FACULTY OF ENGINEERING

Scheme of Instruction & Examination

(AICTE Model Curriculum for the Academic Year 2019-2020)

and

Syllabi

B.E. III and IV Semester

of

Four Year Degree Programme

in

Electronics and Communication Engineering

(With effect from the academic year 2019– 2020)

(As approved in the faculty meeting held on 25-06-2019)

Issued by

Dean, Faculty of Engineering

Osmania University, Hyderabad – 500 007

2019

SCHEME OF INSTRUCTION & EXAMINATION
B.E. (Electronics and Communication Engineering) III – SEMESTER

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination			Credits
			L	T	P/D	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
Theory Courses										
1	MC111PO	Indian Constitution	2	-	-	2	30	70	3	-
2	HS201EG	Effective Technical Communication in English	3	-	-	3	30	70	3	3
3	HS202CM	Finance and Accounting	3	-	-	3	30	70	3	3
4	BS205MT	Mathematics – III	3	-	-	3	30	70	3	3
5	ES212ME	Elements of Mechanical Engineering	3	-	-	3	30	70	3	3
6	ES216EC	Digital Electronics	3	-	-	3	30	70	3	3
7	PC221EC	Electronic Devices	3	-	-	3	30	70	3	3
8	PC222EC	Network Theory	3	-	-	3	30	70	3	3
Practical/ Laboratory Courses										
9	PC251EC	Electronic Devices Lab	-	-	2	2	25	50	2	1
10	PC252EC	Electronic Workshop	-	-	2	2	25	50	2	1
			23	**-**	**04**	**27**	**290**	**660**		**23**

HS: Humanities and Social Sciences BS: Basic Science ES: Engineering Science
MC: Mandatory Course PC: Professional Core
L: Lecture T: Tutorial P: Practical D: Drawing
CIE: Continuous Internal Evaluation SEE: Semester End Evaluation (Univ. Exam)
PO: Political Science EG: English CM: Commerce MT: Mathematics
ME: Mechanical Engineering EC: Electronics and Communication Engineering

Note:

1. Each contact hour is a clock hour
2. The duration of the practical class is two hours, however it can be extended wherever necessary, to enable the student to complete the experiment.

3. All mentioned **Mandatory Courses** for BE (All Branches) should be offered either in I – Semester or II – Semester only **from the academic year 2019-2020**.
4. For those of the students admitted in BE (All Branches) during the academic year 2018-2019 the Mandatory Courses were not offered during the I – Semester or II – Semester may be compulsorily offered either in III – Semester or IV – Semester **for the academic year 2019-2020 only**.

Course Code	Course Title						Core/Elective
MC 111 PO	**Indian Constitution**						**Mandatory**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**2**	**-**	**-**	**-**	**30**	**70**	**-**

Course Objectives

- To create awareness among students about the Indian Constitution.
- To acquaint the working conditions of union, state, local levels, their powers and functions.
- To create consciousness in the students on democratic values and principles articulated in the constitution.
- To expose the students on the relations between federal and provincial units.
- To divulge the students about the statutory institutions.

Course Outcomes

After completing this course, the student will

1. Know the background of the present constitution of India.
2. Understand the working of the union, state and local levels.
3. Gain consciousness on the fundamental rights and duties.
4. Be able to understand the functioning and distribution of financial resources between the centre and states.
5. Be exposed to the reality of hierarchical Indian social structure and the ways the grievances of the deprived sections can be addressed to raise human dignity in a democratic way.

UNIT-I

Evolution of the Indian Constitution: 1909 Act, 1919 Act and 1935 Act. Constituent Assembly: Composition and Functions; Fundamental features of the Indian Constitution.

