weighted resistor DAC, R-2R ladder DAC. Dual slope ADC, Successive approximation ADC, flash ADC.

Text Books:

1. Integrated Electronics- J. Millman and C.C. Halkias, TMH
2. Electronic Devices and Circuits- Salivahanan, N.Suresh Kumar, A. Vallavaraj, TMH
3. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, TMH
4. Pulse and Digital Circuits – A. Anand Kumar, PHI
5. Linear Integrated Circuits – D. Roy Choudhury, 4th edition, New Age International (p) Ltd.
6. Op-Amps & Linear Integrated Circuits - Ramakanth A. Gayakwad,3rd edition, PHI.

References :

1. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall.

2. Electronic Circuit Analysis - B.V.Rao, K.R.Rajeswari, P.C.R.Pantulu, K.B.R.Murthy, Pearson Publications.
3. Pulse & Digital Circuits-BN Yoga Narasimhan, 2000,Sri Maruthi Publishers, Bangalore.
4. Operational Amplifiers & Linear Integrated Circuits –Sanjay Sharma ;SK Kataria &Sons;2nd Edition,2010

Course: Probability Theory & Stochastic Processes

L	T	P	C
3	1	-	4

Code : V18ECT09

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

1. Explain basic concepts of probability theory through Sets and Relative Frequency **[K2]**
2. Explain the concept of a random variable, functions based on random variable like distribution and density functions **[K2]**
3. Compute the expected value, moments on one random variable **[K3]**
4. Illustrate the concepts of joint distribution & density functions on multiple random variables and their transformations with examples **[K3]**
5. Compute the statistical characteristics of stochastic processes like auto correlation & cross correlation functions. **[K3]**
6. Calculate the power density spectrum and cross power- density spectrum of signals **[K3]**

UNIT I: PROBABILITY : Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events

UNIT II: **THE RANDOM VARIABLE**: Definition of a random variable, Discrete, continuous and mixed random Variables. Distribution & density functions and its properties of a random variable. Binomial, Poisson, Uniform, Gaussian, Exponential and Rayleigh random variables. Conditional distribution and density functions and its properties.

UNIT III: OPERATION ON ONE RANDOM VARIABLE – EXPECTATIONS : Introduction, expected value of a random variable, function of a random variable, moments about the origin, central moments, variance, characteristic function, moment generating function, transformations of a random variable: Monotonic transformations for a continuous random variable

UNIT IV: MULTIPLE RANDOM VARIABLES : Vector random variables, joint distribution function, properties of joint distribution, marginal distribution functions, conditional distribution and density, statistical independence, sum of two random variables, sum of several random variables, central limit theorem: unequal distribution, equal distributions.

OPERATIONS ON MULTIPLE RANDOM VARIABLES: Joint moments about the origin, joint central moments, joint characteristic functions, jointly Gaussian random variables: two random variables case, N-random variables case

UNIT V: RANDOM PROCESSES – TEMPORAL CHARACTERISTICS: The random process concept, classification of processes, deterministic and nondeterministic processes, distribution and density functions, concept of Stationarity and statistical independence. First-order stationary processes, second-order and wide-sense Stationarity, nth-order and strict-sense Stationarity, time averages and Ergodicity, autocorrelation function and its properties, cross-correlation function and its properties, covariance functions

UNIT VI: RANDOM PROCESSES – SPECTRAL CHARACTERISTICS: The power density spectrum: properties, relationship between power density spectrum and autocorrelation function, the cross-power density spectrum, properties, relationship between cross-power density spectrum and cross-correlation function.

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles, Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Probability, Random Variables and Stochastic Processes, Athanasios Papoulis and S.Unnikrishna Pillai, PHI, 4th Edition, 2002.
3. Probability Theory and Stochastic Processes, Y. Mallikarjuna Reddy, 4th Edition, Universities Press,

REFERENCE BOOKS:

1. Probability Theory and Stochastic Processes – B. Prabhakara Rao, BS Publications
2. Probability and Random Processes with Applications to Signal Processing, Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3. Schaum's Outline of Probability, Random Variables, and Random Processes.
4. An Introduction to Random Signals and Communication Theory, B.P. Lathi, International Textbook, 1968.
5. Random Process – Ludeman , John Wiley
6. Probability Theory and Random Processes, P. Ramesh Babu, McGrawHill, 2015.

