WITH EFFECT FROM THE ACADEMIC YEAR 2003-2004

SCHEME OF INSTRUCTION & EXAMINATION

B.E II YEAR (REGULAR)

(MECHANICAL ENGINEERING)

SEMESTER - II

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions Periods per Week L/T	D/P	Scheme of Examination Dura-tion in Hrs	Maximum Marks Univ. Exam	Sessionals
		THEORY					
1.	MAT 251	Mathematics - IV	**4**	**-**	**3**	**75**	**25**
2.	ME 251	Kinematics of Machines	**3**	**2**	**3**	**75**	**25**
3.	ME 252	Production Drawing	**-**	**6**	**3**	**75**	**25**
4.	ME 253	Thermodynamics	**4**	**-**	**3**	**75**	**25**
5.	EC 272	Applied Electronics	**4**	**-**	**3**	**75**	**25**
6.	CE 271	Fluid Dynamics	**4**	**-**	**3**	**75**	**25**
		PRACTICALS					
1.	EE 291	Electrical Circuits & Machines Lab	**-**	**3**	**3**	**50**	**25**
2.	EC 292	Applied Electronics Lab	**-**	**3**	**3**	**50**	**25**
		TOTAL	**19**	**14**	**-**	**550**	**200**

ME 251

KINEMATICS OF MACHINES

Instruction	
Lectures:	3 Periods per week
Drawing/Tutorials	2 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT-I

Definitions of Link(Element),pair, kinematics chain , mechanism and machine. Grubler's criterion, single slider and double slider chains. Inversions of quadric cycle chain, inversions of single and double slider chains. Four bar mechanism coupler curve equation, geometric properties of coupler curves, Robert's Law . Mechanisms with lower pairs and
straight line motion mechanisms: Pantograph, peaucellier, Hart, Scott-Russel, watt & Tchebicheff mechanism.

UNIT –II

Analysis of mechanisms: Analytical and graphical methods to find velocities of mechanisms. Instantaneous center, body centrode and space centrode, Kennedy's theorem. Analytical and graphical determination of acceleration of different mechanisms including coriolis components of acceleration.

Synthesis of Mechanisms: Two position and three position synthesis of four bar mechanism, Bloch's synthesis. Freudenstein's method for four bar linkage.

UNIT-III

Laws of friction: Friction in screw threads, pivots, collars and clutches. Friction axis of a link and friction circle.
Belt and Rope Drives: Open and closed belt drives. Length of belt. Ratio of tensions Effect of Centrifugal tension and initial tension on power transmission. Conditions for maximum power.
Chain Drives: Classifications of chains, Relation between pitch, pitch diameters, and number of teeth. Velocity ratio and length of chain.
Brakes and Dynamometers : Block or shoe , Band and Block , Internal expanding shoe brake . Prony , Rope brake, Hydraulic and Swinging field Dynamometers. Belt transmission , Epicyclic train and Torsion Dynamometers.

UNIT-IV

Cams: Types of Cams and followers- Displacement diagrams for followers -uniform motion, parabolic motion, simple Harmonic motion, cycloidal motion.

Drawing Cam profile with knife-edge follower, Translating Roller follower and Translating Flat follower. Cams of Specified contour: Eccentric circle cam with Translating flat follower, Eccentric circle cam with translating roller follower, circulars arc cam (Triple- curve cam) with translating flat follower, tangent cam with roller follower, equivalent Dl mechanisms.

UNIT-V

Gears: Classification of gears. Spur Gears: Nomenclature, Law of gear tooth action involute as a gear tooth profile, interference of involute gears, minimum number teeth to avoid interference, contact ratio, cycloidal tooth profiles. Comparison of involute and cycloidal tooth profile.

Helical Gears: Helical gear tooth relations, contact of helical gear teeth. Bevel Gears: Gear tooth action and contact conditions. Worm Gears: Calculation of Speed ratio

Gear Trains: Simple, Compound, Reverted and Epicyclic Gear Trains.

***Suggested Reading**:*

1. S.S. Ratan, *"Theory ofMachines",* TataMcGraw-Hill Publications, 1995.
2. J.S. Rao and R. v. Dukipati, *"Mechanisms and Machine Theory",* Wiley East Limited, 1992.
3. J.E. Shigley, *"Theories of Machines",* McGraw-Hill Publications, 1995.
4. Thomas Bevan, *"Theory of Machines",* CBS Publishers, 1995.

ME 252

PRODUCTION DRAWING

Instruction	6 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

1. Format of drawing sheet, title block, columns of materials, processes, part list, etc., conventional representation of parts(Screwed joints, Welded joints, Springs, Gears, elements of Electrical, Hydraulic and Pneumatic circuits, machine tool elements). Methods of indicating notes on drawing.

