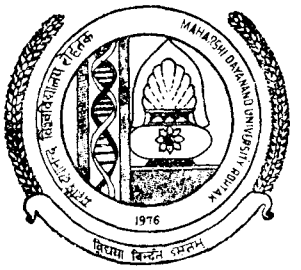
Maharshi Dayanand University
Rohtak



Ordinances, Syllabus and Courses of Reading for B.E. 2nd Year 3rd & 4th Semester Examination

Session—1999-2000

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ORDINANCE FOR BACHELOR OF ENGINEERING (B.E.) AND BACHELOR OF TECHNOLOGY (B.TECH.)

(Amended upto 13.7.1997)

Notwithstanding anything contained in any other ordinance with regard to the matters hereunder, the courses of study for the Degrees of Bachelor of Engineering and Bachelor of Technology and the conditions for admission thereto shall be as under :-

1. The Bachelor of Engineering and Bachelor of Technology Degree Courses shall extend over a minimum period of four academic years. However students will be admitted on the basis of 3 years diploma directly in the IInd year, Teaching in each academic year shall be divided into two semesters, each semester extending to about 15 weeks of teaching and two and a half weeks for preparatory holidays and practical examinations. Teaching for odd semesters will normally be during August to December and for even semesters from January to May.

2.1.(a) A candidate may be admitted to the first semester of these Courses only if he has passed the 10 plus 2 examination of Haryana School Education Board or its equivalent examination from a recognised Board/University with Physics, Chemistry, Mathematics and English and must have obtained at least 50% marks (without any rounding off) in the aggregate of Physics, Chemistry and Mathematics.

Note : In case of Scheduled Caste/Scheduled Tribe candidates, no minimum percentage of marks is prescribed and merly pass in qualifying examination with the said subjects is adequate.

2.1.(b) A candidate may be admitted directly to the IIIrd Semester of these courses only if he has passed the 3-year diploma course in the relevant discipline from Haryana Board of Technical Education or its equivalent with atleast 60% aggregate marks.

2.2 Admission to the third semester may be allowed in the beginning of the session to the candidates who are permitted to migrate to the Guru Jambheshwar University in accordance with the migration rules of the University for these courses.

3.1. At the end of the each semester, these shall be an examination wherein candidates may be examined in the courses studied by them in that semester. Each semester examination shall be designated as First Semester Examination, Second Semester Examination, Third Semester Examination and so on.

3.2. The examination for all semesters will normally be held in December/January and also in May/June on such dates as may be fixed by the Vice-Chancellor. The date(s) of commencement of examinations as well as the last date(s) for the receipt of examination forms and fees as fixed by the Vice-Chancellor shall be notified by by the Controller of Examinations to the concerned University Teaching Departments and the College/ Institutes admitted to the privileges of the University.

However, in case of late declaration of result by the University, forms can be submitted without late fee within 10 days of declaration of result by the University subject to the requirements of Clause 5.

4.1. The courses of the study and the subjects of examinations shall be as approved by the Academic Council from time to time. The examination shall consist of :-

(a) **Theory Papers** : 50% theory papers will be set by internal and 50% by external paper setters out of the panel approved by the concerned Board of studies. Internal paper setter means a teacher from a University Department or Engineering/Technological College affiliated to M.D. University. If a question paper is not received from external paper setter four weeks before the commencement of examinations, it may be got set from an internal paper setter. The evaluation of answer books will be done by the internal examiner as per the procedure laid down by the University for the purpose.

(b) **Practical Examination** : Examinations in practicals and viva voce shall be conducted jointly by the External and Internal Examiners. If an External Examiner is not able to come, alternate examiner (including those of the same

University Dept./College) may be appointed by the Chairman of the concerned University Dept. or the Principal of the College.

External examiners for practical examination will also include teachers from the other colleges affiliated to this University and the University Department of Guru Jambheshwar University.

(c) Sessionals : Sessionals work shall be evaluated by the teachers of the various subjects based on the work done during semester in accordance with the guidelines/procedure approved by the Director-principal of the concerned Institute on the basis of the following weightage :

For Theory Subjects :	B.E.	B.Tech.
(i) Class tests	40%	60%
(ii) Class Attendance (Lecture Plus Tutorial)	40%	20%
(iii) Class Work	20%	20%
II. For Practical/Project Work :		
(i) Viva Voce/Test	20%	20%
(ii) Laboratory Record/Project Report	20%	20%
(iii) Class Attendance	40%	20%
(iv) Class Work	20%	20%

The maximum attendance for calculation of attendance component of Sessional marks shall be 85% of the total scheduled periods.

The marks obtained in sessional work shall be awarded by the teachers concerned and duly countersigned by the chairman of the concerned Department and then fowarded by the Principal of the College/Chairman of University Teaching Dept.(s) to the Controller of Examinations of the University immediately after the semester.

5.1 The examination shall be open to a candidate who :-

(i) has attended regularly the prescribed courses of studies for the relevant semester in the college recognised by the University for the degree of Bachelor of Engineering and Bachelor of Technology.

(ii) has his name submitted to the Registrar/Controller of Examinations by the Principal of the college: and

(iii) produced the following certificates signed by the Principal :-

(a) of good moral character;

(b) of having carried out or acquinted himself/herself to the satisfaction of the Principal/ Chair person of concerned University Department in class work, laboratory and sessional work covered during the semester and in the periodical tests held in the college from time to time; and

(c) of having attended not less than 75% of the total classes held in that semester in the subject offered by him/her for the examination provided that his/her subject attendance in each individual subject is not less than 60%. The Director Principal of the College, Chairperson of the concerned University Department may in bonafide cases, condone deficiency upto 10% in the total and /or 5% in individual subjects.

5.2 (a) He has unless he is candidate for admission to the First semester Examination, passed the previous semester Examination, except in case of candidate eligible under Clause-6 below.

(b) He produce a certificate from the Principal of the College or Chairperson of the University Teaching Department that he has worked diligently during the semester and that his conduct and behaviour has been satisfactory. Provided that the candidate who has not attended the requisite number of classese for any subject(s) will be eligible to take examination in the remaining subject(s). Provided further that a candidate who is deficient in attendance shall have to repeat those course in which he is deficient whenever offered by the College/Department.

(c) A candidate not covered under Clause 6 below whose result declaration is delayed for no fault of his or has applied for reevaluation may attend classes of the next higher se-

mester provisionally at his own risk and responsibility subject to his passing the concerned semester Examination. Such candidate shall also be governed by clause 5. In case the candidate fails to pass the concerned Semester Examination, his attendance and studies in the next higher semester in which he was allowed to attend classes provisionally, shall stand cancelled.

6. If a candidate has, after attending the course of studies in the College/Dept. either not apeared or having appeared in any semester examination and failed in one or more paper(s) for that examination, he can appear for such paper(s) at subsequent examinations without attending a fresh course of studies for that semester in the college/Dept. Such a candidate may, in the meantime, prosecute his studies for the next semester(s) and appear in the examination(s) for the same alongwith the examination for the lower semester(s).

Provided that a candidate shall not be allowed to attend classes and apper in the Semester Examination(s) mentioned in Column (a), unless he has passed in the Semester Examinations mentioned in Column (b) below :-

(a)	(b)
5th Semester onwards	Ist Semester
6th Semester onwards	2nd Semester
7th Semester onwards	3rd Semester
8th Semester onwards	4th Semester

Provided further that a candidate shall not be allowed to attend classes in any semester unless he has fulfilled the attendance requirements of the previous semester.

7. A candidate who is unable-to the Bachelor of Engineering/ Bachelor of Technology Course within a maximum of seven consecutive academic years from the date of his admission shall not be eligible for appearing in any subsequent Bachelor of Engineering/Bachelor of Technology examination.

8. The minimum pass marks for passing any semester examination shall be:

(i) 40% in each theory paper

(ii) 40% in each practical examination or viva-voce examination

(iii) 40% in the aggregate of sessionals and examination for each theory and practical subject.

Provided that :-

A candidate who fails to obtain the requisite marks in aggregate of sessionals and examination marks as provided in 8(iii) shall be required to appear in the examination in the concerned subject in the subsequent examination(s) subject to Clause 6. Such candidate will not be required to repeat the sessional work.

9. In order to determine the division in which the candidate should be placed, the scaled marks will be as under :-

Name of Examination	Scaled Marks
1st & 2nd Semester	40%
3rd & 4th Semester	60%
5th & 6th Semester	80%
7th & 8th Semester	100%

For diploma holder admited under lateral entry scheme, the scaled marks will be as under :

3rd& 4th Semester	60%
5th & 6th Semester	80%
7th & 8th Semester	100%

Candidates who pass the prescribed subjects for all the semesters, but obtain :-

(i) Less than 50% makrs	Pass Class
(ii) 50% or more, but less than 60%	2nd Division
(iii) 60% or more, but less than 70%	1st Division with Honours provided that they have passed all semester exams within the normal period of course.

Provided that a candidate who is permitted to migrate from any other University, the marks obtained by him in this University only will be taken into account. These marks, however, be increased proportionately so as to raise them to the level of maxium marks of Guru Jambheshwar University. Similar procedure will be applicable to the Diploma holders admitted directly to the IIIrd semester.

10. Unless specifically provided in the syllabus, the medium of instruction and examination shall be English.

11. The amount of examination admission fee to be paid by a candidate for each semester shall be as decided by the Vice-Chancellor from time to time. a candidate who appears in one or more papers shall pay the full examination fee.

12. A candidate who has passed the final examination of this University and is desirous of improving his/her performance, will be allowed to appear as an ex-student in even/odd semester examinations, as and when held, twice within the period permissible under Clause,-7. Such a candidate in the first instance shall be required to intimate all the paper(s) in which he/she would like to improve his/her performance. He/she will then appear in the respective paper(s) at the concerned semester examinations simultaneously as and when held. If he/she does not improve his/her performance, he/she shall be eligible to do so in the following examinations which would be treated as second chance.

13. At the end of each semester examination, the Controller of Examination shall publish the result, provided that in a case where candidate who was permitted to take examination for higher semester but has not cleared the lower semester examinations his result for the higher semester examination will be declared provisionally.

14. Notwithstanding the intergrated nature of this course which is spread over more one academic year, the Ordinance in force at

the time of a student joins the course shall hold good only for the examination held during or at the end of the academic year and nothing in this Ordinance shall be deemed to debar the University from amending the Ordinance and the amended Ordinance, if any, shall apply to all students, whether old or new.

COMPUTER SCIENCE & ENGINEERING SEMESTER-III (1999-2000)

Course No	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam.
HUM-201-C	PRINCIPLES & APPLICATIONS OF ECONOMICS (Common for all branches)	3	1	-	4	50	100	--	150	3
MATH-201-C	MATHEMATICS-III (Common for all branches)	3	2	-	5	50	100	--	150	3
EE-201-C	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES (CSE,EE,EL,IC)	3	1	-	4	50	100	--	150	3
CSE-201-C	DISCRETE STRUCTURES	3	1	-	4	50	100	--	150	3
CSE-203-C	PROGRAMMING LANGUAGES	3	1	-	4	50	100	--	150	3
CSE-205-C	DATA STRUCTURES (CSE,EL)	3	1	-	4	50	100	--	150	3
CSE-207-C	SOFTWARE PACKAGES LAB	-	-	3	3	50	-	50	100	3
CSE-209-C	PROGRAMMING LANGUAGES LAB	-	-	2	2	25	-	25	50	3
EE-211-C	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES LAB (CSE, EE,EL,IC)	-	-	2	2	25	-	25	50	3
ME-213-C	ELECTRICAL WORKSHOP (CHE,CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
	TOTAL	18	7	9	34	425	600	125	1150	

HUM-201-C **PRINCIPLES & APPLICATIONS OF ECONOMICS**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150
			Duration of Exam.	: 3 Hrs.

Course Objective : The purpose of this course is to :

1. Acquaint the student in the basic economic concepts and thier operational significance and
2. Stimulate him to think systematically and objectively about contemporary economic problems.

