SCHEME OF INSTRUCTION & EXAMINATION

B.E. II YEAR ELECTRICAL & ELECTRONICS ENGINEERING

SEMESTER - I

Sl.No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	MT 201	Mathematics - III	4	-	3	75	25
2.	EE 201	Electrical Circuits - I	4	-	3	75	25
3.	CE 222	Environmental Studies	4	-	3	75	25
4.	EE 204	Electrical Measurements and Instrumentation	4	-	3	75	25
5.	EC 221	Electronic Engg. - I	4	-	3	75	25
6.	ME 223	Principles of Mechanical Engineering	4	-	3	75	25
		PRACTICALS					
1.	EC 241	Electronic Engg. Lab. - I	-	3	3	50	25
2.	EE 242	Circuits and Measurements Lab	-	3	3	50	25
		Total	**24**	**6**	**-**	**550**	**200**

SCHEME OF INSTRUCTION & EXAMINATION

B.E. II YEAR SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

SEMESTER - I

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	EE 222	Electrical Technology (For ECE)	4	-	3	75	25
2.	EE 221	Electrical Circuits and Machines (For IT)	4	-	3	75	25
3.	EE223	Automotive Electrical and Electronics (For AE)	4	-	3	75	25
		PRACTICALS					
1.	EE243	Auto electrical and Microprocessor Lab	-	3	3	50	25

MT 201 UE

MATHEMATICS-III
(Common to all Branches except ECE)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course Objectives

1. To introduce the concepts of Fourier series, partial differential equations and their applications
2. To provide the knowledge of some probability distributions , tests of significance, curve fiting, correlation and regression

UNIT- I

Partial differential equations: Formation of Partial differential equations, Linear first order equations, Lagrange's equation, Non linear first order equations, Charpit's method, Standard forms.

UNIT-II

Fourier series and its applications to partial differential equations: Expansion of a function in Fourier series for a given range , Fourier series for odd and even functions, Change of interval, Half range sine and cosine series , Solution of wave equation, Heat equation and Laplace's equation by the method of separation of variables and their use in problems of vibrating string, One dimensional unsteady state heat flow and two dimensional steady state heat flow.

UNIT-III

Statistics : Introduction to Probality, Baye's theorem, Random variables , Density functions, Mathematical expectation, Expected values, Moments and Moment generating functions, Characteristic functions.

UNIT-IV

Distributions: Poisson, Normal , Gamma and Chi-Square distributions , Tests of significance, Chi-Square , F and t-tests.

UNIT-V

Curve Fitting : Fitting of curves by the method of least squares (straight line, parabola, exponential curves),Correlation and Regression , Lines of regression.

Suggested Reading:

1. R.K. Jain & S.R.K. lyengar, Advanced Engineering Mathematics, Narosa Publications, 4th Edition, 2014.
2. Dr.B.S.Grewal, Higher Engineering Mathematics, Khanna Publications, 43rd Edition, 2014.
3. Dr.M.D.Raisinghania, Ordinary and Partial differential equations, S.CHAND, 17th Edition 2014.
4. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, 2012.
5. S.C Gupta, V.K.Kapoor, Fundamentals of Mathematical Statistics, S.CHAND & SONS.

EE 201

ELECTRICAL CIRCUITS –I

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

Course Objectives

- To acquire knowledge in circuits and to understand the fundamentals of derived circuit laws.
- To understand theorems and apply to steady state and transient analysis of single phase and 3-phase circuits.

UNIT I

Network Elements & Laws: Active elements, Independent and dependent sources. Passive elements — R, Lend C, Energy stored in inductance and capacitance, Kirchhoff's laws, Source transformations, Star-delta transformations, Node voltage method, Mesh current method including super node and super mesh analysis.

UNIT II

Single-Phase Circuits: RMS and average values of periodic sinusoidal and non- sinusoidal waveforms, Phasor representation, Steady-state response of series, parallel and series-parallel circuits.
Impedance, Admittance, Current locus diagrams of RL and RC series and parallel circuits with variation of various parameters.

UNIT III

Poly-phase Circuits: Analysis of balanced and unbalanced 3- phase circuits, Star and delta connections, Measurement of three phase power for balanced and unbalanced loads.