L	T	P	C
3	1	-	4

Course: Electro Magnetic Waves & Transmission Lines

Code : V18ECT10

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

1. Use Various laws of static electric field to determine E. (K3)
2. Use Various laws of magneto static field to determine H and Apply Maxwell's equations to analyze the time varying behavior of EM waves (K3)
3. Compute the Propagation Characteristics of the EM Waves in different mediums. (K3)
4. Calculate Brewster angle, critical angle and total internal reflection. (K3)
5. Compute Primary and Secondary constants for a given transmission line(K3)
6. Calculate reflection coefficient, VSWR etc. using smith chart(K3)

UNIT I: Review of Co-ordinate Systems, **Electrostatics:** Coulomb's Law, Electric Field Intensity Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Types of Capacitance Illustrative Problems.

UNIT II: Magneto Statics : Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Ampere's Force Law, Inductances and Magnetic Energy. Illustrative Problems.

Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Introduction to Boundary conditions. Illustrative Problems.

UNIT III: EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations between E & H. Sinusoidal Variations. Wave Propagation in Lossless and Conducting Media. Wave Propagation in Good Conductors and Good Dielectrics. Polarization. Illustrative Problems.

UNIT IV: EM Wave Characteristics – II: Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance. Poynting Theorem – Applications, Illustrative Problems.

UNIT V: Transmission Lines - I : Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless line. Condition for Distortionless Line. Illustrative Problems.

UNIT VI: Transmission Lines – II : Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance Transformations. Smith Chart – Configuration and Applications, Single Stub Matching. Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.
3. Electromagnetic field theory and Transmission Lines – G.SasibhusanaRao,Wiley India Pvt.L

REFERENCES:

1. Electromagnetic Fields and Wave Theory –GSN Raju, Pearson Education 2006
2. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
3. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi, 2001.
4. Electromagnetic waves & Radiating Systems, Prentice Hall, India 3. Narayana Rao, N: Engineering Electromagnetics, 3rd ed., Prentice Hall, 1997.
5. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006

Course: Analog Circuits Lab
Code: V18ECL06

L	T	P	C
-	-	2	1

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO 1- Construct circuit for linear wave shaping circuits. **[K3]**

CO 2- Construct feedback amplifiers and obtain their characteristics **[K3]**

CO 3- Construct different RC and LC oscillators using BJT based on the frequency range. **[K3]**

CO 4- Construct circuit and analyze different multivibrator circuits. [**K4]**

CO 5- Construct circuits for verifying linear and nonlinear applications using IC 741 op-amp and IC 555 timer [**K3]**

CO 6- Sketch the Frequency Response Characteristics of Active filters **[K3]**

Minimum Ten Experiments to be conducted:

1. Linear wave shaping
2. Non Linear wave shaping
3. Voltage-Series Feedback Amplifier
4. Class B Push-Pull Power Amplifier
5. RC Phase Shift/Wien Bridge Oscillator
6. Hartley/Colpitt's Oscillator
7. B istable Multi vibrator.
8. Summing, Scaling, Averaging amplifiers using IC 741.
9. Integrator and Differentiator Circuits using IC 741.
10. A stable Multi vibrator using IC 555.
11. Active Filters – LPF, HPF (first order)
12. 4 bit Digital to Analog Converter

Course: Communications Lab
Code : V18ECL05

L	T	P	C
-	-	2	1

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO-1- Demonstrate the operation of various pulse modulation and demodulation techniques. **[K3]**

CO-2 -Construct the pre-emphasis and de-emphasis circuits and verify its frequency response. **[K3]**

CO-3 -Demonstrate the spectrum analysis of modulated signal using spectrum analyzer, operation of AGC and PLL **[K3]**