Unit-I

Definition of Economics- various definitions. Nature of Economics problem. Production Possibility Curve Economic laws and their nature. Relation between Science, Engineering, Technology and Economic development.

Basic Concepts Micro, Macro Economics, Equilibrium-Static & Dynamic, Stock & Flow; Inductive & Deductive Methods.

Unit-II

Concepts and measurement of Utility, Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility-Its practical application and importance.

Unit-III

Meaning of Demand, Individual and Market demand schedule, Law of Demand, Shape of demand Curve, change in demand Vs. change in quantity demanded, Demand forecasting, Elasticity of Demand, Measurement of Elasticity of Demand, factors effecting elasticity of demand, practical importance & applications of the concept of Elasticity of Demand.

Unit-IV

Meaning of production and factors of production ;Division of Labour-meaning , its forms merits and demerits;-Law of variable proportions. Returns to scale, Internal and External Economies and Diseconomies of scale.

Unit-V

Various concepts of Cost-Fixed Cost, Variable Cost, Average Cost, Marginal Cost, Money Cost,Real Cost Opportunity Cost, Shape of Average Cost, Marginal Cost, Total Cost etc. in short run and long run.

Unit-VI

Meaning of Market . Types of Market-Perfect Competition. Monopoly, Oligopoly, Monopolistic Competition (Main features of these markets).

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices.

Unit-VII

Nature and characteristics of Indian Economy (brief and elementary introduction), Privatization-meaning merits and demerits. Globalization of Indian economy-merits and demerits.

Text Book :

Principles of Economics: P.N.Chopra-Kalyani Publishers.

References Books :

1. Indian Economy : Rudar Dutt & K.P.M. Sundhram.
2. Modern Micro Economics : S.K. Mishra-Pragati Publications.
3. Economic Theory : A.B.N. Kulkarni & A.B. Kalkundrikar R. Chand & Co.
4. Elementary Engg. Economics : Kapoor, Mehra & Gakhar- New Academic Publishing Co.

Note : Eight questions are to be set atleast one question from each Unit and the students will have to attempt five questions in all, however question number I will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be expected to answer any 10 questions.

MATH-201-C **MATHEMATICS-III**

L	T	P		
3	2	-	Class Work	: 50 marks
			Exam.	: 100 marks
			Total	: 150 marks
			Duration of Exam.	: 3 Hrs.

Part-A

Complex Variables:

Functions of a complex variable, continuity, derivative, Cauchy-Riemann equations, analytic functions, harmonic functions, integration of a complex function, Cauchy's theorem, Cauchy's integral formula. Taylor's and Laurent's series, singularities, residues, residue theorem, calculation of residues, evaluation of real definite integrals around unit circle and semi-circle only).

Fourier Series :

Euler's formulae, conditions for a Fourier expansion, Fourier expansion of functions having points of discontinuity, change of interval, odd and even functions.Half range series, Parseval's formula, practical Harmonic analysis.

Part-B

Partial Differentiai, Equations:

Formation, solution, linear partial differential equations of the first order, integral surfaces passing through a given curve, non-linear partial differential equations of the first order, Charpit's method, classification of linear second order, equations, Euler's equations, linear equations with constant co-efficients, methods of separation of variables, applications to the wave equation, one dimentional heat flow, two dimentional heat flow, Laplace equation (two dimensional) and Laplace equation in polor co-ordinates.

Fourier Transform :

Fourier sine and cosine transforms, properties of F-transforms, convolution theorem, Perseval's identity, relation between Fourier and Laplace transforms, fourier transforms of the derivatives of funtions, applications to boundary value problems.

Text Books :

1. Higher Engineering Mathematics : B.S. Grewal-Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics : E.Kreyzing-Wiley Estern Ltd.

Reference Books :

1. Complex Variables and Applications: R.V.Churchil-Mc-Graw Hill.
2. Elements of partial Differential Equations: IAN, Sneddon.
3. Engineering Mathematics Vol. II : S.S. Sastry, Prentice-Hall of India.

Note : Examiner will set eight questions in all; taking four from Part-A and four from Part -B. Students will be required to attempt five questions, taking atleast two questions from each part.

EE-201-C **ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES**

L	T	P
3	1	-

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam. : 3 Hrs.

Part-A

Conducting Materials :

Review of energy bands description of materials, drift velocity, collision time, Mean free path, mobility, conductivity, relaxation time, factors affecting conductivity of materials, types of thermal conductivity, Wiedemann Franz law, superconductivity, effect of magnetic field, conducting materials, applications.

Dielectric Materials :

Behaviour of dielectric materials in static electric field, Dipole moments, Polarization, Dielectric constant, Polarizability, Susceptibility, mechanisms of polarization, behaviour in alternating field, dielectric loss, loss tangent, types of dielectric & insulating materials, electrostriction, Piezo Electricity, Applications.

Magnetic Materials :

Permeability, Magnetic susceptibility, magnetic moment, Magnetization, Dipole moment, types of magnetic materials, Magnetostriction, Eddy current & hysteresis losses, applications.

Part-B

Semiconductors :

Review of Si and Ge as semiconducting materials, P-N junction, Drift & Diffusion, Diffusion & Transition capacitance of P-N junction.

Construction and Characteristics of Semiconductor Devices:

Brief introduction to Planar Technology for device fabrication, Diode, Schottky diode, Point contact diode, Zener diode, BJT, FET, MOSFETS, Thyristor, UJT, Diac, Triac, GTO, IGBT, LED, Photo sensitive Devices.

Text Books :

1. Electrical Engineering Materials: A.J. Dekker-PHI.
2. Integrated Electronics : Millman & Halkias-MGH.

Reference Books :

1. Electronic Devices & Circuits : Millman & Halkias-MGH.
2. Text Book of Power Electroniecs : H.C. Rai-Galgotia Publications.
3. Electronics Devices & Circuits : Motershed-PHI.

Note : Five out of eight questions are to be attempted. four questions are to be set from each part and at least two questions should be attempted from each part.

CSE-211-C **DISCRETE STRUCTURES**

L T P
3 1 -

Class Work : 50 Marks
Exam : 100 Marks
Total : 150 Marks
Duration of Exam. : 3 Hrs.

Unit I : Set Theory

Set Operations, Algebra of sets, Duality, Finite and Infinite sets, classes of sets, power sets, multisets. Cartesian product, representation of relations, types of relations. Equivalence relations and partitions, Partial ordering relation and lattices, function and its types, composition of functions and relations, cardinality, inverse function.

Unit II : Recursion and Recurrence Relations

Polynomials and their evaluation, Sequences, linear recurrence relations with constant coefficients, Homogeneous solution, Particular solution and Total solution, solution of a recurrence relation using generating functions.

Unit-III : Algebraic Structures

Definition and exmples of monoid, Semigroup, Group, ring, homomorphism, Isomorphism and automorphism, subgroups and normal subgroups, Cycle group, Integral domain and Field, Cosets, Lagrenge's theorem.

Unit-IV : Graphs and Trees

Directed and undirected graphs, Homomorphic and isomorphic graphs, Sub-graph, Cut-points, Bridges, Multigraph and Weighted graphs, Paths and circuits, Shortest path in weighted graphs, Eulerion paths and circuits, Hamiltonian paths and circuits, planer graphs, Euler's formula, Trees, Spanning trees, Binary tree and it's traversal.

Text Book

1. Elements of Discrete Mathematics : C.L. Liu.

Reference Books

1. Discrete Mathematics-A Unified Approach: Stephen A. Wiitala.
2. Graph theory : N.Dey.

Note : i) Five out of eight questions are to be attempted.
ii) Eight questions are to be set by the examiner selecting atleast one question from each unit.

CSE 203-C **PROGRAMMING LANGUAGE**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Exam.	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Unit-I : Introduction

A brief history, characteristics of a good programming language programming language translators-compiler & interpreter, syntax & semantics. Elementary data types-data objects, variables and constants, data types, specification and implementation of elementary data types; declarations, type checking and type conversion, assignment and initialization, numeric data types, enumerations, booleans and characters.

Unit-II : Structured Data Types

Structured data objects and data types, specification and implementation of structured data types, Declaration and type checking of data structures, vectors and arrays, records, Character-strings, variable-size data structures, Pointers and Programmer defined data objects, sets, files.

Unit-III: Subprograms and Programmer Defined Data Types

Evolution of the data type concept, Abstraction, Encapsulation and Information hiding, subprograms, type Definitions, abstract data types.

Unit-IV : Sequence Control

Implicit and explicit sequence control, , sequence control within expressions, sequence control within statements, subprogram sequence control; simple call return, Recursive subprograms, Exception and exception handlers, co-routines, Scheduled subprograms, tasks and concurrent execution, data structures and sequence control.

Unit-V : Data Control

Names and referencing environments, static and Dynamic scope, Block structure, Local data and local referencing environment, Shared data: dynamic and static scope. Parameters and Parameters transmission schemes.

Unit VI : Storage Management

Major run-time element requiring storage, Programmer and system controlled storage management and phases, Static storage management, Stack based storage management, Heap storage management, variable size and fixed size elements.

Unit V : Programming Languages

Introduction to Procedural, Non procedural, Structured, Logic, Functional, Object oriented programming languages, Comparison of salient features of C and C++ Programming Languages.

Text Book :

Programming languages Design and Implementation : T.W. Pratt-Prentice Hall Pub.

Reference Books :

1. Fundamentals of Programming Languages : Ellis Horowitz-Galgotia Publications.
2. Programming Language Concepts : C.Ghezzl, M.Jazayeri-Wiley Publications.
3. Programming Languages : Tucker-Mc-Graw Hill.

Note : i) Five out of eight questions are to be attempted

ii) Eight questions are to be set by the examiner selecting atleast one question from each unit.

[illegible]

[illegible] Work	:	50 Marks
[illegible]	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3 Hrs.

[illegible]

[illegible] to Data Structures, built-in and user defined [illegible] defined List and operations on it.

[illegible] Arrays

[illegible] implementation, lower bound, upper bound, [illegible] an element at a particular index for One dimensional ar[illegible] dimensional arrays and Multi-dimensional arrays. Imple[illegible] of Data Structures like structure/Record, Union, Sparse [illegible] implementation of transpose and fast transpose methods.

[illegible] Stacks

[illegible] implementation of stacks, operations like push pop, [illegible] Postfix and Prefix expressions, Evaluation of Postfix [illegible] converting infix expression to Postfix expression.

[illegible] Queues

[illegible] implementation of linear queue, operations like insert, [illegible] Circular queue implementation (Using arrays), op[illegible] like insert, remove, empty, advantage over linear queue.

[illegible] Linked Lists

Need of dynamic data structures, array implementation of [illegible] operations like getnode, freenode, insertnode, removenode, [illegible] Dynamic implementation of linked lists, operations like [illegible] freenode, insertnode, removenode, emptylist. Comparison [illegible] Array and Dynamic implementation of linked lists, linked [illegible] implementation of stacks and queues. Circular lists, implementation [illegible] primitive operations like empty, insert & remove. Doubly linked lists [illegible] implementation (using arrays & using dynamic way), implemen[illegible] operations like getnode, freenode, deletenode, insertleft, [illegible]

[illegible] Trees

Basic terminology, Binary tree, Strictly binary tree, Complete [illegible] complete binary tree, arry and Dynamic Imple-

mentation of a binary tree, primitive operations on binary trees External and Internal nodes. Binary tree traversals: preorder, inorder and postorder traversals. Representation of infix, postfix and prefix expressions using trees. Representation of lists as binary trees.

Unit-VII : Graphs

Basic terminology, Representation of graphs, Transitive closure. Graph traversal and spanning forests, Depth First traversal, Breadth first traversal, Minimum spannings trees.

Unit-VIII : Searching & Sorting

Binary search, Selection sort, Bubble sort, Insertion sort, Quick sort, merge sort, Heap sort and big-o comparison.

Text Book :

Data Structures Using C: Aaron M.Tenenbaum, Yadidyah Langsam, Moshe J. Augentein-PHI Pub.