UNIT IV

Topological Description of Networks: Graph, tree, chord, cut- set, incident matrix, circuit matrix and cut-set matrix, Formulation of node equations, loop equations, cut-set equations for RLC networks.
Network theorems: Superposition theorem, Thevinin's theorem, Norton's theorems, Maximum power transfer theorem, Tellegen's theorem, Compensation theorem, Miliman's theorem and Reciprocity theorem.

UNIT V

Coupled Circuits: Concept of self and mutual inductance, Dot connection, Coefficient of coupling, Analysis of circuits with mutual Inductance. Resonance: Series and parallel circuits, Band-width and Q-factor.

Suggested Reading:

1. Van Valkenburg M.E., Network Analysis, Prentice Hall of India, 3rd Edition, 2000.
2. William Hayt H., Kimmerly Jack E. and Steven Durbin M., Engineering Circuit Analysis, McGraw Hill, 6th Edition, 2002.
3. Jagan N.C. and Lakshrninarayana C., Network Theory, B.S. Publications, 2nd Edition, 2005.
4. A.Sudhakar & Shyammohan Palli, Network Analysis, Tata Mc-Graw Hill Publications, 4th Edition, 2010.

CE 222

ENVIRONMENTAL STUDIES
(Common to all Branches)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

Course Objectives

- To study the sources of water, floods and its impact on environment.
- To know about the ecosystem and energy resource system
- To understand the biodiversity concepts and its advantages.
- To study different types of pollution and its impact on environment
- To know the social and environment related issues and their preventive measures

UNIT -I

Environmental studies: Definition, scope and importance, need for public awareness. Natural resources: Water resources; use and over utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems. Effects of modern agriculture, fertilizer-pesticide problems, water logging salinity. Energy resources, growing energy needs, renewable and non-renewable energy sources. Land Resources, land as a resource, land degradation, soil erosion and desertification.

UNIT -II

Ecosystems: Concepts of an ecosystem, structure and functions of an ecosystem, producers, consumers and decomposers, energy flow in ecosystem, food chains, ecological pyramids, aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT - III

Biodiversity: Genetic species and ecosystem diversity, bio-geographical classification of India. Value of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

UNIT -IV

Environmental Pollution: Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution and solid waste management.

Environment Protection Act: Air, water, forest and wild life acts, issues involved in enforcement of environmental legislation.

UNIT—V

Social Aspects and the Environment: Water conservation, watershed management, and environmental ethics. Climate change, global warming, acid rain, ozone layer depletion. Environmental protection act, population explosion.

Disaster management: Types of disasters, impact of disasters on environment, infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology, disaster management cycle, and disaster management in India.

Suggested Reading:

1. A. K. De, *Environmental Chemistry*, New Age Publications, 2002.
2. E. P. Odum, *Fundamentals of Ecology*, W.B. Sunders Co., USA.
3. G.L.Karia and R.A. Christian, *Waste Water Treatment, Concepts and Design Approach*, Prentice Hall of India, 2005.
4. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2005
5. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi, 1999.

EE 204

ELECTRICAL MEASUREMENTS AND INSTRUMENTION
(Common for EEE & IE)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

Course Objectives

- To learn and understand various DC and AC meters.
- To be able to understand in detail about measurement of various electrical parameters and quantities.

Unit I

Principles of Measurement and Instrumentation: Objectives of measurements, analog versus digital measurements, accuracy, precision and uncertainty, sources of measurement error. Standard cell and standard resistance. Basic characteristics of measuring instruments with a moving element.

Instruments: Ammeter, Voltmeter. Expression for torque of moving coil, moving iron, dynamometer, induction and electrostatic instruments. Extension of range of instruments wattmeter, Torque expression for dynamometer instruments. Reactive power measurement.

Unit II

Energy meters, single phase and three phase, Driving torque and braking torque equations. Errors and testing compensation, maximum demand indicator, power factor meters, frequency meters, electrical resonance and Weston type of synchroscope.

Unit III

Bridge Methods and Transducers: Measurement of inductance, capacitance and resistance using Bridge. Maxwell's Anderson, Wein, Heaveside Cambell's Desauty's, Schering's bridges, kelvin's double bridge, Megger, Wagners Earthing device. Transducers- Analog and digital transducers, strain gauges and Hall effect transducers.