CO-4- Understand the Time division multiplexing and Demultiplexing, Pulse digital modulation techniques, such as PCM, DPCM, and DM, Companding theorem **[K2]**

CO-5- Understand generation and detection of digital modulation techniques, such as ASK, PSK, FSK and DPSK. **[K2]**

CO-6- Verify the Source encoding and decoding (Huffman Coding) technique and channel encoding and decoding techniques. **[K3]**

List of Experiments (Twelve experiments to be done)

A. Analog Communications
   1. Amplitude Modulation - Mod. & Demod.
   2. AM - DSB SC - Mod. & Demod.
   3. Spectrum Analysis of Modulated signal using Spectrum Analyser
   4. Pre-emphasis & De-emphasis
   5. Frequency Modulation - Mod. & Demod, PLL.
   6. Sampling Theorem - Pulse Amplitude Modulation - Mod. & Demod.
   7. PWM , PPM - Mod. & Demod.

B. Digital Communications
   1. Pulse code modulation, Differential pulse code modulation.
   2. Delta modulation, Companding.
   3. ASK, FSK, PSK.
   4. Differential phase shift keying.
   5. Source Encoder and Decoder
   6. Channel coding-
      i. Linear Block Code-Encoder and Decoder
      ii. Binary Cyclic Code – Encoder and Decoder
      iii. Convolution Code – Encoder and Decoder

III SEMESTER

Course : Digital Electronics

Code : V18ECT06

Branch: III Semester CSE

L	T	P	C
3	-	-	3

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

1. Illustrate the conversion of a number from one number system to another. **[K3]**
2. Classify Boolean theorems & simplify the Boolean functions using the Boolean properties. **[K2]**
3. Use K-map as a tool to simplify and design logic circuits **[K3]**
4. Construct different combinational Logic circuits like MUX, Decoders, Encoders etc. **[K3]**
5. Demonstrate the basic flip-flops in terms of truth table & excitation table **[K2]**
6. Apply the concepts of flip-flops in the designing of different sequential circuits like registers, counters, etc. **[K3]**

UNIT1: Number systems& Binary codes:

Number systems: Number Systems, Radix conversions, complement of numbers. Binary codes: Binary codes, Weighted and non-Weighted codes, BCD code, gray code, excess 3 codes.

UNIT -II: Concept of Boolean algebra:

Basic Theorems and Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Minterms and Maxterms, Logic gates: NOT, OR, AND, NOR, NAND, XOR, XNOR - Universal gates.

UNIT- III: Gate level Minimization:

Map Method, Two-Variable K-Map, Three-Variable K-Map, Four Variable K-Maps. Products of Sum Simplification, Sum of Products Simplification, Don't – Care Conditions, NAND and NOR Implementation.

UNIT- IV:Combinational Logic:

Introduction, Analysis Procedure, Design Procedure, Binary Adder–Subtractor, Decimal Adder, Decoders, Encoders, Multiplexers.

UNIT V: **Sequential Logic Circuits**:

Introduction –Latches and Flip flops: Basic Flip flop circuit, RS, D, JK and T Flip-flops – Triggering of Flip flops: Master Slave Flip flop, edge triggered flip flop – Conversion of one type of Flip flop to another.

UNIT -VI: Registers and Counters:

Registers and Counters: Shift Register, Universal Shift Register, Applications of Registers, Asynchronous counter, Synchronous counter, Mod-N Counter, binary up/down counter, Ring counter, Johnson counter.

Memories: Introduction to ROM, PROM, EPROM.

TEXT BOOKS:

1. Digital Design, 5/e, M.Morris Mano, Michael D Ciletti, PEA.

2. Fundamentals of Logic Design, 5/e, Roth, Cengage.

REFERENCE BOOKS:

1. Digital Logic and Computer Design, M.Morris Mano, PEA.

2. Digital Logic Design, Leach, Malvino, Saha, TMH.

3. Modern Digital Electronics, R.P. Jain, TMH

Course : Digital Electronics Lab
Code : V18ECL04
Branch: III Semester CSE

L	T	P	C
-	-	2	1

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO1: Apply the Boolean algebra to design digital logic circuits. **[K3]**
CO2: Analyse the behaviour of different combinational logic circuits. **[K4]**
CO3: Analyse the behaviour of different sequential logic circuits **[K4]**
CO4: Construct and troubleshoot simple combinational and sequential circuits **[K3]**

List of Experiments

Minimum Ten Experiments to be conducted:

Study of Integrated Circuits, Bread board& Power supplies.