Reference Books :

1. Fundamentals of Data Structures : Ellis Horonitz & Sartaj Sahni-Galgotia Pub.
2. Algorithms & Data Structures : N. Wirth-PHI, 1988.
3. Data Structures & Algorithms : A.V. Aho, J.E. Hopcroft & J.D. Ullman-Addison-Wesley 1985.

Note : i) Five out of eight questions are to be attempted.

ii) Eight questions are to be set by examiner selecting atleast one question from each unit.

CSE-207-C **SOFTWARE PACKAGE LAB**

L	T	P
-	-	3

Class Work : 50 Marks
Exam. : 50 Marks
Total : 100 Marks
Duration of Exam. : 3 Hrs.

Unit-I : C Language

1. Write a program to findout minimum and maximum among three numbers.
2. Write a program to find positve and negative in an array.
3. Write a program to sort and merge two arrays.
4. Write a program to find number of vowels in an string.
5. Write a program to add one item at 'n'th position and remove one item at 'm'th position.
6. Write a program to find out total number of pension holders in the given list of persons, with the condition that male should be>=65 and female should be >=60 years of age.
7. Write a program to draw a "hut" and fill it to give a proper look.

Unit-II Wordstar

Draft any letter with mail merge.

Unit-III: Lotus

Prepare the balance sheet and profit and loss account of a Company.

Unit-IV : D-base

Develop Library management system of own college.

Note : Attempt all the excercises.

EE-211-C **ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES-II LAB**

L	T	P		
-	-	2	Class Work	: 25 Marks
			Exam.	: 25 Marks
			Total	: 50 Marks
			Duration of Exam	: 3 Hrs.

List of Experiments

1. To study V-I charateristics of diode, and determination of D.C. model parameters.
2. Use of reverse biased diode as a capacitance.
3. Study of the characteristics of transistor in Common Emitter configuration.
4. Study of the characteristics of transistor in Common base configuration.
5. Study of I-V characteristics of a photovoltaic cell.
6. To determine the h-parameter of transistor in Common Emitter configuration.
7. Study of characteristics of MOSFET/JFET in CS configuration.
8. Study of characteristics of FET in CD configuration.
9. To determine the mobility of holes & electrons.
10. To plot B-H curve of a magnetic material.
11. To plot characteristic of thyristor.
12. To plot characterstics of UJT and diac.
13. Determination of loss tangent of a dielectric material by an ac bridge.
14. Study of photoresist in patterning for planar technology/PCB technology.

Note : *1. At least ten experiments have to be performed from the semester.*

2. At least seven experiments should be performed from above list. Remaining three experiments may be performed from the list designed by the concerned institution as per the requirement of the syllabus.

EE-213-C **ELECTRICAL WORKSHOP**

L	T	P
-	-	2

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

List of Experiments :

1. Introduction of tools, electrical materials, symbols and abbreviations.
2. To make T and Straight joints.
3. To study stair case wiring.
4. To study house wiring i.e. batten, cleat, casing-capping and conduit wiring.
5. To Study fluorescent tube light.
6. To study high pressure mercury vapour lamp (H.P.M.V.)
7. To study Sodium lamp.
8. To study single phase induction motor using single phase energy meter and double pole main switch.
9. To study three phase induction motor using three phase energy meter, TPN main switch and DOL starter.
10. To study three phase induction Motor using three phase energy meter, TPN main switch and Star-delta starter.
11. To study repairing of home applinces such as heater, electric iron, fans etc.
12. To study construction of moving iron, moving coil, electrodynamics & induction type meters.
13. To design & fabricate single phase transformer.
14. To study fuses, relays, contactors, MCBs and circuit breakers.
15. Insulation testing of electrical equipment.

Note : 1. At least ten experiments have to be performed in the semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

ELECTRICAL ENGINEERING SEMESTER-III, [illegible]

Course No.	Course Title	L	T	P	Total	Sessional	Theory	Practical	Total	Duration of Exam
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] MATERIALS & SEMICONDUCTOR DEVICES (CSE,EE,EL,IC)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]-C	CIRCUIT THEORY (EE,EL,IC)	3	1	-	4	50	100	[illegible]	[illegible]	[illegible]
[illegible]-C	ELECTRONICS	3	1	-	4	50	100	[illegible]	[illegible]	[illegible]
[illegible]-C	APPLIED MECHANICS (C[illegible])	3	1	-	4	50	100	[illegible]	[illegible]	[illegible]
[illegible]-209-C	CIRCUIT THEORY LAB (EE,EL,IC)	-	-	2	2	25	-	[illegible]	[illegible]	[illegible]
[illegible]-211-C	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES LAB (CSE,EE,EL,IC)	-	-	2	2	25	25	25	50	3
EE 213-C	ELECTRICAL WORKSHOP (CHE,CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
[illegible]-217-C	ELECTROTECHINCS LAB	-	-	3	3	50	-	50	100	3
	TOTAL	18	7	9	34	425	600	125	1150	

IEM-201-C PRINCIPLES & APPLICATIONS OF ECONOMICS

L	T	P		
3	1	-	Class Work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Course **Objective** : The purpose of this course is to :

1. Acquaint the student in the basic economic concepts and thier operational significance and
2. *Stimulate him to think systematically and objectively about con-* temporary economic problems.

Unit-I

Definition of Economics- various definitions, Nature of Economic problem. Production possibility curve Economic laws and their nature, Relation between Science, Engineering Technology and economic development.

Basic Concepts : Micro, Macro Economics, Equilibrium-Static & Dynamic. Stock & Flow; Inductive & Deductive Methods.

Unit-II

Concepts and Measurement of Utility, Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility-Its practical application and importance.

Unit-III

Meaning of Demand, Individual and Market Demand schedule. Law of Demand, Shape of Demand Curve, change in Demand Vs. change in quantity Demanded, Demand forecasting, Elasticity of demand. Measurement of Elasticity of Demand. Factors Effecting Elasticity of Demand, practical importance & applications of the concept of Elasticity of Demand.

Unit-IV

Meaning of production and factors of production ; Division of labour-meaning, its merits and demerits ; Law of variable proportions, Returns to scale, Internal and External Economies and Diseconomies of scale.

Unit-V

Various concepts of Cost : Fixed Cost, Variable Cost, Average Cost, Marginal Cost, Money Cost, Real Cost Opportunity Cost, Shape of Average Cost Curve, Total Cost, Total Cost etc. in Short run and Long run.

Unit-VI

Meaning of Market, Types of Market [illegible] Monopoly, Oligopoly, Monopolistic Competition [illegible] markets).

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices.

Unit-VII

Nature and characteristics of Indian Economy (brief and elementary introduction). Privatization-meaning, Merits and demerits. Globalization of Indian Economy-Merits and demerits.

Text Book :

Principles of Economics : P.N. Chopra [illegible]

Reference Books :

1. Indian Economy : Rudar Dutt & K.P.M. Sundhram
2. Modern Micro Economics : S.K. Mishra-Pragati Publications.
3. Economic Theory : A.B.N. Kulkarni & A.B. Kulkarnikar- R. Chand & Co.
4. Elementary Engg. Economics : Kapoor, Mehra & Gulshan- New Academic Publishing Co.

Note : Eight questions are to be set atleast [illegible] question from each unit and the students will have to attempt five questions in all, however question number [illegible] will be compulsory having internal choice, this question will consist of short answer type 12 questions [illegible] whole syllabus and students will be expected to attempt all the questions.

MATH-201-C **MATHEMATICS-III**

L	T	P
3	2	-

Class Work : 50 marks
Exam. : 100 marks
Total : 150 marks
Duration of Exam. : 3 Hrs.

Part-A

Complex Variables :

Functions of a complex variable, continuity, derivative, Cauchy-Riemann equations, analytic functions, Harmonic functions, integration of a complex function, Cauchy's theorem, Cauchy's integral formula. Taylor's and Laurent's series, singularities, residues, residue theorem, calculation of residues, evaluation of real definite integrals around unit circle and semi-circle only).

Fourier Series :

Euler's formulae, conditions for a Fourier expansion, Fourier expansion of functions having points of discontinuity, change of interval, odd and even functions.Half range series, Parseval's formula, Practical Harmonic Analysis.

Part-B

Partial Differential, Equations:

Formation, solution, linear partial differential equations of the first order, integral surfaces passing through a given curve, non-linear partial differential equations of the first order, Charpit's method, classification of linear second order equations, Euler's equations, linear equations with constant co-efficients, methods of separation of variables, applications to the wave equation, one dimentional heat flow, two dimentional heat flow, Laplace equation (two dimensional) and Laplace equation in polor co-ordinates.

Fourier Transform :

Fourier sine and cosine transforms, properties of F-transforms, convolution theorem, Perseval's identity, relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of functions, applications to boundary value problems.

Text Books :

1. Higher Engineering Mathematics : B.S. Grewal-Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics : E.Kreyzing-Wiley Estern Ltd

Reference Books :

1. Complex Variables and Applications: R.V.Churchil-Mc-Graw Hill.
2. Elements of Partial Differential Equations: IAN, Sneddon.
3. Engineering Mathematics Vol. II : S.S. Sastry, Prentice-Hall of India.

Note : Examiner will set eight questions in all; taking four from Part -A and four from Part-B. Students will be required to attempt five questions, taking atleast two questions from each part.

ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES

Class Work : 50 Marks
Theory : 100 Marks
Total : 150 Marks
Duration of Exam: 3 Hrs.

Part-A

Conducting Materials :

Review of energy bands description of materials, drift velocity, collision time, Mean free path, mobility, conductivity, relaxation time, factors affecting conductivity, Wiedemann Franz Law, superconductivity effect of magnetic field, conducting materials, applications.

Dielectric Materials :

Behaviour of dielectric materials in static electric field, Dipole moments, Polarization, Dielectric constant, Polarizability, Susceptibility, mechanisms of polarization, behaviour in alternating field, dielectric loss, loss tangent, types of dielectric & insulating materials, electrostriction, Piezo electricity, Applications.

Magnetic Materials :

Permeability, Magnetic susceptibility, magnetic movement, Magnetization, Dipole movement, types of magnetic materials, Magnetostriction, Eddy current & hysteresis losses, applications.

Part-B

Semiconductors

Review of Si and Ge as semiconducting materials, P-N junction, Drift & Diffusion & Transition capacitance of P-N junction.

Construction and Characteristics of Semiconductor Devices :

Brief Introduction to Planar Technology for device fabrication, Diode, Schottky diode, Point contact diode, Zener diode, BJT, FET, MOSFET, SCR, Thyristor, UJT, Diac, Triac, GTO, IGBT, LED, Photosensitive Devices.

Text Books :

1. Electrical Engineering Materials: A.J. Dekker-PHI.
2. Electronics: Millman & Halkias-MGH

Reference Books :

1. Electronic Devices & Circuits : Millman & Halkias-McGr
2. Text Book of Power Electronics : H.C. Rai-Galgotia Publications.
3. Electronics Devices & Circuits : Motershed-PHI.

Note : Five out of eight questions are to be attempted, four questions are to be set from each part and atleast two questions should be attempted from each part.

[illegible]

CIA Marks : 50 Marks

Exam : 100 Marks

Total : 150 Marks

Duration of Exam: 3 Hrs.

Unit I - [illegible] :

[illegible] RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations [illegible]

Unit II - Network Functions :

[illegible] ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behaviour from the pole zero plot.

Unit III - Characteristics and Parametres of two Port Networks :

Relationship of two-port variables, short circuits Admittance parameters, open circuit impedance parameters, Transmission parameters, hybrid parameters, relationships between parameters sets, Inter-connection of two port networks.

Unit IV - Topology :

Principles of network topology, graph matrices, network analysis using graph theory.

Unit V - Types of Filters and their Characteristics :

Filter fundamentals, Band reject filter, band pass filter, high pass filter and low pass filter.

Unit VI - Network Synthesis :

Positive real functions, synthesis of one port and two port networks, [illegible] of Active networks.

Text Books :

1. Network Analysis & Synthesis : Umesh Sinha-Satya Prakas Pub.
2. Network Analysis & Synthesis : F.F. Kuo-John Wiley & Sons Inc.

