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 Hours	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	Enviornmental Studies	4	-	3	75	25
4.	EE 204	Electrical Measurements and Instruments	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 & 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 Hours	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	EE 222	Electrical Technology (For ECE)	4	-	3	75	25

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MT 201

MATHEMATICS-III
(Common to all Branches)

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

UNIT-I

Partial differential Equations : Formation of partial-differential equation of first order-Lagrange's solution, Standard types-Charpit's method of solution-partial differential equations of higher order, Monge's method.

UNIT-II

Fourier Series : Expansion of a function in Fourier series for a given range-odd and even functions of Fourier series-change of interval-Applications of Fourier series-square wave forms-saw tooth wave form and modified square saw tooth wave form-half range sine and cosine expansions-complex Fourier series.

UNIT-III

Applications of Partial differential equations : Solution of wave equation, hear equation and Laplace's equation by the method of separation of variables and their use in problems of vibrating string, one dimensional unsteady heat flow and two dimensional steady state hear flow.

UNIT-IV

Numerical methods : Solutions of Algebraic and Transcendental equations - Bisection method, Regula-Falsi method and Newton-Raphson's method-Solution of Linear system of equations, Gauss elimination method, Gauss Seidel iterative method, ill conditioned equations and refinement of solutions, Interpolation, Newton's divided difference interpolation-Numerical differentiation, Solution of differential equations by Euler's method, modified Euler's method and Runge-Kutta Method of 4th order.

UNIT-V

Z-Transforms : Introduction, Basic Theory of Z-transforms. Z-transform of some standard sequences, Existence of Z-Transform. Linearity property, Translation Theorem, Scaling property, Initial and Final Value Theorems, Differentiation of Z-Transform, Convolution Theorem, Solution of Difference equations using Z-transforms.

Suggested Reading :

1. R.K. Jain & S.R.K. Iyengar, *Advance Engineering Mathematics,* Narosa Publications - 2008.
2. B.S. Grewal, *Higher Engineering Mathematics,* Khanna Publications, 40th Edition, 2008.
3. N. Bali, M.Goyal, C.Watkins, *Advanced Engineering Mathematics,* 7th Edition, 2009 Laxmi Publications.
4. M.K. Venkatraman, *Engineering Mathematics-III,* Technical Publications, Chennai.
5. H.K. Dass, *Advanced Engineering Mathematics,* S.Chand & Co. Pvt. Ltd., 2010.

M.J.C.E.T

EE 201

ELECTRICAL CIRCUITS –I

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

Unit-I

D.C Circuit Analysis, Techniques, Definitions of Electric Circuit Parameters, Voltage, Current, and Power, Passive sign conventions, Passive circuit elements R, L and C, their V-I relationships & symbols. Description of independent and dependent sources, Simple series and parallel circuit analysis and reduction techniques, Current and voltage division principles.

Unit-II

Nodal, loop and mesh circuit analysis. Network theorems: Superposition Theorem, Thevenin, Norton, Maximum Power Transfer and Reciprocity theorems and their applications.

Network Topology: Network Graph concept, oriented graph, node, branch, complete incidence matrix, basic incidence matrix, loop, tie-set, tree and its properties, co-tree, Fundamental tie-set matrix, cut-set, Fundamental cut-set matrix, Duality.

Unit-III

Definition and computation of average value, RMS value of time varying periodic signals, Steady State response of RLC networks subjected to sinusoidal excitation, Complex exponentials, Definition of phasor, Phasor domain conversions, Network analysis techniques in phasor domain. Definition of complex power, Reactive power, Power factor and Calculations of power in single phase ac circuits.

Unit-IV

Resonance - Definitions and computations of series and parallel resonance, definitions of bandwidth and Q-factor. Locus diagrams Coupled circuits: Analysis of circuits with mutual inductance, Linear Transformers and ideal Transformers.

Two-port parameters: Z, Y, ABCD and h-parameters, their inter-relationships, series, parallel and cascade connection of two ports, terminated two ports.