UNIT-II

Union Government: Executive-President, Prime Minister, Council of Minister
State Government: Executive: Governor, Chief Minister, Council of Minister
Local Government: Panchayat Raj Institutions, Urban Government

UNIT-III

Rights and Duties: Fundamental Rights, Directive principles, Fundamental Duties

UNIT-IV

Relation between Federal and Provincial units: Union-State relations, Administrative, legislative and Financial, Inter State council, NITI Ayog, Finance Commission of India

UNIT-V

Statutory Institutions: Elections-Election Commission of India, National Human Rights Commission, National Commission for Women

Suggested Readings:

1. Abhay Prasad Singh & Krishna Murari, Constitutional Government and Democracy in India, Pearson Education, New Delhi, 2019
2. D.D. Basu, Introduction to the constitution of India, Lexis Nexis, New Delhi
3. Subhash Kashyap, Our Parliament, National Book Trust, New Delhi

4. Peu Ghosh, Indian Government &Politics, Prentice Hall of India, New Delhi
5. B.Z. Fadia & Kuldeep Fadia, Indian Government &Politics, Lexis Nexis, New Delhi

Course Code	Course Title						Core/Elective
HS201EG	**Effective Technical Communication in English**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**-**	**-**	**-**	**30**	**70**	**3**

Course Objectives

To expose the students to:

- Features of technical communication
- Types of professional correspondence
- Techniques of report writing
- Basics of manual writing
- Aspects of data transfer and presentations.

Course Outcomes

On successful completion of the course, the students would be able to:

1. Handle technical communication effectively
2. Use different types of professional correspondence
3. Use various techniques of report writing
4. Acquire adequate skills of manual writing
5. Enhance their skills of information transfer and presentations

UNIT I

Definition and Features of Technical communication: Definition and features of technical communication (precision, relevance, format, style, use of visual aids), Differences between general writing and technical writing, Types of technical communication (oral and written)

UNIT II

Technical Writing-I (Official correspondence): Emails, IOM, Business letters, Business proposals.

UNIT III

Technical writing-II (Reports): Project report, Feasibility report, Progress report, Evaluation report.

UNIT IV

Technical writing- III (Manuals): Types of manuals, User manual, Product manual, Operations manual.

UNIT V

Information Transfer and Presentations: Non-verbal (bar diagram, flow chart, pie chart, tree diagram) to verbal (writing), Verbal (written) to non-verbal, Important aspects of oral and visual presentations.

Suggested readings:

1. Raman, Meenakshi & Sharma, Sangeeta. (2015). *Technical Communication: Principles and Practice* (3rd ed.). New Delhi.
2. Rizvi, Ashraf, M. (2017). *Effective Technical Communication* (2nd ed.). Tata McGraw Hill Education. New Delhi.
3. Sharma, R. C., & Mohan, Krishna. (2017). *Business Correspondence and Report Writing: A Practical Approach to Business & Technical Communication* (4th ed.). Tata McGraw Hill Education. New Delhi.

4. Tyagi, Kavita &Misra, Padma. (2011). *Advanced Technical Communication*. New Delhi, PHI Learning.
5. Jungk, Dale. (2004). *Applied Writing for Technicians,* McGraw-Hill Higher Education, New York.

Course Code	Course Title						Core/Elective
HS202CM	**Finance and Accounting**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**-**	**-**	**-**	**30**	**70**	**3**

Course Objectives

The course will introduce the students

- To provide basic understanding of Financial and Accounting aspects of a business unit
- To provide understanding of the accounting aspects of business
- To provide understanding of financial statements
- To provide the understanding of financial system
- To provide inputs necessary to evaluate the viability of projects
- To provide the skills necessary to analyse the financial statements

Course Outcomes

After successful completion of the course the students will be able to

1. Evaluate the financial performance of the business unit.
2. Take decisions on selection of projects.
3. Take decisions on procurement of finances.
4. Analyse the liquidity, solvency and profitability of the business unit.
5. Evaluate the overall financial functioning of an enterprise.

UNIT-I

Basics of Accounting: Financial Accounting–Definition- Accounting Cycle – Journal - Ledger and Trial Balance-Cash Book-Bank Reconciliation Statement (including Problems)

UNIT-II

Final Accounts: Trading Account-Concept of Gross Profit- Profit and Loss Account-Concept of Net Profit-Balance Sheet (including problems with minor adjustments)

UNIT-III

Financial System and Markets: Financial System-Components-Role-Considerations of the investors and issuers- Role of Financial Intermediaries. Financial Markets-Players- Regulators and instruments - Money Markets Credit Market- Capital Market (Basics only)

UNIT-IV

Basics of Capital Budgeting techniques: Time Value of money- Compounding- Discounting- Future Value of single and multiple flows- Present Value of single and multiple Flows- Present Value of annuities- Financial Appraisal of Projects– Payback Period, ARR- NPV, Benefit Cost Ratio, IRR (simple ratios).