...e Books:

...uction to Modern Network Synthesis: Van Valken Burg- ...iley.

... Circuit Theory : Dasoer Kuh - Mc Graw Hill.

...se in Electrical Circuit Analysis : Soni & Gupta- Dhanpat ...blication.

...t Analysis : G.K. Mithal-Khanna Publication.

...Five out of eight questions are to be attempted. At least one question should be set from each unit.

EE-205-C ELECTRICAL MACHINES

L T P

3 1 -

Class Work : 50 Marks

Exam. : 100 Marks

Total : 150 Marks

Duration of Exam : 3 Hrs.

Part-A

Magnetic Circuits and Materials :

Introduction to magnetic circuit, flux linkage, laws of Electromagnetic induction, self inductance, properties of magnetic materials, behaviour of permanent magnets and applications, coupled coils, coefficient of coupling, dot convention, analysis of coupled coils.

Electromechanical Energy Conversion :

Force and torque in magnetic field systems, energy balance, energy and force in singly excited magnetic field system, concept of co-energy, force and torque in system with permanent magnets, dynamic equation.

Part-B

Transformers :

1. Principle : construction of core, winding and tank, operation, testing of single phase transformer, equivalent circuit, phasor diagram, parameters determination, P.U. representation of parameters, regulation, losses and efficiency, separation of iron losses.
2. Various types of connections of three phase transformer, their comparative features, zig-zag connection
3. Parallel operation of single phase and three phase transformers.
4. Auto-transformer : Principle, construction, comparison with two winding transformers, application.
5. Nature of magnetizing current, plotting of magnetizing current from B-H curve, Inrush current, harmonics, effect of construction on input current, connections of three phase transformer.
6. Phase-conversion : Three to two phase, three to six phase and three to twelve phase conversions
7. Introduction to three winding, tap-changing and phase hifting transformers
8. Introduction to C.T. and P.T

Text Book :

Electric Machines : Nagrath & Kothari-Tata Mc-Graw Hill.

Reference Books :

1. Principle of Electrical Engineering: Del Toro-Wiley Eastern.
2. Electric Machinery : Fitzgerald Kingsley and Umans-MGH.
3. A course in Electrical Measurement & Instrumentation : A K. Sawhney-Dhanpat Rai & Sons.

Note : 1. Five out of eight questions are to be attempted.

2. At least two questions from Part A and five questions from Part-B are to be set.

ME-209-C APPLIED MECHANICS

L T P

3 1 -

Class Work : 50 Marks
Theory : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Unit-I

Stress & Strain : Review of simple stresses, simple strains, Hook's Law & elastic constants, general biaxial stress systems, principal planes and principal stresses, principal strains, maximum shear stresses and shear strains in terms of principal stresses & principal strains respectively, Mohr's stress circle, Problems.

Unit-II

Bending & Shear Stresses in Beams : Review of centre of gravity of an area, moment of inertia of the sections, bending stress in beams with symmeterical sections and subjected to pure bending, shear stresses in beams of symmetric sections, shear centre, Problems.

Unit-III

Torsion of Circular Members : Torsion of tube, solid and hollow circular shafts, tapered shafts, stepped shaft & composite concentric shafts, combined bending & torsion, equivalent torque, effect of end thrust, Numericals.

Unit-IV

Bending Moment & Shear Force : Definitions, SF & BM diagrams for centilever & simply supported beam and calculation of max. SF, BM and point of centralflexure under the loads of (i) concentrated load (ii) uniformly distributed load (iii) uniform varying load (iv) combination of load concentrated & UDL loads Numericals.

Unit-V

Theories of failure : Concepts of various theories of elastic failure and governing equations with their graphical representation, applications, Numricals.

Unit-VI

General Design Considerations : Introduction, scope & meaning of design, design process, concept of tearing, bearing shearing, crushing, bending etc. selection of materials, factor of safety, stress concentration factor, design stresses for variable & repeated loads, endurance limit, fatigue strength, fits & tolerances, Numericals.

Unit-VII

Cables & Columns : Derivations for cables subjected to concentrated loads and uniformly distributed load per unit horizontal distance separately and cable uniformly loaded per unit length along the cable itself, Derivation of Euler's formulafor crippling load of coloumn under different and conditions, Use of Rankin's Formula. Ecentic Loading of short columns of circular & rectangular cross sections, Numericals.

Unit-VIII

Fluid Flow Mechanics : Review of fluid properties, flow regimes, types of flow, stream lines, path lines, streak lines, continuity equation, rotation , circulation, velocity potential, steam function, flow net, general energy equation for steady flow of any fluid, Bernoulli's equation with its applications & limitations, flow measuring devices, Numericals.

Text Books

1. Fluid Mechanics : A.K. Mohanty-Prentice Hall of India, N.D.
2. Strength of Material : G.H. Ryder-ELBS.
3. Engg. Mechanics : A.K. Tayel-Umesh Publishing, N.Delhi.
4. Machine Design :P.C. Sharma & D.K. Agarwal-S.K. Kataria & Sons, New Delhi.

Reference Books

1. Fluid Mechanics : A.K. Jain-Khanna Publications, New Delhi.
2. Hydraulics & Fluid Mechanics : Jagdish Lal-Metropolitan `Book Co. Pvt. Ltd. Delhi.

Note : In the semester examination, the examiner will set eight questions in all at least one question from each unit, and students will be required to attempt only five questions.

EE-209-C **CIRCUIT THEORY LAB**

L T P	Class Work	: 25 Marks
0 0 2	Exam	: 25 Marks
	Total	: 50 Marks
	Duration of Exam	: 3 Hrs.

List of Experiments :

1. To study transient response of RL circuit.
2. To study transient response of RC circuit.
3. To find the resonance frequency, Band width and Q-factor of RLC series circuit.
4. To calculate and verify "z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To determine equivalent parameters of parallel connections of two port network.
7. To plot the frequency response of low pass filter and determine half-power frequency.
8. To plot the frequency response of high pass filter and determine half-power frequency.
9. To plot the frequency response of band pass filter and determine the band-width.
10. To calculate and veryfy "ABCD" parameters of a two port network.
11. To synthesize a network of a given network function and veryfy its response.
12. Interoduction to P-Spice

Note : 1. At least ten experiments are to be performed in the semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the list designed & set by the concerned institution per the scope of the syllabus.

EE-211-C ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES LAB

L	T	P
-	-	2

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

List of Experiments

1. To study V-I charateristics of diode, and determination of D.C. model parameters.
2. Use of reverse biased diode as a capacitance.
3. Study of the characteristics of transistor in Common Emitter configuration.
4. Study of the characteristics of transistor in Common Base configuration.
5. Study of I-V characteristics of a photovoltaic cell.
6. To determine the h-parameter of transistor in Common Emitter configuration.
7. Study of characteristics of MOSFET/JFET in CS configuration.
8. Study of characteristics of FET in CD configuration.
9. To determine the mobility of holes & electrons.
10. To plot B-H curve of a magnetic material.
11. To plot characteristic of thyristor.
12. To plot characterstics of UJT and diac.
13. Determination of loss tangent of a dielectric material by an ac bridge.
14. Study of photoresist in metal patterning for planar technology/PCB technology

Note : *1. At least ten experiments have to be performed in the semester.*

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-213-C **ELECTRICAL WORKSHOP**

L	T	P
-	-	2

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

List of Experiments :

1. Introduction of tools, electrical materials, symbols and abbreviations.
2. To make T and Straight joints.
3. To study stair case wiring.
4. To study house wiring i.e. batten, cleat, casing-capping and conduit wiring.
5. To Study fluorescent tube light.
6. To study high pressure mercury vapour lamp (H.P.M.V.).
7. To study Sodium lamp.
8. To study single phase induction motor using single phase energy meter and double pole main switch.
9. To study three phase induction motor using three phase energy meter, TPN main switch and DOL starter.
10. To study three phase inderction on motor using three phase energy meter, TPN main switch and star-delta starter.
11. To study repairing of home applinces such as heater, electric iron, fans etc.
12. To study construction of moving iron, moving coil, electrodynamics & induction type meters.
13. To design & fabricate single phase transformer.
14. To study fuses, relays, contactors, MCBs and circuit breakers.
15. Insulation testing of electrical equipment.

Note : 1. At least ten experiments have to be performed in a semester.

2. At least seven experiments should be performed from the above list. Remaining three experiments may be performed from the above list or designed & set by the concerned institution as per the scope of the subject.

EE-217-C **ELECTRO TECHNICS LAB**

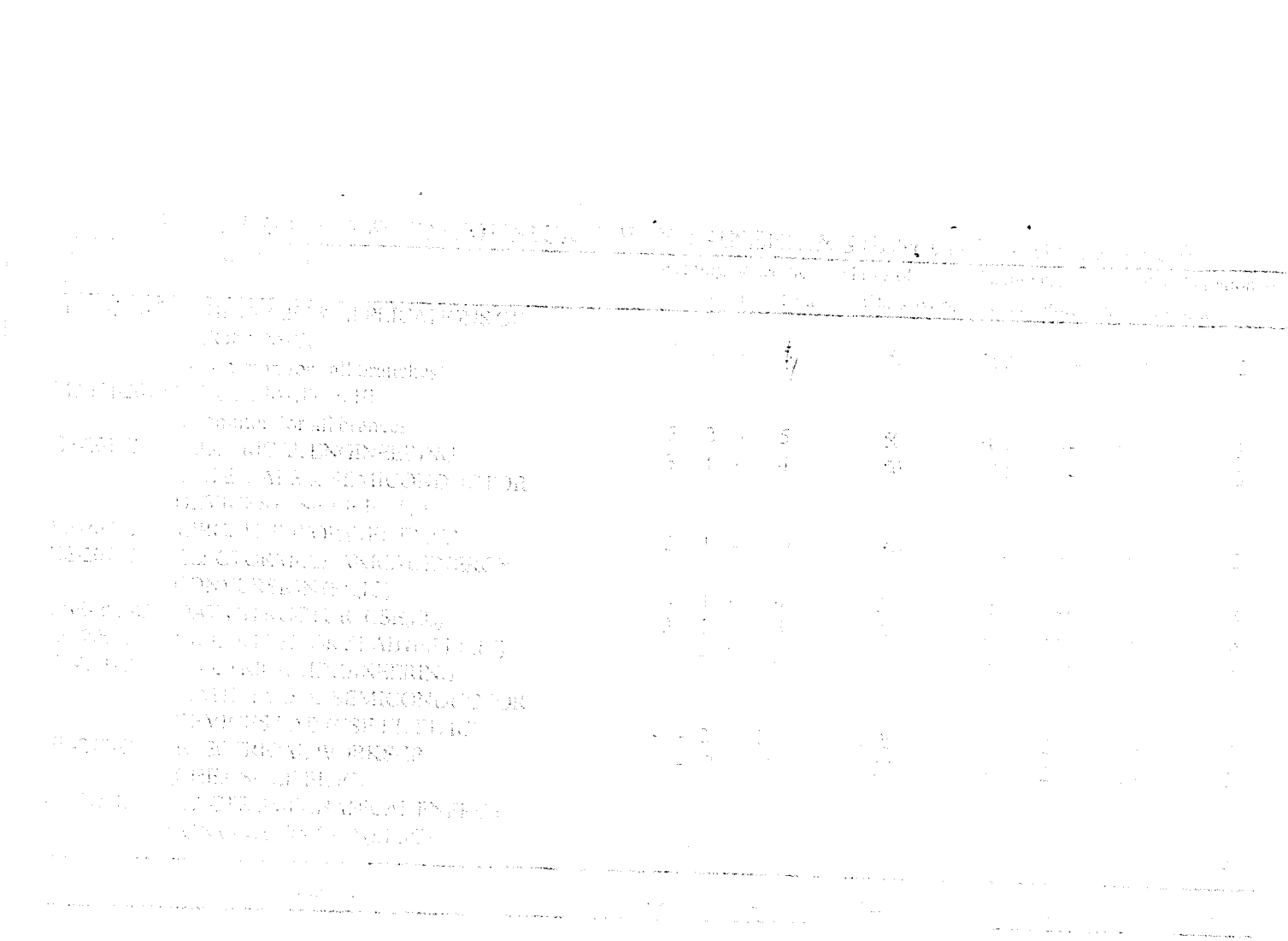
L T P		
0 0 3	Class Work	: 50 Marks
	Exam.	: 50 Marks
	Total	: 100 Marks
	Duration of Exam: 3 Hrs.	