Unit IV

Magnetic Measurements: Ballistic galvanometer. Testing of ring and bar specimens. Determination of B-H curve and hysteresis loop using CRO, determination of leakage factor.

Unit V

Potentiometers and Instrument Transformers: Crompton's DC and AC polar and coordinate types. Applications, Measurement of impedance. Calibration of ammeter, voltmeter and wattmeter. Use of Oscilloscope in frequency, phase and amplitude measurements. Instrument transformers. Ratio and Phase angle errors and their reduction.

Suggested Reading:

1. A.K.Sawhney- A Course in Electrical and Electronics Measurements and Instruments- Dhanpat Rai and Sons, Delhi, 2005.
2. Umesh Sinha- Electrical and Electronics Measurements & Instrumentation- Satya Prakashan,
3. F.W.Golding and Widdis, Electrical Measurements and Measuring Instruments,5th Edition-2010

EC 221

ELECTRONIC ENGINEERING – I
(Common for EEE & IE)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course Objectives

- To understand the characteristics of diodes and transistor configurations.
- To understand the design concepts of biasing of BJT and FET.
- To understand the design concepts of OP Amp.
- To study the characteristics of logic families.

UNIT-I

Semiconductor diodes and Rectifiers: Review of semiconductor physics, p-n junction as a rectifier, V-I characteristics, temperature dependence of V-I characteristics; Breakdown of junctions-Zener and Avalanche. Half wave, full wave, bridge rectifiers, L, C, pi-section filters; Regulation and Ripple characteristics.

UNIT-II

Transistors and their biasing: BJT, current components; CE, CB, CC configurations; characteristics. Transistor as an amplifier; h-parameters; Analysis of CE, CB, CC amplifiers. Operating point, bias stability, bias stabilization circuits, fixed bias, collector to base bias and Emitter bias.

UNIT-III

Field Effect Transistors and their biasing: Principles of V-I characteristics of JFET and MOSFETs; Depletion and Enhancement modes, small signal equivalent circuit, FET as a CS amplifier.
Biasing of JFET's and MOSFET's, source self bias, biasing for zero current drift, biasing against device variations, Biasing the enhancement MOSFET, Characteristics of UJT, SCR, DIAC & TRIAC.

UNIT-IV

Low frequency BJT amplifier Circuits: Cascading amplifier stages, simplified analysis for three amplifier configurations, Miller's theorem-High input impedance transistor circuits, cascade configuration, Difference amplifier.

UNIT-V

Multistage amplifiers: Classification of amplifiers, Distortion in amplifiers, Frequency response of RC coupled amplifiers, Transformer coupled amplifiers, step response, Bandwidth of cascaded stages. Effect of emitter (source) bypass capacitor on LF response.

Suggested Reading:

1. Jacob Millman & Christos C. Halkias, *Electonic Devices and Circuits*, 3rd edition Tata McGraw Hill, 2011.
2. Jacob Millman & Christos C. Halkias, *Integrated Electronics*, Tata McGrawHill, 2011.
3. Salivahanan, Suresh Kumar and Vallavaraj, *Electronic Devices and Circuits*, 2nd edition Tata McGraw Hill, 2010.

ME 223

PRINCIPLES OF MECHANICAL ENGINEERING

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks

Course Objectives

1. To know basics of fluid mechanics and governing equations.
2. To understand the working principle of hydrautic turbines and pumps.
3. To understand the working principle of steam and gas power plants.

UNIT I

Laws of Thermodynamics: Steady flow energy equation-conditions of reversible and irreversible process- Modes of Heat transfer-conduction and convection , radiation - concept of black body radiation - steady state conduction -Heat transfer through plane walls, cylinders, critical radius of insulation for cylinders.

Heat Exchanger: Classification, Industry applications, LMTD calculations, parallel and counter flows

Refrigeration System: Types, co-efficient of performance and ton, SVC & air refrigeration and properties of refrigerants, eco friendly refrigerants, Psychometric Processes for summer and winter A/c only.

