VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.-II (Electrical Engg.)

Semester - IV

Mechanics of Strength of material & Fluid Mechanics

Electronics II

Electrical Networks II

Electrical Machines II

Engineering Electromagnetic

Applied Thermodynamics & Thermal Engineering

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.-II (Electrical Engg.)

Semester - IV

ELE 401 ELE Mechanics of Strength of material & Fluid Mechanics

	Theory	Tutorial	Practical
Teaching Hours	4	0	2
Examination Scheme Marks	100	0	Continuous Evaluation 20 Examination 30
Duration	4 hrs		

Section1.

Stress/Strain :- Simple stress / strain/ strength & elasticity of material / elastic modulus & bulk modulus, temperature stresses.

Shear forces /bending moments :- Shear force & bending moment diagrams for concentrated & distributed loading & their relationship, theory of simple bending and shear stresses.

Torsion :- Torsion of circular shafts: solid and hollow. Shear stresses & strain. Introductory Concepts :- Introduction to principal stresses and strain vibration & strain energy concept.

Mechanical Properties :- Mechanical properties of engineering materials, including latest advancements as applicable to electrical / electronic / computer engineering components.

Section 2

Fluid properties :- Scope of fluid mechanics, fluid properties and classification of fluids, fluid pressure and its measurement.

Fundamentals of fluid flow :- Types of fluid flows, streamlines, path lines, streak lines, stream tubes. Continuity equation, velocity potential and stream function, velocity and acceleration of fluid particles. Energy equation and its applications.

Flow through pipes and flow measurement :- Concept of equivalent length, siphons, parallel and compound pipe lines, branching of pipe lines, pipe network, different types of flow meters.

Hydraulic Machines & Hydro Power :- Impact of jet on flat, curved, stationary and moving plates, velocity triangle at inlet and outlet. Classification of hydro turbines, velocity diagrams, centrifugal pumps and its components. Efficiency of pumps, pumps in series and parallel, characteristic curves. Types of Hydro- power plants & layout and case studies.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.-II (Electrical Engg.)

Semester - IV

ECE 402 ELE Electronics II

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	0	Continuous Evaluation 20 Examination 30

Multiple Transistor Circuits :- Cascading of amplifier stages; Difference amplifier; Common mode rejection ratio; Difference amplifier with constant current source; emitter follower and Darlington connections.

Negative Feedback In Amplifiers :- Basic concept of feedback amplifier, effect on gain, input and output impedances due to feedback, feedback amplifiers and sensitivity function, voltage series, voltage shunt, current series and current shunt configuration circuits, detailed analysis and introduction to its design. Frequency response of a feed back amplifier.

Frequency Response Of Amplifiers :- R-C Coupled amplifier with BJTs; Effect of emitter bypass capacitor; Coupling capacitor of base and collector; Low frequency analysis of FET amplifier, Source bypass capacitor; Drain coupling capacitor and gate coupling capacitor.

Oscillators :- Barkhausens criteria for oscillators, stability concept, three pole amplifier, Nyquist criteria, stabilizing networks, frequency compensation and sinusoidal oscillators, phase shift, wien bridge, Colpits, Hartley, crystal and tuned circuit type oscillators (AF and R.F range) Switching characteristics of devices Semiconductor diodes, transistors, FET, MOSFET, photo transistors and optocouplers.

Wave Shaping Circuits :- RL, RC, RLC wave shaping circuits, clipping, clamping and comparator circuits, their analysis, operations and applications.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.-II (Electrical Engg.)

Semester - IV

ELE 403 ELE Electrical Networks II

	Lecture	Tutorial	Practical
Teaching Hours	**2**	**2**	
Examination Scheme Marks	**100**	**50**	**Continuous Evaluation 00** **Examination 00**

Graph Theory and its Applications :- Fundamental concepts, definitions of a graph and various related terms, paths and circuit connections, tree of a graph, cut sets and tie sets, non separable planner and dual graphs, matrices of oriented graphs, properties and inter relationships of incidence, tie set and cut set matrices, complete circuit analysis using tie set and cut set matrices.

Circuit Transients :- Review of d.c. transients; R-L, R-C and R-L-C sinusoidal transient analysis using Laplace transform methods, two mesh a.c. transients, initial and final value theorems and S-domain circuits.

Symmetrical Components :- Review of analysis of polyphase unbalanced networks, theory of symmetrical components, its applications to the analysis of various polyphase unbalanced circuits.

Network Functions and Two port parameters :- Poles and zeros of a function, physical and analytical concepts, terminals and terminal pairs, driving point immittances, transfer functions, restrictions on locations of poles and zeros in S-plane, time domain behaviour from pole zero locations in the S-plane.

Procedure for finding network functions for general two terminal pair network, transfer immitances, two port and N-port networks, Ladder, Lattice, Pie, and Tee networks, Image parameters, definitions, calculations and interrelationships of impedance, admittance, hybrid, and transmission line parameters for two port networks.