Unit-V

Poly phase circuits and in particular 3-phase circuit analysis: 3-phase power, Y and " connected systems, Calculations of voltages, current and power in 3-phase circuits with Y and " connected loads and generator, Star- Delta transformation. Balanced and unbalanced loads. Measurement of 3-phase power by two wattmeter method.

Suggested Reading:

1. Van Valkenburg, *NetworkAnalysis,* Prentice Hall of India, 3rdEdition, 1992.
2. W.H.Hayt, J.E.Kimmerly, *Engineering Circuit Analysis,* McGrawHill, 5th Edition, 2000
3. Charles K.Alexander & Matthew N.O.Sadiku, *Fundamental of ElectricCircuits,* TataMcGraw-Hill, 2003.
4. Joseph A Edminister, *Electric Circuits,* Sham's outline series.
5. Gopal G Bhise, Prem R Chadha & Durgesh C Kulshreshtha, *Engineering Network Analysis & Filter Design,* Umesh Publications.

M.J.C.E.T

CE 222

ENVIRONMENTAL STUDIES

(Common to all Branches)

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

UNI-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. GL. Karia and R.A. Christian, *Waste Water Treatment, Concepts and Design Approach*, Prentice Hall of India, 2005.
4. Benny Joseph, *Environmental Studies*,TataMcGraw-Hill, 2005
5. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi, 1999.

M.J.C.E.T

EE 204

ELECTRICAL MEASUREMENTS AND INSTRUMENTS
(Common for EEE & IE)

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

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 poly 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: Measurement of inductance, capacitance and resistance using Bridge.

Maxwell's Anderson, Wein, Heaveside Cambell's Desauty's, Schering's bridges, kelvin's doublebridge, price guard wire bridge loss of charge method, Megger, Wagners Earthing device.

Unit-IV

Magnetic Measurements: Ballistic galvanometer, calibration by Hibbert's magnetic standard flux meter, Lloyd-fischer square for measuring iron loss.

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 Readings:

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.

M.J.C.E.T

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

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. Single half wave, full wave, bridge rectifiers, L,C, pisection filters; Regulation and ripple characteristics.

UNIT-II

Transistors and their biasing : BJT, current components; CE, CB, CC configurations; characteristics; Transistor as an amplifiers; 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 and CS amplifier.

Biasing of JFET's and MOSFETs 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 resistance 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) by pass capacitor on LF response.

Suggested Reading :

1. Jocob Millman & Christos C. Halkias, *Electonic Devices and Circuits,* McGraw Hill,3/e,2010.
2. Jocob Millman & Christos C. Halkias, *Integrated Electronics,* McGraw Hill, 1991.
3. Donald L Schilling & Charles Belove, *Electronics Circuits : Discrete & Integrated,* McGraw Hill International Edition, 3rd Edition, 1989.

M.J.C.E.T

ME 223

PRINCIPLES OF MECHANICAL ENGINEERING

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

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 Wheels, 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.

M.J.C.E.T

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

Experiments on the following :

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.

General Note:

i) There should not be more than 2 students per batch while performing any of the lab experiment.

ii) Mini Project cum design exercise:
   a) The students must design, rig-up, and test the circuits wherever possible and should carry out the experiments individually.
   b) This exercise carries sessional marks of 10 out of 25, while the remaining 15 marks are for the remaining lab exercises.

M.J.C.E.T

EE 242

CIRCUITS & MEASUREMENTS LAB

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

List of Experiments:

PART – A: CIRCUITS

1. Charging 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 in RLC circuits
8. Application of PSPICE to electrical circuits

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
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

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

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.

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

Unit-III

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-IV

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.

Unit-V

Power Systems: Basic ideas of thermal, hydro, nuclear and non-conventional generating systems and layout, Block schematic of power systems, Transmission using high voltages, Advantages, Basic ideas of line parameters, Short line calculations.

Suggested Reading:

1. H.Cotton, *Electrical Technology*, BI Publications, 2002.
2. M.L. Soni, P.V. Gupta and V.S. Bhatnagar, *A Course in Electrical Power*, Dhanpat Rai and Sons, Delhi, 2005.

M.J.C.E.T