List of Experiments :

1. To plot the magnetization curve (B-H-Curve) of the core of a single phase transformer.
2. To find the polarity and turns ratio of a single phase transformer.
3. Short circuit and open circuit tests on single phase transformer.
4. Efficiency of a transformer by Sumpner's back to back test.
5. Conversion of three phase to two phase using Scott connection.
6. Parallel operation of transformers.
7. Open delta connection of two similar transformers.
8. Study of C.T. and P.T. and measurement of current and voltage using these devices.
9. To study the operation of multiphase transformer for different connections.
10. Separation of Hysteresis and Eddy current losses of a transformer.

Note : 1. At least ten experiments have to be performed in the semester.

2. At least seven experiments should be performed from above list. Remaining three experi ments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.



HUM-201-C PRINCIPLES & APPLICATIONS OF ECONOMICS

L	T	P		
3	1	-	Class Work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Course Objective : The purpose of this course is to :

1. Acquaint the student in the basic economic concepts and thier operational significance and
2. Stimulate him to think systematically and objectively about contemporary economic problems.

Unit-I

Definition of Economics- various definitions, Nature of Economic problem. Production possibility curve Economic laws and their nature, Relation between Science, Engineering Technology and economic development.

Basic Concepts : Micro, Macro Economics, Equilibrium-Static & Dynamic, Stock & Flow; Inductive & Deductive Methods.

Unit-II

Concepts and Measurement of Utility, Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility-Its practical application and importance.

Unit-III

Meaning of Demand, Individual and Market Demand schedule, Law of Demand, Shape of Demand Curve, change in Demand Vs, change in quantity Demanded, Demand forecasting, Elasticity of demand, Measurement of Elasticity of Demand, Factors Effecting Elasticity of Demand, practical importance & applications of the concept of Elasticity of Demand.

Unit-IV

Meaning of production and factors of production ;`Division of Labour-meaning , its forms merits and demerits;-Law of variable proportions, Returns to scale, Internal and External Economics and Diseconomies of scale.

Unit-V

Various concepts of Cost-Fixed Cost, Variable Cost, Average Cost, Marginal Cost, Money Cost, Real Cost Opportunity Cost Shape of Average Cost, Marginal Cost, Total Cost etc. in Short run and Long run.

Unit-VI

Meaning of Market , Types of Market-Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition (Main features of these markets).

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices.

Unit-VII

Nature and characteristics of Indian Economy (brief and elementary introduction), Privatization-meaning Merits and demerits. Globalization of Indian Economy-Merits and demerits.

Text Book :

Principles of Economics : P.N. Chopra-Kalyani Publishers.

Reference Books :

1. Indian Economy : Rudar Dutt & K.P.M. Sundhram
2. Modern Micro Economics : S.K. Mishra-Pragati Publications.
3. Economic Theory : A.B.N. Kulkarni & A.B. Kalkundrikar- R. Chand & Co.
4. Elementary Engg. Economics : Kapoor, Mehra & Gakhar- New Academic Publishing Co.

Note : Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all, however question number I will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be expected to answer any 10 questions.

MATH-201-C MATHEMATICS-III

L	T	P		
3	2	-	Class Work	: 50 marks
			Exam.	: 100 marks
			Total	: 150 marks
			Duration of Exam.	: 3 Hrs.

Part-A

Complex Variables :

Functions of a complex variable, continuity, derivative, Cauchy-Riemann equations, analytic functions, Harmonic functions, integration of a complex function, Cauchy's theorem, Cauchy's integral formula. Taylor's and Laurent's series, singularities, residues, residue theorem, calculation of residues, evaluation of real definite integrals around unit circle and semi-circle only).

Fourier Series :

Euler's formulae, conditions for a Fourier expansion, Fourier expansion of functions having points of discontinuity, change of interval, odd and even functions.Half range series, Parseval's formula, Practical Harmonic Analysis.

Part-B

Partial Differential, Equations:

Formation, solution, linear partial differential equations of the first order, integral surfaces passing through a given curve, non-linear partial differential equations of the first order, Charpit's method, classification of linear second order equations, Euler's equations, linear equations with constant co-efficients, methods of separation of variables, applications to the wave equation, one dimentional heat flow, two dimentional heat flow, Laplace equation (two dimensional) and Laplace equation in polor co-ordinates.

Fourier Transform :

Fourier sine and cosine transforms, properties of F-transforms, convolution theorem, Perseval's identity, relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of functions, applications to boundary value problems.

Text Books :

1. Higher Engineering Mathematics : B.S. Grewal-Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics : E.Kreyzing-Wiley Estern Ltd.

Reference Books :

1. Complex Variables and Applications: R.V.Churchil-Mc-Graw Hill.
2. Elements of Partial Differential Equations: IAN, Sneddon.
3. Engineering Mathematics Vol. II : S.S. Sastry, Prentice-Hall of India.

Note : Examiner will set eight questions in all; taking four from Part -A and four from Part-B. Students will be required to attempt five questions, taking atleast two questions from each part.

EL-201 C ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES

L T P	Class Work	: 50 Marks
3 1 0	Theory	: 100 Marks
	Total	: 150 Marks
	Duration of Exam: 3 Hrs.	

Part-A

Conducting Materials :

Review of energy bands description of materials, drift velocity, collision time, Mean free path, mobility, conductivity, relaxation time, factors affecting conductivity, Wiedemann Franz Law, super conductivity, effect of magnetic field, conducting materials & applications.

Dielectric Materials :

Behaviour of dielectric materials in [illegible] fields, dipole moments, Polarization, Dielectric constant, [illegible], mechanisms of polarization, behaviour in [illegible] fields, dielectric loss, loss tangent, types of dielectrics & insulating materials, electrostriction, Piezoelectricity, Applications.

Magnetic Materials :

Permeability, Magnetic susceptibility, magnetic moment, Magnetization, Dipole movement, types of magnetic materials, Magnetostriction, Eddy current & hysteresis losses, applications.

Part-B

Semiconductors :

Review of Si and Ge as semiconducting materials, P-N junction, Drift & Diffusion & Transition capacitance of P-N junction.

Construction and Characteristics of Semiconductor Devices :

Brief Introduction to Planar Technology for device fabrication, Diode, Schottky diode, Point contact diode, Zener diode, BJT, FET, MOSFETS, Thyristor, UJT, Diac, Triac, GTO, IGBT, LED, Photosensitive Devices.

Text Books :

1. Electrical Engineering Materials : A.J. Dekker-PHI
2. Integrated Electronics: Millman & Halkias-MGH.

Reference Books :

1. Electronic Devices & Circuits : Millman & Halkias-MGH
2. Text Book of Power Electronics : H.C. Rai-Galgotia Publications
3. Electronics Devices & Circuits : Motershed-PHI.

Note : Five out of eight questions are to be attempted, four questions are to be set from each part and atleast two questions should be attempted from each part.

CIRCUIT THEORY

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam: 3 Hrs.

Unit I Transient Response :

Transient response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

Unit II-Network Functions :

Terminal pairs or ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behaviour from the pole zero plot.

Unit III - Characteristics and Parametres of two Port Networks :

Relationship of two-port variables, short circuits Admittance parameters, open circuit impedance parameters, Transmission parameters, hybrid parameters, relationships between parameters sets, Inter-connection of two port networks.

Unit IV - Topology :

Principles of network topology, graph matrices, network analysis using graph theory.

Unit V- Types of filters and their Characteristics :

Filter fundamentals, Band reject filter, band pass filter, high pass filter and low pass filter.

Unit VI - Network Synthesis :

Positive real functions, synthesis of one port and two port networks, elementary ideas of Active networks.

Text Books :

1. Network analysis & Synthesis : Umesh Sinha-Satya Prakas Pub.
2. Network Analysis & Synthesis F.F. Kuo-John Wiley & Sons Inc.

EE-207-C ELECTROMECHANICAL ENENGY CONVERSION

L	T	P		
3	1	0	Class Work	: 50
			Exam.	: 100
			Total	: 150
			Duration of Exam	: 3hrs.

UNIT I-MAGNETIC CIRCUITS AND INDUCTION :

Magnetic Circuits, Magnetic Materials and their properties, static and dynamic emfs and force on current carrying conductor, AC operation of Magnetic Circuits. Hysteresis and Eddy current losses.

UNIT II-PRINCIPLES OF ELECTROMECHANICAL ENERGY CONVERSION :

Force and torque in magnetic field system, energy balance, energy and force in singly excited magnetic field system, concept of co energy, force & torque in system with permanent magnets, dynamic equation.

UNIT-III TRANSFORMERS :

Basic theory, construction and operation at no load, and full load, equivalent circuit, phasor diagram, O.C. and S.C. tests for parameters determination, efficiency and regulation, autotransformer, introduction to three phase transformer Current and Potential Transformers. Principle, construction, analysis and applications.

UNIT-IV DC MACHINES :

Basic theory of DC generator brief idea of construction, emf equation, load characteristics, basic theory of DC motor, concept of back emf, torque and power equations, load characteristics, starting and speed control of DC motors, applications.

UNIT-V INTRODUCTION MOTOR :

Basic theory construction, Phasor diagram, equivalent circuit, torque equation, Load characteristics, starting and speed control of induction motor, Introduction to single induction phase motor, applications, Fractional H.P. Motors, Introduction to stepper, servo, reluctance and universal motors.

UNIT VI-SYNCHRONOUS MACHINES :

Construction and basic theory of synchronous generator, emf equation, model of generator, Phaser diagram, Regulation, Basic theory of synchronous motor, v-curves, synchronous condenser, applications.

TEXT BOOK: Electrical Machines: Nagarath and Kothari-TMH Pub.

REFERENCE BOOK: Electrical Machines: P.S. Bhimhara—Khanna Publications
Electrical Machines: Mukherjee and Chakravorti-Dhanpat Rai & Sons

NOTE: 1. Five out of eight questions are to be attempted.
2. Atleast one question should be set from each unit.

[illegible] DATA STRUCTURES

[illegible]	[illegible]	Class Work	: 50 Marks
[illegible]	[illegible]	Exam.	: 100 Marks
		Total	: 150 Marks
		Duration of Exam.	: 3 Hrs.

Unit-I : Introduction

Introduction to Data Structures, built-in and user defined data structures, Ordered List and operations on it.

Unit-II : Arrays

Definition, implementation, lower bound, upper bound, addressing an element at a particular index for One dimensional arrays, Two dimensional arrays and Multi-dimensional arrays. Implementation of Data Structures like structure/Record, Union. Sparse matrices, implementation of transpose and fast transpose methods.

Unit-III : Stacks

Array implementation of stacks, operations like Push pop, empty, Infix, Postfix and Prefix expressions, Evaluation of Postfix Expression, converting Infix Expression to Postfix Expression.

Unit-IV : Queues

Array implementation of linear queue, operations like insert, remove, empty. Circular queue: implementation (Using arrays), operations like insert, remove, empty, advantage over linear queue.

Unit-V : Linked Lists

Need of dynamic data structures, array implementation of linked list, operations like getnode, freenode, insertnode, removenode, emptylist. Dynamic implementation of linked lists, operations like getnode, freenode, insertnode, removenode, emptylist. Comparison between Array and Dynamic implementatin of linked lists. linked implementation of satcks and queues. Circular lists, implementation of primitive operations like empty, insert & remove Doubly linked lists: implementation (using arrays & using dynamic way), implementation of operations like getnode, freenode, deletenode, insertleft, insertright emptylist.