UNIT-V

Financial statement Analysis: Financial Statement Analysis- Importance-Users-Ratio Analysis-liquidity, solvency, turnover and profitability ratios.

Suggested Readings:

1. Satyanarayana. S.V. and Satish. D., Finance and Accounting for Engineering, Pearson Education
2. Rajasekharan, Financial Accounting, Pearson Education

3. Sharma.S.K. and Rachan Sareen, Financial Management, Sultan Chand
4. Jonathan Berk, Fundamentals of Corporate Finance, Pearson Education
5. Sharan, Fundamentals of Financial Management, Pearson Education

Course Code	Course Title						Core/Elective
BS205MT	**Mathematics – III**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**-**	**-**	**-**	**30**	**70**	**3**

Course Objectives

- To introduce the solution methodologies for second order Partial Differential Equations with applications in engineering
- To provide an overview of probability and statistics to engineers

Course Outcomes

After completing this course, the student will be able to:

1. Solve field problems in engineering involving PDEs.
2. They can also formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.

UNIT - I

Definition of Partial Differential Equations, First order partial differential equations, solutions of first order linear PDEs; Solution to homogenous and non-homogenous linear partial differential equations of second order by complimentary function and particular integral method.

UNIT - II

Second-order linear equations and their classification, Initial and boundary conditions, D'Alembert's solution of the wave equation; Heat diffusion and vibration problems, Separation of variables method to simple problems in Cartesian coordinates. The Laplacian in plane, one dimensional diffusion equation and its solution by separation of variables.

UNIT - III

Discrete random variables, expectation of discrete random variables, moments, variance of a sum, continuous random variables & their properties, distribution- functions, and densities.

UNIT - IV

Basic Statistics, Measures of Central tendency: Moments, skewness and Kurtosis – Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation. Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.

UNIT - V

Test of significance; Large sample test for single proportion, difference of properties, Tests for single mean, difference of means, and difference of standard deviations. Test for ratio of variances – Chi- square test for goodness of fit and independence of attributes.

Suggested Readings:

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2000.
2. Advanced Engineering Mathematics, R.K. Jain & Iyengar, Narosa Publications.
3. Engineering Mathematics, P. Sivaramakrishna Das & C. Vijaya Kumar, Pearson India Education Services Pvt. Ltd.
4. N.P. Bali and M. Goyal, "A text book of Engineering Mathematics", Laxmi Publications, 2010.

5. E. Kreyszig, “Advanced Engineering Mathematics”, John Wiley & Sons, 2006.
6. P. G. Hoel, S. C. Port and C. J. Stone, “Introduction to Probability Theory”, Universal Book Stall, 2003.
7. S. Ross, “A First Course in Probability”, Pearson Education India, 2002.
8. W. Feller, “An Introduction to Probability Theory and its Applications”, Vol. 1, Wiley, 1968.
9. T. Veerarajan, “Engineering Mathematics”, Tata McGraw-Hill, New Delhi, 2010.
10. Mathematical Statistics, S.C. Gupta & V.K. Kapoor, S. Chand Pub.