1) Verification of Basic LogicGates
2) Verification of Universal Gates, Special Gates.
3) Verify the De-Morganlaws using CMOS IC's
4) Design a Gray code encoder & Decoder using IC 7486
5) Construct a Half Adder using IC's and verify the truth table.
6) Construct a Half Subtractor using IC's and verify the truth table.
7) Verify the truthtableof IC 74138(3x8 Decoder)
8) Verify the truthtable of IC 74153(4x1 MUX).
9) Verify the D Flip- Flop Using IC7474 with PRESET, CLEAR asynchronous Inputs.
10) Verify JK Flip- Flop & T Flip-Flop Using IC7476 with PRESET, CLEAR asynchronous Inputs.
11) Verify Decade counter using IC7490.
12) Design 4-bit right Shift Register using D-Flip-Flop and verify the truthtable.

Course : Analog Electronics
Code : V18ECT05
Branch: III Semester EEE

L	T	P	C
3	-	-	3

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO 1: Explain the working principle of diode and Construct Diode rectifier circuits with and without filters. **[K2]**
CO 2: Sketch V-I characteristics of BJT and FET in different configurations. **[K3]**
CO 3: Explain the operation of Feedback Amplifiers and oscillators. **[K2]**
CO 4: Construct wave shaping circuits for various applications **[K3]**
CO 5: Construct circuits for different applications using ICs. **[K3]**
CO 6: Explain the operation of Data Converters using IC 741 OP-AMP. **[K2]**

UNIT-I: Junction diode characteristics and diode Applications: p-n junction diode, current components in PN junction Diode, derivation of diode equation, V-I Characteristics, Diode resistance, Diode capacitance. Zener Diode, Breakdown mechanisms Basic Rectifier setup**,** half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, L-section filter, π-section filter-, derivation for ripple factor in each case.

UNIT- II: Transistor Characteristics: BJT: Junction transistor, transistor current components, transistor equation, transistor configurations, transistor as an amplifier, and characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, punch through/ reach through, typical transistor junction voltage values.

FET: FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

UNIT- III Feedback amplifiers and Oscillators: Voltage series, current series, voltage shunt, current shunt feedback amplifiers, effect of negative feedback. Oscillators: Basic concept, Barkhausen criterion, RC oscillators (phase shift, Wien bridge), LC oscillators (Hartley, Colpitts)

UNIT- IV Wave shaping circuits: Response of high pass and low pass RC circuits to step, pulse inputs. High pass RC circuit as differentiator, low pass RC circuit as integrator. Series and shunt clippers, clipping at two independent levels, Positive and Negative Clampers. Introduction to multivibrators: Bistable, Monostable and Astable Multivibrators.

UNIT- V Integrated Circuits and applications: Op-amp Block Diagram, Ideal Op-amp, Equivalent Circuit, Power supplies, Ideal voltage transfer curve, open loop op-

amp configurations. Inverting and non-inverting amplifiers, summing, scaling, averaging amplifier, integrator and differentiator, 555 timer functional block diagram, Astable and Monostable multivibrators.

UNIT- VI Data Converters: Weighted resistor DAC, R-2R ladder DAC. Flash Type ADC, Counter type ADC, Successive approximation ADC, Dual slope ADC,. Specifications of DAC&ADC.

Text Books:

1. Integrated Electronics- J. Millman and C.C. Halkias, TMH
2. Electronic Devices and Circuits- Salivahanan, N.Suresh Kumar, A. Vallavaraj, TMH
3. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, TMH
4. Linear Integrated Circuits – D. Roy Choudhury, 4th edition, New Age International (p) Ltd.
5. Op-Amps & Linear Integrated Circuits - Ramakanth A. Gayakwad,3rd edition, PHI.