Unit-VI : Trees

Basic terminology, Binary tree, Strictly binary tree, Complete [illegible] tree , almost complete binary tree, array and Dynamic Imple-

mentation of a binary tree, primitive operations on binary trees, ex
ternal and internal nodes. Binary tree traversals: preorder, inord
and postorder traversals. Representation of infix, postfix and prefix
expressions using trees. Representation of lists as binary trees.

Unit-VII : Graphs

Basic terminology, Representation of graphs, Transitive closure. Graph traversal and spanning forests, Depth First traversal, Breadth first traversal, Minimum spannings trees.

Unit-VIII : Searching & Sorting

Binary search, Selection sort, Bubble sort, Insertion sort, Quick sort, merge sort, Heap sort and big-o comparison.

Text Book :

Data Structures using C: Aaron M.Tenenbaum, Yadidyal Langsam, Moshe J. Augentein-PHI Pub.

Reference Books :

1. Fundamentals of Data Structures : Ellis Horonitz & Sartaj Sahni Galgotia Pub.
2. Algorithms & Data Structures : N. Wirth-PHI, 1988.
3. Data Structures & Algorithms : A.V. Aho, J.E. Hopcroft & J.D Ullman-Addison-Wesley 1985.

Note : i) Five out of eight questions are to be attempted.

ii). Eight questions are to be set by examiner selecting atleast one question from each unit.

EE-209-C **CIRCUIT THEORY LAB**

L T P

- - 3

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

List of Experiments :

1. To study transient response of RL circuit.
2. To study transient response of RC circuit.
3. To find the resonance frequency, Band width and Q-factor of RLC series circuit.
4. To calculate and verify "z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To determine equivalent parameters of parallel connections of two port network.
7. To plot the frequency response of low pass filter and determine half-power frequency.
8. To plot the frequency response of high pass filter and determine half-power frequency.
9. To plot the frequency response of band pass filter and determine the band-width.
10. To calculate and veryfy "ABCD" parameters of a two port network.
11. To synthesize a network of a given network function and veryfy its response.
12. Interoduction to P-Spice

Note : 1. At least ten experiments are to be performed in the semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-201-C ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES LAB

T	P		
-	2	Class Work	: 25 Marks
		Exam.	: 25 Marks
		Total	: 50 Marks
		Duration of Exam	: 3 Hrs

List of Experiments

1. To study V-I charateristics of diode, and determination of its D.C. model parameters.
2. Use of reverse biased diode as a capacitance.
3. Study of the characteristics of transistor in Common Emitter configuration.
4. Study of the characteristics of transistor in Common Base configuration.
5. Study of I-V characteristics of a photovoltaic cell.
6. To determine the h-parameter of transistor in Common Emitter configuration.
7. Study of characteristics of MOSFET/JFET in CS configuration.
8. Study of characteristics of FET in CD configuration.
9. To determine the mobility of holes & electrons.
10. To plot B-H curve of a magnetic material.
11. To plot characteristic of thyristor.
12. To plot characterstics of UJT and diac.
13. Determination of loss tangent of a dielectric material by ac bridge.
14. Study of photoresist in metal patterning for photo technology/PCB technology

Note : 1. *At least ten experiments have to be performed in the semester.*

2. *At least seven experiments should be performed from the above list. Remaining three experiments may be performed from the above list or designed by the concerned institution as per the scope of the syllabus.*

EE-215-C **ELECTROMECHANICAL ENERGY CONVERSION LAB**

L	T	P		
-	-	3	Class Work	: 50 Marks
			Exam.	: 50 Marks
			Total	: 100 Marks
			Duration of Exam.	: 3 Hrs.

List of Experiments :

1. To find turns, ratio and polarity of a single phase transformer.
2. To perform open and short circuit tests on a single phase transformer.
3. To perform Sumpner's back to back test on single phase transformers.
4. Parallel operation of two phase transformers.
5. Study of construction of a DC machine.
6. To plot OCC of DC shunt genertor and find its critical resistance.
7. To perform direct load Test of a DC motor.
8. Speed control of a DC motor by armature control and field control methods.
9. To perform open circuit and block rotor tests of an induction motor.
10. Stardelta starting of a three phase induction motor.
11. Plot OCC of a synchronous generator.
12. To plot V-curve of a synchronous motor.

Note : At least seven experiments should be performed from the above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-217-C ELECTRO TECHNICS LAB

L T P		
0 0 3	Class Work	: 50 Marks
	Exam.	: 50 Marks
	Total	: 100 Marks
	Duration of Exam: 3 Hrs.	

List of Experiments :

1. To plot the magnetization curve (B-H-Curve) of the core of a single phase transformer.
2. To find the polarity and turns ratio of a single phase transformer.
3. Short circuit and open circuit tests on single phase transformer.
4. Efficiency of a transformer by Sumpner's back to back test.
5. Conversion of three phase to two phase using Scott connection.
6. Parallel operation of transformers.
7. Open delta connection of two similar transformers.
8. Study of C.T. and P.T. and measurement of current and voltage using these devices.
9. To study the operation of multiphase transformer for different connections.
10. Separation of Hysteresis and Eddy current losses of a transformer.

Note : 1. At least ten experiments have to be performed in the semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

PRACTICAL TRAINING-I

At the end of fourth Semester each student would undergo six weeks Practical Training in an industry/Professional Organisation/ Research laboratory with the prior approval of the Director-Principal/ Principal of the concerned college and submit a written typed report alongwith a certificate from the organization. The report will be evaluated by a Board of Examiners to be appointed by the Director-Principal/Principal of the concerned College who will award one of the following grades :

Excellent	:	A
Good	:	B
Satisfactory	:	C
Not Satisfactory	:	F

A student who has been awarded 'F' grade will be required to repeat the practical training. The examination of practical training will be held alongwith the examination of the fifth semester.

SCHEME OF EXAMINATION FOR MECHANICAL ENGINEERING SEMESTER-III (1999-2000)

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam.
HUM-201-C	PRINCIPLES & APPLICATIONS OF ECONOMICS (Common for all branches)	3	1	-	4	50	100	--	150	3
MATH-201-C	MATHEMATICS-III (Common for all brances)	3	2	-	5	50	100	--	150	3
ME-201-C	THERMODYNAMICS	3	1	-	4	50	100	--	150	3
ME-203-C	STRENGTH OF MATERIALS-I	3	1	-	4	50	100	--	150	3
ME-205-C	ENGINEERING MECHANICS	3	1	-	4	50	100	--	150	3
ME-207-C	MACHINE DRAWING	1	-	4	5	50	100	--	150	4
EE-219-C	ELECTRONICS ENGINEERING (ME,CHE)	3	1	-	4	50	100	--	150	3
ME-211-C	STRENGTH OF MATERIALS-I LAB	-	-	2	2	25	-	25	50	3
EE-221-C	ELECTRONICS ENGINEERING LAB (ME,CHE)	-	-	2	2	25	-	25	50	3
	TOTAL	19	7	8	34	400	700	50	1150	-

HUM-201-C PRINCIPLES & APPLICATIONS OF ECONOMICS

L	T	P		
3	1	-	Class Work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Course Objective : The purpose of this course is to :

1. Acquaint the student in the basic economic concepts and thier operational significance and
2. Stimulate him to think systematically and objectively about contemporary economic problems.

Unit-I

Definition of Economics- various definitions, Nature of Economic problem. Production possibility curve Economic laws and their nature, Relation between Science, Engineering Technology and economic development.

Basic Concepts : Micro, Macro Economics, Equilibrium-Static & Dynamic, Stock & Flow; Inductive & Deductive Methods.

Unit-II

Concepts and Measurement of Utility, Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility-Its practical application and importance.

Unit-III

Meaning of Demand, Individual and Market Demand schedule, Law of Demand, Shape of Demand Curve, change in Demand Vs. change in quantity Demanded, Demand forecasting, Elasticity of demand, Measurement of Elasticity of Demand, Factors Effecting Elasticity of Demand, practical importance & applications of the concept of Elasticity of Demand.

Unit-IV

Meaning of production and factors of production ;'Division of labour-meaning, its forms merits and demerits;-Law of variable proportions, Returns to scale, Internal and External Economies and Diseconomies of scale.

Unit-V

Various concepts of Cost-Fixed Cost, Variable Cost, Average Cost, Marginal Cost, Money Cost, Real Cost Opportunity Cost, Shape of Average Cost, Marginal Cost, Total Cost etc. in Short run and Long run.

Unit-VI

Meaning of Market , Types of Market-Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition (Main features of these markets).

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in Demand and Supply on prices.

Unit-VII

Nature and characteristics of Indian Economy (brief and elementary introduction), Privatization-meaning Merits and demerits. Globalization of Indian Economy-Merits and demerits.

Text Book :

Principles of Economics : P.N. Chopra-Kalyani Publishers.

Reference Books :

1. Indian Economy : Rudar Dutt & K.P.M. Sundhram
2. Modern Micro Economics : S.K. Mishra-Pragati Publications
3. Economic Theory : A.B.N. Kulkarni & A.D. Kale [illegible] S. Chand & Co.
4. Elementary Engg. Economics . Kapoor, [illegible] & Chand & Co. New Academic Publishing Co.

Note : Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all, however question number I will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be expected to answer any 10 questions.

MATH-201-C **MATHEMATICS-III**

L	T	P		
3	2	-	Class Work	: 50 marks
			Exam.	: 100 marks
			Total	: 150 marks
			Duration of Exam.	: 3 Hrs.

Part-A

Complex Variables :

Functions of a Complex Variable, continuity, derivative, Cauchy-Riemann Equations, Analytic Functions, Harmonic Functions, Integration of a Complex Function, Cauchy's theorem, Cauchy's integral formula. Taylor's and Laurent's series, singularities, residues, residue theorem, calculation of residues, evaluation of real definite integrals around unit circle and semi-circle only).

Fourier Series :

Euler's formulae, conditions for a Fourier expansion, Fourier expansion of functions having points of discontinuity, change of interval, odd and even functions.Half range series, Parseval's formula, Practical Harmonic Analysis.

Part-B

Partial Differential, Equations:

Formation, solution, linear partial differential equations of the first order, integral surfaces passing through a given curve, non-linear partial differential equations of the first order, Charpit's method, classification of linear second order equations, Euler's equations, linear equations with constant co-efficients, methods of separation of variables, applications to the wave equation, one dimentional heat flow, two dimentional heat flow, Laplace equation (two dimensional) and Laplace equation in polor co-ordinates.

Fourier Transform :

Fourier sine and cosine transforms, properties of F-transforms, convolution theorem, Perseval's identity, relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of functions, applications to boundary value problems.

Text Books :

1. Higher Engineering Mathematics : B.S. Grewal-Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics : E.Kreyzing-Wiley Estern Ltd.

Reference Books :

1. Complex Variables and Applications: R.V.Churchil-Mc-Graw Hill.
2. Elements of Partial Differential Equations: IAN, Sneddon.
3. Engineering Mathematics Vol. II : S.S. Sastry, Prentice-Hall of India.

Note : Examiner will set eight questions in all; taking four from Part -A and four from Part-B. Students will be required to attempt five questions, taking atleast two questions from each part.

THERMODYNAMICS

Class Work	: 50
Exam.	: 100
Total Marks	: 150
Duration of Exam.	: 3 Hours

Unit-I

Basic concepts : Definition of thermodynamics, different approaches, thermodynamic systems, surroundings, control volume, processes, quasi-static process, criterion for reversible process, state postulate, total energy, internal energy, energy exchange as work and heat, types of work transfer with examples and derivations for various processes, thermodynamic equilibrium, Zeroth Law, temperature measurement, calibration of thermometers, Numericals.

Unit-II

First Law of Thermodynamics : Cycles, first law of thermodynamics, consequences of first law, perpetual motion machine of first kind (PMMFK), first law analysis of some elementary processes, control mass and control volume analysis, first law for a control volume, steady state flow process, applications of SFEE, throttling process, transient flow processes, Numericals.

Unit-III

Second Law of Thermodynamics : Limitations of first law, thermal reservoir, source, sink, heat engine, refrigerator, perpetual motion machine of the second kind (PMMSK), Carnot cycle, thermodynamic temp. scale, Clausius inequility, entropy, principal of entropy increase, entropy change in different processes, an introduction to 3rd law of thermodynamics, Numericals.