Course Code	Course Title						Core/Elective
ES212ME	**Elements of Mechanical Engineering**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**-**	**-**	**-**	**30**	**70**	**3**

Course Objectives

- To learn certain fundamental topics related to mechanical engineering
- To understand and applications of thermodynamics.
- To understand the working principles of IC engines, gas turbines, hydraulic turbines and pumps.
- To understand the basic modes of heat transfer
- To familiarize the design and working principles of transmission Systems and various manufacturing processes

Course Outcomes

1. State and differentiate various classifications of IC engines and reciprocating air compressors with specific focus on similarities and differences between (i) 2 stroke and 4 stroke engines and (ii) CI and SI engines. Subsequently, the student would be able to compute the performance parameters of the engines and gas turbines.
2. Compare various types of heat transfer, analyse the governing equations, understand the applications of heat exchangers and solve related problems
3. Demonstrate the working principles of hydraulic turbines and pumps
4. Classify different types of power transmission systems like gears, gear trains, belts, ropes etc. with emphasis on their kinematic mechanisms and solve related problems
5. Understand various manufacturing processes like, welding, , machining, etc. and recognize their suitability for manufacturing of different industrial products

UNIT-I

IC Engines: Working of four stroke and two stroke petrol and diesel engine with p-V diagrams, valve timing diagram, calculation of indicated power, brake power, specific fuel consumption, mechanical and thermal efficiencies.

Gas Turbines: Classification, calculation of efficiency of simple open gas turbine cycle (joule cycle/ Brayton cycle) and applications.

UNIT-II

Heat Transfer: Basic modes of heat transfer, Fourier's law of conduction, Newton's law of cooling, Stefan-Boltzmann law of radiation. One dimensional steady state conduction heat transfer through plane walls without heat generation.

Heat exchangers: Classification and application of heat exchangers in industry, derivation of LMTD in parallel and counter-flow heat exchangers and problems

UNIT-III

Hydraulic turbines: Classification, working principle, calculation of overall efficiencies of Pelton wheel and Francis turbines.

Hydraulic pumps: definition and classifications

Reciprocating pump: classification, working principle and limitations**.**

Centrifugal pump: classification, working principle and limitations

UNIT-IV

Power Transmission Elements: Gears: Definitions and uses of Spur, helical &Bevel gears.
Gear trains: Classifications and simple problems on simple/compound &Reverted gear train.
Belt drives: Definitions of velocity ratio, creep and slip, open and cross belt drives.

UNIT-V

Basic Manufacturing Processes:

Welding: Definitions and method of soldering, brazing and welding and differences. Brief description of Arc welding and Oxy- Acetylene welding.
Machining: Working mechanism of Lathe, Milling and grinding machines.
Additive Manufacturing: introduction to 3D printing and applications.

Suggested Readings:

1. R.K. Rajput "Thermal Engineering", Laxmi Publications, 2005
2. C. Sachdeva "Fundamentals of Engineering Heat and Mass transfer", Wiley Eastern Ltd,2004.
3. P.N. Rao "Manufacturing Technology", Vol. 1 &2, Tata McGraw Hill publishing co, 2010.
4. S.S. Rattan, "Theory of Machines", Tata McGraw Hill, New Delhi 2010.
5. Bansal, R.K. Fluid Mechanics and Hydraulic Machines, Laxmi publications(p)ltd. Delhi,1995

Course Code	Course Title						Core/Elective
ES216EC	**Digital Electronics**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**-**	**-**	**-**	**30**	**70**	**3**

Course Objectives

- To learn the principles of digital hardware and support given by it to the software.
- To explain the operation and design of combinational and arithmetic logic circuits.
- To design hardware for real world problems.

Course Outcomes

At the end of this course the students will be able to

1. Understand the deign process of digital hardware, use Boolean algebra to minimize the logical expressions and optimize the implementation of logical functions.
2. Understand the number representation and design combinational circuits like adders, MUX etc.
3. Design Combinational circuits using PLDS and write VHDL code for basic gates and combinational circuits.
4. Analyse sequential circuits using flip-flops and design registers, counters.
5. Represent a sequential circuit using Finite State machine and apply state minimization techniques to design a FSM

UNIT – I

Design Concepts: Digital Hardware, Design process, Design of digital hardware. Introduction to logic circuits – Variables and functions, Logic gates and networks. Boolean algebra, Synthesis using gates, Design examples. Optimized implementation of logic functions using K-Map and Quine-McCluskey Tabular method

UNIT – II

Number representation: Addition and Subtraction of signed and unsigned numbers.