References :

1. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall.
2. Electronic Circuit Analysis - B.V.Rao, K.R.Rajeswari, P.C.R.Pantulu, K.B.R.Murthy, Pearson Publications.
3. Pulse & Digital Circuits-BN Yoga Narasimhan, 2000,Sri Maruthi Publishers, Bangalore.
4. Operational Amplifiers & Linear Integrated Circuits –Sanjay Sharma ;SK Kataria &Sons;2nd Edition,2010

L	T	P	C
-	-	2	1

Course: Analog Electronics Lab
Code : V18ECL03
Branch: III Semester EEE

COURSE OUTCOMES:

After successful completion of the course, the student will be able to:

CO-1: Interpret the Characteristics of various semiconductor devices. **[K2]**
CO-2: Examine the Performance of Rectifiers with and without Filters. **[K3]**
CO 3: Construct circuit for linear wave shaping circuits. **[K3]**
CO 4**:** Construct different RC and LC oscillators using BJT based on the frequency range. **[K3]**
CO 5**-** Construct circuits for verifying linear and nonlinear applications using IC 741op-amp and IC 555 timer [**K3]**
CO 6**-** Verify the Characteristics of 4 bit Digital to Analog Converter **[K3]**

List of Experiments:

1. P-N Junction Diode Characteristics
   Part A: Germanium Diode (Forward bias only)
   Part B: Silicon Diode (Forward & Reverse bias)
2. Rectifiers (without and with c-filter)
   Part A: Half-wave Rectifier
   Part B: Full-wave Rectifier
3. Zener Diode Characteristics
   Part A: V-I Characteristics
   Part B: Zener Diode as Voltage Regulator
4 BJT Characteristics (CE Configuration)
   Part A: Input Characteristics
   Part B: Output Characteristics
5 FET Characteristics (CS Configuration)
   Part A: Drain Characteristics
   Part B: Transfer Characteristics.
6 Linear wave shaping
7 Non Linear wave shaping
8 RC Phase Shift/Wien Bridge Oscillator
9 Hartley/Colpitt's Oscillator
10 Integrator and Differentiator Circuits using IC 741
11 A stable Multi vibrator using IC 555
12 4 bit Digital to Analog Converter

Appendix-ECE-04

Course Structure for Electronics and Communication Technology (ECT) Programme

I SEMESTER

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT01	English – I	2	-	-	MNC
2	V18MAT01	Engineering Mathematics – I	3	1	-	4
3	V18CHT01	Engineering Chemistry	3	1	-	4
4	V18CST01	Programming in C for problem solving	3	-	-	3
5	V18MET01	Engineering Graphics	1	-	3	2.5
6	V18ENL01	English Communication Skills Lab – I	-	-	2	MNC
7	V18CSL01	Programming lab in C for problem solving	-	-	3	1.5
8	V18CHL01	Engineering Chemistry Lab	-	-	3	1.5
Total			12	2	11	16.5

Total Contact Hours: 25 Total Credits: 16.5

II SEMESTER

S.No	Course Code	Course Name	L	T	P	C
1	V18ENT02	English – II	2	-	-	2
2	V18MAT02	Engineering Mathematics – II	3	1	-	4
3	V18PHT02	Opto Electronics and Semi Conductors for EEE & ECE	3	1	-	4
4	VI8EET02	Basic Electrical Engineering for ECE	3	1	-	4
5	V18CHT02	Environmental Studies for ECE	3	-	-	MNC
6	V18ENL02	English Communication Skills Lab – II	-	-	2	1
7	VI8EELO2	Basic Electrical Engineering Lab for ECE	-	-	3	1.5
8	V18PHL02	Opto Electronics and Semi Conductors lab for ECE	-	-	3	1.5
9	VI8MELO1	Engineering and IT Workshop				
Total			12	2	11	19.5

Total Contact Hours: 25