2. Limits and Fits : Basic definition of terms, alpha numeric designation of limits/ ears: fits. Types of Fits. Interchangeability, and selective Assembly. Exercises involving ratio, selection/interpretation. of fits and calculation of limits. Dimensional chains.
3. Production Drawing: Conventional practices of indicating tolerances on size and geometrical form, Surface finish, surface treatments. Part drawing from assembled drawings. Specification and indication of above features on the drawings. Calculation of limits suggesting suitable fits for mating parts. , as c l!
4. Assignments: Sketches of conventional representation of parts described with syllabus at (I) Process sheets, Tolerances and finishes obtainable from different processes. Study of I.S. : 2709 on limits and fits.

N.B: Tolerance charts to be provided in the examination Hall (or calculation of limits.

***Suggested Reading**:*

1. R.K. Jain, *"Engineering Metrology",* Khanna Publishers, 8th edition, 1985.
2. K.L. Narayana, P. Kannaiah and K. Venkat Reddy, " *Production Drawing",* New Age International (P) Ltd., Revised edition 1997.
3. P. Narasimha Reddy, T.A. lanardhan Reddy and C. Srinivasa Rao, *"Production*

Drawing Practice", HI-Tech Publishers, 2001.

ME 253

THERMODYNAMICS

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

UNIT -I

Introduction: Macroscopic and Microscopic approach of thermodynamics system surroundings and property, intensive and extensive properties. Measurement of temperature. Zeroth law of thermodynamics. Temperature Scales, Ideal gas and ideal gas thermometer. Reversibility and irreversibility quasi-static process. Specific heats for ideal gases. Thermodynamic Equilibrium.

UNIT - II

First Law of Thermodynamics: Statement of First Law. Heat and work interactions Thermodynamics work and Internal energy. Energy as property of system. First La applicable to Closed system. Thermodynamic processes and calculation of work, Heat transfer, and internal energy. Heat as Path Function. First law analysis of flow process and limitation. Calculation of work done during flow processes.

UNIT - III

Second Law of Thermodynamics: Physical description of second law. Kelvin-plan and Clausius statement of second Law of thermodynamics. Equivalence of Kelvi Planck and Clausius statement. Reversible and irreversible processes Cornot Theore Clausius Inequality. Calculation of Entropy change during various thermodynamic proce

principle of Entropy increase T -S diagrams. Available and Unavailable energies in steady flow. Second Law analysis of Control Volume. Helmholtz and Gibb's functions. Avail function for flow and non-flow processes.

UNIT-IV

Thermodynamic properties of Fluids: Properties of pure substances. Concept of phase change. Graphical representation of Pressure, Volume and Temperature (PVT)

T and H diagram. Properties of steam. .Use of steam Tables and Mollier Charts, Thermodynamic relations involving entropy. Enthalpy and Internal Energy. Maxwell relations and Clapeyron equation.

UNIT-V

Thermodynamics of Mixtures : Mixture of independent substances. Ideal gas mixtures. First law applied to gas-vapour mixtures. Psychrometry Applications of Psychrometry:

use of psychometric Chart for air conditioning calculations. Air standard Cycles - Otto, Diesel, Dual Combustion Cycles. Thermodynamic analysis of Joule / Brayton cycle, Sterling and Rankine cycle.

Suggested Reading:

1. P.K.Nag, Engineering Thermodynamics, Tata McGraw Hill Publication, 5th Edition
2. Y.V.C Rao An Introduction to Thermodynamics, Wiley Eastern, 1993

EC 272

APPLIED ELECTRONICS

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

Unit I

Characteristics of PN junction-Full wave rectifier, Bridge rectifier, filters, ripple, regulation and efficiency-Zener diode-Zener diode regulations-CRT construction. Basic CRO application-CRO probes, Special purpose CRO's

Unit II

Bipolar and Field effect transistors (including Mosfets) and their small signal models, BJT h-parameter equivalent circuits. Basic amplifier circuits using these configuration of BJT and FET's

Unit III

Feedback concepts-Types of negative feedback-modification of gain, brandwidth and impedances-Application.

Oscillators-Rc Phase shifts Wien's Bridge, LC. Hartley Calpitts, Clap and Crystal Oscillators (Qualitative treatment only)

Unit IV

Operational Amplifiers-Basic principle: Concept of Virtual Ground, characteristics- (Summer, Subtractor, Integrator, Differentiator current to voltage follower, voltage to current converter, Instrumentation amplifier), comparator, sample & Hold circuits. Introduction of Digital systems AND, OR, NOT, NAND, NOR and EX-OR gage. Binary half adder and Full adder.