Combinational circuit building blocks: Half adder, Full adder, Multiplexers. Decoders. Encoders. Code converters, BCD to 7-segment converter, Arithmetic comparator circuits.

UNIT – III

Design of combinational circuits using Programmable Logic Devices (PLDs): General structure of a Programmable Array Logic (PAL), Programmable Logic Arrays(PLAs), Structure of CPLDs and FPGAs, 2-input and 3-input lookup tables (LUTs)

Introduction to Verilog HDL: Verilog code for basic logic gates, adders, decoders

UNIT – IV

Sequential Circuits: Basic Latch, Gated SR Latch, gated D Latch, Master-Slave edge triggered flip-flops, T Flip-flop, JK Flip-flop, Excitation tables. Registers, Counters, Verilog code for flip-flops

UNIT – V

Synchronous Sequential Circuits: Basic Design Steps, Finite State machine(FSM) representation using Moore and Mealy state models, State minimization, Design of FSM for Sequence Generation and Detection, Algorithmic State Machine charts.

Suggested Readings:

1. Moris Mano and Michael D CIletti, Digital Design, Pearson, fourth edition,2008
2. Zvi Kohavi, Switching and Finite Automata Theory, 3rd ed., Cambridge University Press-New Delhi, 2011.
3. R. P Jain, Modern Digital Electronics,4th ed., McGraw Hill Education (India) Private Limited, 2003
4. Ronald J.Tocci, Neal S. Widmer &Gregory L.Moss, "Digital Systems: Principles and Applications," PHI, 10/e, 2009.
5. Samir Palnitkar, "Verilog HDL A Guide to Digital Design and Synthesis," 2nd Edition, Pearson Education, 2006.

Course Code	Course Title						Core/Elective
PC221EC	**Electronic Devices**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**-**	**-**	**-**	**30**	**70**	**3**

Course Objectives

- Study semiconductor physics and Analyse the behavior of Semiconductor diodes in Forward and Reverse bias.
- Develop Half wave and Full wave rectifiers with L, C Filters.
- Explain V-I characteristics of Bipolar Junction Transistor in CB, CE & CC configurations.
- Design DC Biasing techniques and evaluate A.C parameters for BJT in Amplifier Applications.
- Explore V-I characteristics of FETs, MOSFETs and study IC fabrication techniques.

Course Outcomes

1. Interpret the characteristics and apply diode models to analyse various applications of diodes.
2. Identify the merits and demerits of various filters, formulate and design rectifier circuits with filters Calculate ripple factor, efficiency and % regulation of rectifier circuits.
3. Discriminate the BJT configurations to recognize appropriate transistor configuration for any given application and design the biasing circuits with good stability.
4. Analyse, Compare and design of BJT amplifiers with various biasing circuits.
5. Distinguish the working principles of BJT and FET also between FET & MOSFET.

UNIT-I

Introduction to Semiconductor Physics: Energy bands in intrinsic and extrinsic Silicon. Carrier transport: diffusion current, drift current, mobility and resistivity; Generation and recombination of carriers, Poisson and continuity equation.

Junction Diode: PN Junction formation, Characteristics, biasing – band diagram and current flow, Diode current equation, Breakdown in diodes, Diode as a circuit element, Small signal diode models, Diode switching characteristics, Zener Diode, Zener voltage regulator and its limitation, Schottky diode.

UNIT-II

PN Diode Applications: Half wave, Full wave and Bridge rectifiers – their operation, performance characteristics and analysis. Filters (L, C filters) used in power supplies and their ripple factor calculations, design of Rectifiers with and without Filters.

Special Diodes: Elementary treatment on the functioning of Light Emitting diode, Photo diode and Solar cells.

UNIT-III

Bipolar Junction Transistor: Transistor Junction formation (collector-base, base-emitter Junctions), Transistor biasing – band diagram for NPN and PNP transistors, current components and current flow in BJT, Ebers moll model, Modes of transistor operation, BJT V-I characteristics in CB, CE, CC configurations, BJT as an amplifier, BJT biasing techniques, operating point stabilization against temperature and device variations, Bias stabilization and compensation techniques, Biasing circuits design.