UNIT II

Principles of IC Engines: Petrol and diesel, 2 stroke / 4 stroke and load characteristics, compressors – concept of multi stage compression, Types, load characteristics, Calculation of mechanical and thermal efficiencies.

Generation of steam: Boilers - Gas Turbines – types – classification- constant pressure.

UNIT III

Gears: Classification, Gear trains, types – Single, Compound, Inverted, & Epi cyclic gear trains, Belt & rope drives, open and cross belt, length of belt, ratio of tension flat belts, condition for maximum power.

UNIT IV

Introduction to Bernoulli's equation, applications - Venturi meter, Orifice meter, Flow through pipes – Hagen's formula, Friction loss in pipes, Darcy's formula, Reynolds number and its significance

Hydraulic Turbines: Classification – working principle – Francis, Kaplan, Pelton Wheel, Work done, power output, efficiency, specific speed, Unit quantities, Draft Tube, Performance characteristic curves.

UNIT V

Pumps: Working principles and construction details of Centrifugal and reciprocating pumps, Effect of friction, acceleration head, work done, power required with and without air vessels, Problems faced in pumps, precaution, cavitation, primary velocity triangles of centrifugal pumps

Suggested Reading:

1. R.K. Rajput, *Thermal Engineering*, Laxmi Publications, 2005
2. Thomas Bevan *Theory of Machines*, CBS Publishers, 1995.
3. Yadav, *Steam and Gas turbines*, Central Publishing House Ltd, 2004.
4. S.Ramamrutham, *Hydraulic Machines*, Dhanpat Rai and Sons, 2004.

EC 241

ELECTRONIC ENGINEERING LAB-I
(Common to EEE and IE)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

List of Experiments:

1. Comparison of semiconductor diodes (Ge, Si and Zener)

2. Static Characteristics of BJT (CE)

3. Static Characteristics of BJT (CB)

4. Static Characteristics of FET (CS)

5. Design of Half wave and Full wave Rectifier without filters

6. Design of rectifiers with C, L, LC & Pi-filters

7. Static characteristics of SCR

8. Static characteristics of UJT

9. Measurement of phase, frequency and sensitivity with CRO

10. Biasing of BJT and FET

11. RC coupled amplifier BJT frequency response

12. RC coupled amplifier FET frequency response

13. Emitter Follower

14. Source Follower

15. Cascaded Amplifiers

Suggested Reading:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, Basic Electronics, A Text – Lab Manual, 7th Edition, TMH, 1994.
2. S. Poorna Chandra, B. Sasikala, Electronics Laboratory Primer, A design approach, Wheeler Publishing, 1998.

EE 242 CIRCUITS & MEASUREMENTS LAB

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

PART – A: CIRCUITS

1. Charging and discharging characteristics of RC series circuit
2. Locus diagram of RC/RL circuit
3. Frequency response of a RLC series circuit
4. Parameters of two port network
5. Verification of Theorems (a) Thevenins Theorem (b) Norton Theorem (c) Super Position Theorem (d) Max power transfer theorem
6. Characteristics of Linear/ Non-linear and bi-lateral elements
7. Transient Response of RLC circuits
8. Simulations of Electronic circuits using PSpice/PSim

PART – B: MEASUREMENTS

1. Measurement of low resistance by Kelvin's double bridge
2. Calibration of Single phase energy meter by Phantom loading
3. Measurement of Inductance by Maxwell's and Andersons bridge
4. Measurement of capacitance by DeSauty's bridge, Schering Bridge
5. Measurement of Iron losses by Lloyd Fischer square
6. Use of DC Potentiometer for measurement of unknown voltage and impedance
7. Calibration of three phase energy meter(Electromagnetic/Static) by direct loading
8. Use of Oscilloscope and plotting BH curve and calculation of Iron loss

Note: At least 5 experiments should be conducted from each part.

EE 222

ELECTRICAL TECHNOLOGY
(For ECE)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course Objectives

1. To acquire knowledge in electrical circuits.
2. To be able to understand the basic principle operation of electrical machines.

Unit I

DC Generators: Constructional details, Simple lap and wave windings, Methods of excitation, Induced emf, Basic ideas of armature reaction and commutation, Characteristics of shunt, series and compound generators and applications.