Unit-IV

Properties of pure Substance : Definition of pure substance, simple compressible substances, T-V & P-V & P-T diagrams for simple compressible substances, thermodynamic properties of steam, vapour quality, saturated & super heated steam tables, temp. entropy & mollier charts, separating & throttling calorimeter, specific heats, coefficient of volumetric expansion & compressibility, perfect gas mixtures, properties of the mixture of perfect gases, real gas equation, compressibility factor, corresponding states, incompresible substance, Numericals.

Unit-V

Availability : High & low grades of energy, available enegy ,Helmholtz function & Gibbs function, availability for a closed system, availability in steady flow, reversible work, availabilty balance, second law efficiency, Numericals.

Unit-VI

Thermodynamic Relations : T-ds relations, enthalpy & internal energy as a function of independent variables T & P, specific heat capacity relations, Clapeyron equation, Maxwell relations.

Text Books :

1. Thermodymics : C.P. Gupta & R. Prakash-Nem Chand & Brothers, Roorkee.
2. Basic Thermodynamics : P.K. Nag-Tata McGraw Hill, New Delhi.

Reference Books :

1. Heat Engineering : Vasandani & Kumar-Metropolitan Book Co. (P) Ltd.
2. Energy Conversion - Vol (I) : V. Kadambi & Manohar Prasad-Wiley Eastern Ltd., New Delhi.

Note : 1. In the semester examination the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

2. Steam Tables and Mollier Diagram will be supplied in the Examination.

ME-203-C **STRENGTH OF MATERIALS-I**

L T P		
3 1 -	Class Work	: 50
	Exam.	. 100
	Total Marks	: 150
	Duration of Exam	: 3 Hours

Unit-I

Simple Stresses & Strains : Concept & types of stresses and strains, Poison's ratio, stresses and strain in simple and compound bars under axial loading, stress-strain diagrams, Hook's law, elastic constaints & their relatioships, temperature stress & strain in simple & compound bars under axial loading, Numericals.

Unit-II

Compounds stresses & strains : Concept of surface and volumetric strains, two dimensional stress system, conjugate shear stress at a point on a plane, principle stresses & strains and principle planes, Mohr's Circle of Stresses, Numericals.

Unit-III

Shear Force & Bending Moments : Definitions, SF & BM diagrams for cantilevers, simply supported beams with or without over-hang and calculation of maximum BM & SF and the point of contraflexture under (i) concentrated loads, (ii) uniformly distributed loads over whole span or a part of it, (iii) combination of concentrated loads and uniformaly distributed loads (iv) Uniformaly varying loads,and (V) application of moments, relation between the rate of loading, the shear force and the bending moments, problems.

Unit-IV

Torsion of Circular Members : Torsion of thin circular tube, Solid and hollow circular shafts, tappered shaft, stepped shaft & composite circular shafts, combined bendings and Torsion equivallent Torgue effect of end thrust, Numericals.

Unit-V

Bending & Shear Stresses in Beams : Bending stresses in beams with derivation & its application to beams of circular, rectangular, I, T and channel sections, composite beams, shear stresses in beams with derivation, combined bending torsion & axial loading of beams. Numericals.

Unit-VI

Thin Walled Vessels : Hoop & longitudinal stresses & strains

in cylinderical & spherical vessels & their derivations under internal pressure, wire wound cylinders, Numericals.

Unit-VII

Columns & Struts : Column under axial load, concept of instability and buckling, slenderness ratio, derivation of Eulers formulae for the elastic buckling load, Eulers, Rankine-Gordan's formulae, Johnson's empirical formula for axial loading column and their applications, eccentric compression of a short strut of rectagular & circular sections, Numericals.

Unit-VIII

Slope & Deflection : Relationship between bending moment, slope & deflection, Mohr's Theorem, moment area method, method of integration, Macaulay's method, calculations for slope and deflection of (i) cantilevers and (ii) simply supported beams with or without overhang under concentrated load, Uniformly distributed loads or combination of concentrated and uniformly distributed loads, Numericals.

Text Book :

1. Strength of Materials : G.H. Ryder - Elbs.

Reference Books :

1. Strength of Materials : Popov-PHI, New Delhi.
2. Strength of Materials : Sadhu Singh-Khanna Publications
3. Strength of Materials : S.R. Ramamurthem-Dhanpat Rai & Sons.

Note : In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

ME-205-C **ENGINEERING MECHANICS**

L T P		
3 1 -	Class Work	: 50
	Exam.	: 100
	Total Marks	: 150
	Duration of Exam.	: 3 Hours

Unit-I

Review of Basic force Systems: Dimensions and units of mechanics, idealization of mechanics, laws of mechanics, vector algebra review, moment of a force about a point and axis, the couple and couple moment, addition and substraction of couples, moment of a couple about a line, translation of a force to a parallel position, resultant of a force system, Problems (vector method).

Unit-II

Equilibrium : Introduction, free body diagram, control volumes, general equations of equilibrium, two point equivalent loading, static indeterminancy, simple truss, method of joints, method of sections, coplaner cable-loading a function of x, coplaner cables-loading the weight of the cable itself. Problems.

Unit-III

Properties of Surfaces & Moments and products of Inertia : First moment of an area and the centroid, principal axes, formal defination of interia quantities, relation between mass-inertia terms and area-inertia terms, translation of coordinate axes, transportation properties of the inertia terms, a brief introduction to tensors, the inertia of ellipsoid and principal moments of inertia, Problems (vector method).

Unit-IV

Kinematics of Particles and Rigid Bodies : Velocity and acceleration in path and cylindrical coordinates, motion of a partical relative to a pair of translating axes, translation and rotation of rigid bodies, Chasles Theorem, moving references, velocity and acceleration for different references, inertia and coriolisforces. Problems (vector method).

Unit-V

Partical Dynamics, Energy Methods & Momentum Methods : Newton's Law for rectangular coordinates & cylindrical coordinates, rectifier translation, central force motion, Newton's law for path variables, work energy equations, work energy equations

for a systems of particles, linear and angular momentum equations for a systems of particles. Problems (vector method).

Unit-VI

Variational Mechanics : Hamiton Principal, Lagrange equations, Principal of virtual work, methods of minimum potential energy, stability.

Unit-VII

Simple Machines : Dry friction & its laws, force of friction on a wheel, simple machines & definitions, ideal machine & friction losses, reversibility of machines & self locking machines, pulley & systems of pulleys, wheel & axle differential wheel and axle, differential pulley block, worm and warm wheel, single purchase winch crab, simple & compound screw jacks, problems.

Text Books :

1. Engineeering Mechanics - Statics & Dynamics : I.H. Shames - PHI Pub., N.D.
2. Engineering Mechanics : Timoschenko.

Reference Books :

1. Statics & Dynamics : J.L. Meriam - JohnWiley & Sons (P) Ltd. New York.
2. Statics & Dynamics : Beer & Johnson - MGH, New Delhi.

Note : In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

ME-207-C **MACHINE DRAWING**

L T P		
1 - 4	Sessional Marks	: 50
	Theory Marks	: 100
	Total Marks	: 150
	Duration of Exam.	: 3 Hours

Unit-I

(a) An Introduction to dimensioning, sectioning, surface finish symboles, fits and tolerances.

(b) To make assembly drawings of the following with the help of given views of their components and details.
Machine tools : Tail stock, machine vice.
Boiler mountings and steam engine parts : Eccentric, stop valve, feed check valve, blow off cock.
Bearing : Pedastal bearing, foot step bearing, swivel bearing.

Unit-II

Free hand skeching of stufing box, Cross head, Tool rest, Tool of Shaper & Safety valve.

Text Book :

1. Machine Drawing : P.S. Gill - Katson Publishing House, B.D. Kataria and Sons, Ludhiana - Delhi.

Reference Book :

1. Machine Drawing : N.D. Bhatt - Rupalee Publications, Opposite Amul Dairy, Court Road, Anand- 388001

Note : 1. First/Third angle projection, method and BIS code of practice have to be followed.

2. In the semester examination, the examiner will set three question in all, two questions from Unit-I and one question from Unit-II. The students will be required to attempt two questions in all but one question from each unit. The question from Unit-I will be of 75 marks and that from Unit-II will be of 25 marks.

EE-219-C **ELECTRONICS ENGINEERING**

L T P		
3 1 -	Class Work	: 50
	Exam.	: 100
	Total	: 150
	Duration of Exam.	: 3 Hours

Unit-I : Diodes :

P-N junction, P-N junction as a rectifier, V-I characteristics, Breakdown diodes, Light emitting diodes, load-Line concept, Clipping, Clamping Rectifiers.

Unit-II : Transistors :

Operation and Characteristics of a Transistor, Common Emitter, Common Collector and Common Base Configurations of a transistor, biasing and Transistor as an amplifier and oscillator.

Unit-III : OP-Amps :

Basic Characteristics of an OP-AMP, applications of OP-AMP (Inverter, Non-Inverter, Integrator, differentiator, Logarithimic amplifier, Square wave generator).

Unit-IV : Power Amplifiers :

Class A, Class B, Class C Amplifiers.

Unit-V : Stabilised Power Supplies :

Regulated power supply, series voltage regulator.

Unit-VI : Digital Gates :

Binary numbers, OR,AND,NAND,NOR,NOT,EX-OR Gates.

Text Book : Integrated Electronics : Milman & Halkias-MGH.

Reference Books :

1. Digital Electronics : R.P.Jain-MGH.
2. Microelectronics : Ramana-MGH.
3. Electronics Principles : Malvino-TMH.

Note : 1. Five out of eight questions are to be attempted.

2. At least one question should be set from each unit.

ME-211-C **STRENGTH OF MATIALS-I LAB**

L	T	P		
-	-	2	Class Work	: 25
			Exam.	: 25
			Total	: 50
			Duration of Exam	: 3 Hours

List of Experiments Based on ME-203C and ME-205C

1. To study the Brinell hardness testing machine & perform the Brinell hardness test.
2. To study the Rockwell hardness testing machine & perform the Rockwell hardness test.
3. To study the Vickers hardness testing machine & perform the vickers hardness test.
4. To study the erichsen sheet metal testing machine & perform the erichsen sheet metal test.
5. to study the Impact testing machine and perform the Impact tests (Izod & Charpy).
6. To study the Universal testing machine and perform the tensile test.
7. To perform compression & bending tests on UTM.
8. To perform the shear test on UTM.
9. To study the torsion testing machine and perform the torsion test.
10. To draw the bending moment & shear force diagrams for a simply supported beam under point loads.
11. To calculate efficiencies, mechanical advantages and velocity ratios of single and double purchase winch crabs.
12. To caculate efficiencies, mechanical, advantages and velocity ratios of worm and worm wheels of single, double and triple start.
13. To study simple and compound screw jacks and a crane and find their mechanicaladvantagesefficiencies and velocity ratios.
14. To find %age of error between the observed and calculated values of stresses in the members of JIB crane.
15. To find the moment of inertia of a flywheel.

Note : Any Eleven experiments from the above are required to be performed by the students in the lab.