Sinusoidal Steady State Analysis :- Radian frequency and sinusoid, magnitude and phase of network functions, sinusoidal network functions in terms of poles and zeros, resonant circuits, bandwidth and circuit Q, asymptotic change of magnitude and phase of network functions in light of poles and zeros, polar plots of network functions, analysis and applications of symmetrical lattice network.

One terminal Pair Reactive Networks :- Reactive networks and their properties, (only conceptual) external and internal critical frequencies, four reactive function forms on the basis of external critical frequencies, specifications for reactive functions, Foster and Cauer forms of reactive functions, use of normalized frequency, choice of network realization, separation property for reactive functions and its proof,

Two Terminal Pair Reactive Networks (Filters) :- Ladder network and its decomposition into tee, pie, and L sections, image impedance, image transfer function and applications to L-C networks, attenuation and phase shift in symmetrical Tee and Pie networks, constant K-filters, m-derived filters, composite filters, problem of termination, lattice filters, Bartlett's bisection theorem, (without proof).

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.-II (Electrical Engg.)

Semester - IV

ELE 404 ELE Electrical Machines II

	Lecture	Tutorial	Practical
Teaching Hours	**3**	**1**	**2**
Examination Scheme Marks	**100**	**25**	**Continuous Evaluation 20** **Examination 30**

Synchronous Machines :- Construction, cylindrical and salient pole type, basic principals. Armature windings : Full pitched and chorded coils, phase grouping, single layer and double layer windings. Integral and fractional slot pitch windings. EMF equation, distribution and pitch factors, reduction in harmonic voltages. Rotating fields produced by poly-phase windings, MMF distribution and harmonic distribution, effect of loading alternator, armature reaction, leakage reactance, potier diagram, Synchronous reactance

Alternator regulation: synchronous impedance method, MMF method, zero power factor method, ASA method, open circuit, short circuit, and zero power factor tests. synchronizing. salient poles, direct and quadrature axis reactances. Synchronous motors , damper windings, V curves. power flow equations (alternators & motors).

Induction Motors :- Cage and slip-ring construction, theory of operation, torque-speed characteristics, vector diagram, equivalent circuit. No load, blocked rotor tests, circle diagram (approximate). starting methods, double cage motors, Speed control, cascade connections. cogging and crawling.

Induction Generators.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.-II (Electrical Engg.)

Semester - IV

ELE 405 ELE Engineering Electromagnetics

	Lecture	Tutorial	Practical
Teaching Hours	3	1	0
Examination Scheme Marks	100	25	Continuous Evaluation 00 Examination 00

Vector Analysis :- General treatment on cartesian, cylindrical, spherical and general curvilinear co-ordinate systems with reference to vectors, operation of gradient, divergence, curl, Laplacian. Gauss's divergence theorem, Stoke's theorem.

Electrostatics :- Review of electric field quantities and their definitions. Gauss's flux theorem, Poisson's Equation and Laplace Equation. Green's theorem, Coulomb's law, dipole moment.

Electrostatic Field in Dielectric :- Polarization, electric flux density, boundary conditions, capacitor and capacitance, electrostatic shielding, energy stored in electric fields.

Magnetic Fields and Electromagnetic Induction :- Magnetic flux and flux density, static currents in conducting media, Ampere's law, Biot-savart law, boundary between magnetic media, forces between currents, Faraday's law of induction (transformer and motion), Inductor and Inductances (self and mutual). Energy stored in magnetic field.

Maxwell's equations :- in differential and integral forms.

Waves and wave equations :- Poynting vector and Theorem.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

B.E.-II (Electrical Engg.)

Semester - IV

MED 406 ELE Applied Thermodynamics & Thermal Engineering

	Lecture	Tutorial	Practical
Teaching Hours	3	0	2
Examination Scheme Marks	100	00	Continuous Evaluation 20 Examination 30

Thermodynamics :- Fundamental concepts, system-surrounding-definition of heat and work-, reversible & irreversible processes for non flow and flow of working fluid.

Ist law and 2nd law :- Conservation of energy - non flow equation - steady flow equation - applications- Classius inequality-Concepts of entropy- applications.- properties of steam- Mollier diagram

Internal combustion engines :- Performance evaluation- valve and port timing diagrams- numerical problems

Steam generators :- High pressure boilers- their working principles- boiler instrumentation- Control room

Steam turbines :- Steam nozzles- types of nozzles- condition for maximum discharge- effect of friction- numerical problems- Classification of steam turbines- compounding- Rankine cycle- methods of improving efficiency- reheat and regenerative feed cycle- impulse turbine- velocity triangles-blade velocity coefficient- blade efficiency and stage efficiency- reaction turbines - degree of reaction - stage efficiency- losses in steam turbines-governing of steam turbines- numerical problems

Gas turbines :- classification- types of fuels used- Brayton cycle- methods of improving efficiency and work- numerical problems- cogeneration power plants and combined cycle power plants- use of HRSG

Heat transfer :- Basic modes of heat transfer- conduction, convection and radiation- types of insulators and conductors- critical thickness of insulation and its importance- concepts of free and force convection- non dimensional numbers and their significance- concepts of black body and its utility- numerical problems