UNIT-IV

Small Signal Transistors equivalent circuits: Small signal low frequency h-parameter model of BJT, Approximate model, Analysis of BJT amplifiers using Approximate model for CB, CE and CC configurations; High frequency - Π model, Relationship between hybrid - Π and h – parameter model.

UNIT-V

Junction Field Effect Transistors (JFET): JFET formation, operation & current flow, V-I characteristics of JFET,

MOSFETs: Enhancement & Depletion mode MOSFETs, current equation, V-I characteristics, DC-biasing, Low frequency small signal model of FETs. Analysis of CS, CD and CG amplifiers, MOS Capacitor.

Integrated Circuit Fabrication process: Oxidation, diffusion, ion implantation, photolithography, etching, CMOS Process flow

Suggested Readings:

1. G. Streetman and S. K. Banerjee, *Solid State Electronic Devices*, 7th edition, Pearson, 2014.
2. S. M. Sze and K. N. Kwok, *Physics of Semiconductor Devices*, 3rd edition, John Wiley& Sons, 2006.
3. D. Neamen, D. Biswas, *Semiconductor Physics and Devices*, McGraw-Hill Education.
4. Jacob Millman, Christos C. Halkias, and Satyabrata Jit, *Electronic Devices and Circuits*, 3rd ed., Mc Graw Hill Education, 2010.
5. Robert Boylestad and Louis Nashelsky, *Electronic Devices and Circuit Theory*, 11th ed., Pearson India Publications, 2015.

Course Code	Course Title						Core/Elective
PC222EC	**Network Theory**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**3**	**-**	**-**	**-**	**30**	**70**	**3**

Course Objectives

- Concepts of Two Port networks, study about the different two port parameter representations.
- Concepts about the image impedance on different networks, design of attenuators.
- Design concepts of equalizers.
- Design concepts of different filters.
- Design concepts of network synthesis.

Course Outcomes

1. Able to Express given Electrical Circuit in terms of A, B, C, D and Z, Y Parameter Model and Solve the circuits and how they are used in real time applications.
2. Able to learn how to calculate properties of networks and design of attenuators.
3. Able to design of equalizers.
4. Able to design different types of filters using passive elements.
5. Able to synthesize the RL & RC networks in Foster and Cauer Forms.

UNIT-I

Two Port networks: Z, Y, h, g and ABCD parameters, equivalence of two ports networks, T-PI transforms, Reciprocity theorem, Interconnection of two port networks and Brune's test for inter connections.

UNIT-II

Symmetrical and Asymmetrical Networks: Characteristic impedance and propagation constant of symmetrical T and pi networks, Image and iterative impedances, Image transfer constant and iterative transfer constant of asymmetrical L, T and pi networks,

UNIT-III

Constant k- Filters- Low pass, high pass, band pass and band elimination filter design, m-derived low pass and high pass filter design, Composite filter design and notch filter.

UNIT-IV

Attenuators and Equalizers- Design of symmetrical T, pi, Bridge-T and Lattice attenuators, impedance matching networks, Inverse networks, Equalizers, Constant resistance equalizer, full series and full shunt equalizer**.**

UNIT-V

Network Synthesis: Hurwitz polynomials, positive real functions, Basic Philosophy of Synthesis, L-C Immitance functions, RC impedance functions and RL admittance functions. RL impedance functions and RC admittance functions. Cauer and Foster's forms of RL impedance and RC admittance. Properties of RC, RL Networks**.**

Suggested Readings:

1. Ryder J.D, *Network Lines Fields*, 2nd edition, Prentice Hall of India,1991.
2. P.K. Jain and Gurbir Kau, *Networks, Filters and Transmission Lines,* Tata McGraw-Hill Publishing Company Limited.
3. A. Sudhakar Shyammohan, *Circuits Networks: Analysis Synthesis*, 4th edition, Tata McGraw-Hill, 2010.
4. Van Valkenburg M.E, *Introduction to Modern Network Synthesis,* Wiley Eastern 1994.
5. S.P. Ghosh and A.K. Chakraborty, *Network Analysis and Synthesis,* McGraw Hill, 1st edition, 2009.