Unit V

Data Acquisition systems: Study of transducers such as strain-gauge, LVDT, Thermocouple, instrumentation systems, magnetic tape recorders, Direct recording, FM recording, DIA and AID conversion.

Suggested Reading:

1. Millman J., Grablel, A. Micro Electronics, 2nd Edition McGraw Hill. ISE. 1998
2. Jacob Millman & Christos C. Halkias, Electronic Devices and Circuits, McGraw Hill, 1991
3. S. Shalivahanan, N. Suresh kumar, A. Valla Raj, Electronic Devices and Circutis, Tata McGraw Hill, 2003
4. S.C Sarkar, Electronic Devices & Circuits- I, Everest Publishing House-2001
5. J.B Gupta, Electronic Devices & Circuits, S.K Kataria & Sons, 2002

6. K.R Botkar, Integrated Circuits, Khanna Publishers, 1994

CE 271

FLUID DYNAMICS

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

Unit I

Properties of fluids: Definition of the fluid and concept of continuum Fluid properties- pressure, density, specific weight, specific volume, dynamic and kinematics viscosity, classification of fluids-ideal, real etc.,

Fluid Kinematics: General concepts of path lines, streak line, stream line, stream tube, classification of fluid flow steady and unsteady flow, uniform and non-uniform flow, one-two-three dimensional flows definition and properties of stream function and velocity potential function and use of flow nets.

Unit II

Fluid Dynamics: Derivation of Euler's and Bernoulli's equation and their application, impulse momentum equation and its applications.

Unit III

Measurement of Fluid flows: Measurement of pressure and use of pressure measuring devices such as manometers, Bourdon's Pressure gauge and transducers. Measurement of velocity and use of velocity measuring devices such as pitot tube, hot wire anemometer etc. Measurement of discharge and use of discharge measuring devices such as Venturimeter, Orifice meter and Rotameter-Derivation of relevant formulae.

Unit IV

Laminar and turbulent flow through pipes: Distinction between laminar and turbulent flows. Reynold's number and its significance. Upper and lower critical values of Re for flow in pipes, development of laminar and turbulent flow in circular pioes. Hagen poiseuille equation, friction losses in pipes. Darcy's equation. Estimation of Darcy's friction factor 'f' . Empirical formulae and Moody's chart

Boundary layer theory: Development of laminar and turbulent boundary layer on a flat plate, pressure gradient, and phenomena of separation. Fluid flow over an aerofoil, lift and drag forces lift and drag coefficients.

Unit V

Compressible fluid flow: Concept of compressible flow, continuity, momentum and energy equation of compressible flow, velocity of sound in compressible and incompressible flow, Match No. Classification compressible flow adiabatic flow in perfect gas, stagnation pressure and temperature. Temperature, pressure, density, ratio as functions of Mach number.

Suggested Reading:

1. Modia and Seth, Fluid Mechanics
2. Streeter, Fluid Mechanics, McGraw Hill, Auckland

EC 291

ELECTRICAL CIRCUITS AND MACHINES LAB

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

In the normal course not less than 10 of the following experiments should be done during the semester:

1. Verification of Thevenin's and Norton theorem
2. Study of 3- phase balanced and unbalance circuits
3. Measurement power by two wattmeter method
4. Study of single-phase circuits
5. Study of self and mutual inductance of coils and their inter connections, study of capacitor and their inter connections.
6. To determine the magnetization curve of separately excited DC generator
7. To determine the load characteristics of a shunt generator
8. To determine the performance characteristics of a shunt motor
9. To determine the performance of characteristics of a compound motor.
10. Speed control of DC shunt motor
11. OC and SC tests on single phase transformer
12. 3-phase induction motor load test
13. Regulation of an alternator
14. Speed control methods of Induction motors

15. To determine the load characteristics of a DC series motor.

EC 292

APPLIED ELECTRONICS LAB

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

1. Characteristics of Semiconductor and Zener diode
2. Full wave rectifier with and without filters
3. CRO
4. Characteristics of BJT transistor (CB, CE, CC)
5. Characteristics of field effect transistor
6. h-parameters of transistors
7. Phase shift Oscillator
8. Hartley Oscillator
9. Calpits Oscillator
10. Operational Amplifiers (Characteristics)
11. Comparators
12. Feedback amplifier and amplifier without feedback
13. Applications of operational amplifier.

Curricula and Syllabi for the B.E. Programmes as approved by the University