DC Motors: Torque developed in motors, Motor starter, Characteristics of shunt, series and compound motors, Speed control of DC motors.

Unit II

Balanced Three-Phase System: Star-delta connection, Relationship between line and phase quantities, Measurement of power by Two-Wattmeter method, Operations of fluorescent lamp.

Unit III

AC Generators: Construction, emf equation, Armature reaction, Synchronous impedance, Regulation.

Unit IV

Transformers: Single-phase transformer: Construction, Theory of operation, Phasor diagram under no-load and loaded conditions, OC and SC tests on transformer, Efficiency and regulation, Auto transformer, Theory of operation.

Unit V

Induction Motors: Construction, Production of rotating magnetic field, Slip-torque characteristics, Starters for cage and wound rotor induction motors, Single-phase induction motors, Construction, Theory of operation, Characteristics of shaded pole, Split phase and Capacitor motors, Applications.

Suggested Reading

1. Mehtha V.K., Principles of Electrical Engineering and Electronics, S.Chand & Co., 1999.
2. John Bird, Electrical Circuit theory and Technology, Routledge Taylor & Francis Group, Fourth Edition, 2012.
3. Naidu MS. & Kamakshiah S., Introduction to Electrical Engineering, Tata McGraw Hill, 1995.
4. A.Chakrabarti, Sudipta Nath,, Chandan Kumar Chanda, Basic Electrical Engineering Tata McGraw Hill Education PVT LTD. 2009.

EE 223

AUTOMOTIVE ELECTRICAL & ELECTRONICS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course Objectives

1. To be able to understand the types of batteries and starting motors.
2. To acquire knowledge in current trends in automotive electronics and sensors.

UNIT-I BATTERIES AND ACCESSORIES

Principle and construction of lead acid battery, characteristics of battery, rating capacity and efficiency of batteries various tests on batteries, maintenance and charging. Lighting system: insulated and earth return system, details of head light and side light, LED lighting system, head light dazzling and preventive methods – Horn, wiper system and trafficator.

UNIT-II STARTING SYSTEM

Condition at starting, behavior of starter during starting, series motor and its characteristics, principle and construction of starter motor, working of different starter drive units, care and maintenance of starter motor, starter switches.

UNIT-III CHARGING SYSTEM

Generation of direct current, shunt generator characteristics, armature reaction, third brush regulation, cutout, voltage and current regulators, compensated voltage regulator, alternators principle and constructional aspects and bridge rectifiers, new developments.

UNIT-IV FUNDAMENTALS OF AUTOMOTIVE ELECTRONICS

Current trends in automotive electronic engine management system, electro magnetic interference suppression, electromagnetic compatibility, electronic dashboard instruments, onboard diagnostic system, security and warning system.

UNIT-V SENSORS AND ACTIVATORS

Types of sensors: Sensor for speed, throttled position, exhaust oxygen level, manifold pressure, crankshaft position, coolant temperature, exhaust temperature, air mass flow for engine application. Solenoids, stepper motors relay. Introduction to Microprocessor & Applications in Automobiles.

Suggested Reading

1. Young A.P. & Griffiths. L. “Automotive Electrical Equipment”, ELBS & New Press - 1999.
2. William B. Riddens “Understanding Automotive Electronics”, 5th edition – Butter worth Heinemann Woburn, 1998.

3. Bechhold “Understanding Automotive Electronics”, SAE, 1998.
4. Crouse, W.H “Automobile Electrical Equipment”, McGraw-Hill Book Co., Inc., New York, 3rd edition, 1986.

EE 243

AUTO ELECTRICAL & MICRO PROCESSOR LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hrs
University Examination	50 Marks
Sessional	25 Marks

List of Experiments:

Electrical Laboratory

1. Testing of batteries and battery maintenance
2. Testing of starting motors and generators
3. Testing of regulators and cut –outs
4. Diagnosis of ignition system faults
5. Study of Automobile electrical wiring.

Microprocessor

1. Block Transfer
2. 8 bit Addition, Subtraction
3. Multiplication and Division
4. Maximum and Minimum of block of data
5. Sorting
6. Stepper Motor Intefacing