Course Code	Course Title						Core/Elective
PC251EC	**Electronic Devices Lab**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
ED PC221EC	**-**	**-**	**-**	**2**	**25**	**50**	**1**

Course Objectives

- Study the characteristics of PN diode
- Learn the characteristics of BJT in CE, CB and CC configurations
- Plot the characteristics of FET in CS and CD configurations
- Observe the parameters of BJT and FET amplifiers
- Design biasing circuits

Course Outcomes

1. Understand characteristics of Diodes
2. Plot the characteristics of BJT in different configurations.
3. Record the parameters of BJT and FET amplifiers.
4. Understand biasing techniques of BJT.
5. Use the SPICE software for simulating electronic circuits.

List of Experiments

1. V-I Characteristics of Silicon and Germanium diodes and measurement of static and dynamic resistances.
2. Zener diode Characteristics and its application as voltage regulator.
3. Design, realization and performance evaluation of half wave rectifiers without and with filters.
4. Design, realization and performance evaluation of full wave rectifiers without and with filters.
5. V-I Characteristics of BJT in CB configuration.
6. V-I Characteristics of BJT in CE configuration.
7. V-I Characteristics of JFET in CS configuration.
8. Frequency response of Common Emitter BJT amplifier.
9. Frequency response of Common Source FET amplifier.
10. BJT Biasing circuit design.
11. V-I characteristics of UJT
12. Simulate any two experiments using PSPICE

Note: A minimum of 10 experiments should be performed

Suggested Readings:

1. Paul B. Zbar, Albert P. Malvino, *Micheal A. Miller, Basic Electronics, A text – Lab Manual*, 7th Edition, TMH 2001.

Course Code	Course Title						Core/Elective
PC252EC	**Electronic Workshop**						**Core**
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	**-**	**-**	**-**	**2**	**25**	**50**	**1**

Course Objectives

- To learn the usage of basic electronic components, equipment and meters used in electronic laboratories
- To learn practical electric AC and DC circuits
- Verify the truth tables of combinational and sequential circuits
- Realize combinational and sequential circuits
- Design adder / subtractor

Course Outcomes

1. Use the basic electronic components and design circuits.
2. Verify various parameters of the circuits by applying theorems.
3. Understand the pin configuration of ICs and verify the operation of basic gates
4. Design and verify the combinational and logic circuits.

List of Experiments

Part A

1. Study of all types of discrete Active & passive devices, display devices, integrated components, electro mechanical components (switches, sockets, connectors etc.,) electromagnetic components (relays). Study and use of different meters (volt/ammeter, AVO/Multi meter) for the measurement of electrical parameters. Measurement of RLC components using LCR Meter.
2. Soldering and Desoldering
3. PCB design and circuit assembling
4. Study of CRO and its applications.
5. Design and Verification of Superposition and Tellegan's theorem
6. Design and Verification of of Thevenin's and Maximum Power Transfer Theorem.
7. Measurement of two-port network parameters.
8. Measurement of Image impedance and Characteristics impedance.

Part B

Implement using digital ICs

9. Verification of truth tables of Logic gates and realization of Binary to Gray and Gray to Binary code converters.
10. Realization of Half adder/sub and full adder/sub using universal logic gates.
11. Realization of Full adder/Sub using MUX and Decoder
12. Design 2's complement Adder/subtractor using IC 74283 and verify experimentally.
13. Verification of truth tables of Flip Flops and Flip flop conversions form one form to the other.

Note: A minimum of 6 experiments in Part-A and 4 experiments in Part-B should be performed. The students may use any commercial / open source SPICE programs available like MULTISIM, PSPICE, TINA, LAB VIEW for simulation.

Suggesting Reading:

1. Paul B. Zbar, Albert P. Malvino, *Michael A. Miller, Basic Electronics, A Text – Lab Manual,* 7thEdition, TMH 2001.
2. Paul Tobin, *PSPICE for Circuit Theory and Electronic Devices,* Morgan & Claypool publishers, 1st ed., 2007.
3. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, 5th, Edition, 2004.