EE-221-C **ELECTRONICS ENGINEERING LAB**

L	T	P
0	0	2

Class Work : 25
Exam. : 25
Total : 50
Duration of Exam.: 3 Hours

List of Experiments :

1. Study of V-I Characteristics of Diode.
2. Study of a Clipping and Clamping circuits.
3. Study of Half wave rectifier.
4. Study of a Full wave rectifier.
5. Study and analysis of a Transistor in Common Emitter Configuration.
6. Study of OP-AMP as Inverter and Comparator.
7. Study of OP-AMP as Differentiator.
8. Study of OP-AMP as Integrator.
9. Study of OP-AMP as Square wave generator.
10. Verification of Truth Tables of AND, OR, NOT Gates.
11. Verification of Truth Tables of NAND. and EX-OR Gates.
NOR

Note : At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

CHEMICAL ENGINEERING SEMESTER-III (1999-2000)

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam.
HUM-201-C	PRINCIPLES & APPLICATIONS OF ECONOMICS (Common for all branches)	3	1	-	4	50	100	--	150	3
MATH-201-C	MATHEMATICS-III (Common for all brances)	3	2	-	5	50	100	--	150	3
EE-219-C	ELECTRINICS ENGINEERING (CHE,ME)	3	1	-	4	50	100	--	150	3
CHE-201-C	CHEMICAL ENGINEERING	2	4	-	6	100	100	--	200	3
CHE-203-C	PROCESS CALCULATIONS	3	1	-	4	50	100	--	150	3
ME-209-C	FLUID FLOW	3	1	-	4	50	100	--	150	3
CHE-205-C	APPLIED MECHANICS (CHE,EE,IC)	-	-	3	3	50	-	50	100	3
EE-213-C	FLUID FLOW LAB	-	-	2	2	25	-	25	50	3
EE-221-C	ELECTRICAL WORKSHOP (CHE,CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
	ELECTRONICS ENGINEERING LAB (CHE,ME)									
	TOTAL	17	10	7	34	450	600	100	1150	

HUM-201-C PRINCIPLES & APPLICATIONS OF ECONOMICS

L	T	P		
3	1	-	Class Work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Course Objective : The purpose of this course is to :

1. Acquaint the student in the basic economic concepts and thier operational significance and
2. Stimulate him to think systematically and objectively about contemporary economic problems.

Unit-I

Definition of Economics- various definitions, Nature of Economic problem. Production possibility curve Economic laws and their nature, Relation between Science, Engineering Technology and economic development.

Basic Concepts : Micro, Macro Economics, Equilibrium-Static & Dynamic, Stock & Flow; Inductive & Deductive Methods.

Unit-II

Concepts and Measurement of Utility, Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility-Its practical application and importance.

Unit-III

Meaning of Demand, Individual and Market Demand schedule, Law of Demand, Shape of Demand Curve, change in Demand Vs, change in quantity Demanded, Demand forecasting, Elasticity of demand, Measurement of Elasticity of Demand, Factors Effecting Elasticity of Demand, practical importance & applications of the concept of Elasticity of Demand.

Unit-IV

Meaning of production and factors of production ; Division of Labour-meaning , its forms merits and demerits;-Law of variable proportions, Returns to scale, Internal and External Economies and Diseconomies of scale.

Unit-V

Various concepts of Cost-Fixed Cost, Variable Cost, Average Cost, Marginal Cost, Money Cost, Real Cost Opportunity Cost, Shape of Average Cost, Marginal Cost, Total Cost etc. in Short run and Long run.

Unit-VI

Meaning of Market , Types of Market-Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition (Main features of these markets).

Supply and Law of Supply. Role of Demand & Supply in Price Determination and effect of changes in Demand and Supply on prices.

Unit-VII

Nature and characteristics of Indian Economy (brief and elementary introduction), Privatization-meaning Merits and demerits. Globalization of Indian Economy-Merits and demerits.

Text Book :

Principles of Economics : P.N. Chopra-Kalyani Publishers.

Reference Books :

1. Indian Economy : Rudar Dutt & K.P.M. Sundhram
2. Modern Micro Economics : S.K. Mishra-Pragati Publications.
3. Economic Theory : A.B.N. Kulkarni & A.B. Kalkundrikar- R. Chand & Co.
4. Elementary Engg. Economics : Kapoor, Mehra & Gakhar- New Academic Publishing Co.

Note : Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all, however question number I will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be expected to answer any 10 questions.

MATH-201-C **MATHEMATICS-III**

L	T	P
3	2	-

Class Work : 50 marks
Exam. : 100 marks
Total : 150 marks
Duration of Exam. : 3 Hrs.

Part-A

Complex Variables :

Functions of a Complex Variable, continuity, derivative, Cauchy-Riemann Equations, Analytic Functions, Harmonic Functions, Integration of a Complex Function, Cauchy's theorem, Cauchy's integral formula. Taylor's and Laurent's series, singularities, residues, residue theorem, calculation of residues, evaluation of real definite integrals around unit circle and semi-circle only).

Fourier Series :

Euler's formulae, conditions for a Fourier expansion, Fourier expansion of functions having points of discontinuity, change of interval, odd and even functions.Half range series, Parseval's formula, Practical Harmonic Analysis.

Part-B

Partial Differential, Equations:

Formation, solution, linear partial differential equations of the first order, integral surfaces passing through a given curve, non-linear partial differential equations of the first order, Charpit's method, classification of linear second order equations, Euler's equations, linear equations with constant co-efficients, methods of separation of variables, applications to the wave equation, one dimentional heat flow, two dimentional heat flow, Laplace equation (two dimensional) and Laplace equation in polor co-ordinates.

Fourier Transform :

Fourier sine and cosine transforms, properties of F-transforms, convolution theorem, Perseval's identity, relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of functions, applications to boundary value problems.

Text Books :

1. Higher Engineering Mathematics : B.S. Grewal-Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics : E.Kreyzing-Wiley Estern Ltd.

Reference Books :

1. Complex Variables and Applications: R.V.Churchil-Mc-Graw Hill.
2. Elements of Partial Differential Equations: IAN. Sneddon.
3. Engineering Mathematics Vol. II : S.S. Sastry, Prentice-Hall of India.

Note : Examiner will set eight questions in all; taking four from Part -A and four from Part-B. Students will be required to attempt five questions, taking atleast two questions from each part.

EE-219-C **ELECTRONICS ENGINEERING**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.:	3 Hrs.

Unit-I : Diodes :

P-N junction, P-N junction as a rectifier, V-I characteristics, Breakdown diodes, Light emitting diodes, Load-Line concept, Clipping, Clamping, Clamping Rectifiers.

Unit-II : Transistors :

Operation and Characteristics of a Transistor, Common Emitter Common Emitter, Common Collector and Common Base configurations of a transistor, biasing and Transistor as an amplifier and oscillator.

Unit-III : Op-AMIPS :

Basic Characteristics of an OP-AMP, applications of OP-AMP (Inverter, Non-Inverter, Integrator, differentiator, Logarithmic Amplifier, Square wave generator).

Unit-IV Power Amplifiers :

Class A, Class B and Class C Amplifiers.

Unit-V : Stablilsed Power Supplies :

Regulated power supply, series voltage regulator.

Unit-VI : Digital Gates:

Binary numbers, OR,AND, NAND,NOR, NOT,RX-OR Gates.

Text Book : Integrated Electronics : Miman & Halkias-MGH.

Reference Books :

1. Digital Electronics : R.P. Jain-MGH.
2. Micro electronics: Ramana-MGH.
3. Electronics Principles: malvino-TMH.

Note : 1. Five out of eight questiosns are to be attempted.
2. At least one questions should be set from each unit.

CHE-201-C **CHEMICAL ENGINEERING PROCESS CALCULATIONS**

L	T	P		
2	4	-	Class Work	: 100 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Unit-I

Brief introduction of Chemical Engineering unit processes and unit operations, Units and dimensions, Dimensional groups and constants, Stoichiometric relationships, conservation of mass in Chemical reactions, Excess reactants, Degree of completion, Behaviour of ideal gases, gaseous mixtures, Vapour pressure, Clausius Clapeyron equation, Cox Chart, Duhring's Plot, Raoult's Law.

Unit-II

Humidity and Saturation, Relative Humidity, Humid heat, Humid volume, Dew point, Humidity chart and its use.

Unit-III

Crystallization, Dissolution, Solving material balance problems with and without simultaneous equations, Recycle, Bypass and Purge calculations.

Unit-IV

Heat capacity, Calculation of Enthalpy changes, Energy balances with chemical reaction, Heat of Vaporization, Heat of Formation , Laws of Thermochemistry, Heat of combustion, Heat of reaction.

Unit-V

Case study of selected problems, Aid of Computer in solving problems.

Text Books

1. Chemical Process Principles : D.A. Hougen & K.M. Watson Vol. I, Asia Publishing House.
2. Basic Principles and Calculations in Chemical Engineering : D.M.Himmelblau Printice Hall.

Reference Books

1. Chemical Process Analaysis, Mass and Energy Balance : W.L.Luyben and L.A. Wenzel-Prentice Hall.
2. Stoichiometry : Bhatt, B.I. and Vora, S.M.-Tata McGraw Hill.
3. Chemical Calculations : D.P. Tiwari-Vrinda Publication(Jalgaon)

Note : Five out of 8 questions are to be attempted. Not more than two questions are to be set from each unit.

Code-203-C
L T P
3 1 -

FLUID FLOW

Class Work : 50 Marks
Theory : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Unit-I

Properties of fluids, Classification of fluid forces-Normal forces on fluids, Pressure-depth relation for compressible and incompressible fluids, Forces on submerged bodies, Rigid body motion, Pressure measurement, Kinematics of flow, Description of velocity fields, angular velocity circulation, Stream function. Irrotational flow, Types of flow.

Unit-II

Conservation of mass, momentum and energy, Euler's equation, Bemoulli's equation, Navier-Stoke's equation.

Unit-III

Hagen-Poiseuille equation, Friction factor, Frictions factor equations, Reynolds number and its significance, Dimensional analysis to fluid flow problems.

Unit-IV

Flow of Incompressible fluids in conduits, Energy losses in beds, fittings, valves etc. Different fluid flow situations in conduits, series, parallel and networks of pipelines, Economic pipe diameter Flow through open channels.

Unit-V

Compressible fluid flow in pipes, Flow measuring devices, Mixing of fluids, Power requirements, Pumps, Blowers, Valves and their characteristics, Selection and Specification.

Text Books

1. Chemical Engineering :J.M. Coulson and J.F. Richardson Vol-I-Pergamon.
2. Unit Operations of Chemical Engineering : W.L. Mc Cabe and J.C. Smith-McGraw Hill.

Reference Books

1. Fluid Mechanics : A.K. Jain-Khanna Publishers, New Delhi.
2. Hydraulics & Fluid Mechanics: Jagdish Lal-Metropoliton Book Co. Pvt. Ltd. Delhi.

Note : Five out of eight questions are to be attempted. At least one question (but not more than two) is to be set from each unit.

ME-209-C **APPLIED MECHANICS**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.: 3 Hrs.	

Unit-I

Stress & Strain : Review of simple stresses, simple strains, Hook's Law & elastic constants, general biaxial stress systems, Principal planes and principal stresses, principal strains, maximum shear stresses and shear strains in terms of Principal stresses & Principal Strains respectively, Mohr's Stress Circle, Problems.

Unit-II

Bending & Shear Stresses in Beams : Review of Centre of gravity of an area, moment of inertia of the sections, bending stress in beams with symmeterical sections and subjected to pure bending, shear stresses in beams of symmetric sections, shear centre, Problems.

Unit-III

Torsion of Circular Members : Torsion of tube, solid and hollow circular shafts, tapered shafts, stepped shaft & composite concentric shafts, combined bending & torsion, equivalent torque, effect of end thrust, Numericals.

Unit-IV

Bending Moment & Shear Force : Definitions, SF & BM diagrams for centilever & simply supported beam and calculation of max. SF, BM and point of centralflexure under the loads of (i) concentrated load (ii) uniformly distributed load (iii) uniform varying load (iv) combination of load concentrated & UDL loads Numericals.

Unit-V

Theories of Failure : Concepts of various theories of elastic failure and governing equations with their graphical representation, applications, Numricals.

Unit-VI

General Design Considerations : Introduction, scope & meaning of design, design process, concept of tearing, bearing shearing, crushing, bending etc. selection of materials, factor of safety, stress concentration factor, design stresses for variable & repeated loads, endurance limit, fatigue strength, fits & tolerances, Numericals.

Unit-VII

Cables & Columns : Derivations for cables subjected to concentrated loads and uniformly distributed load per unit horizontal distance separately and cable uniformly loaded per unit length along the cable itself, Derivation of Euler's formula for crippling load of coloumn under different conditions, Use of Rankin's Formula, Ecentic Loading of short columns of circular & rectangular cross-sections, Numericals.

Unit-VIII

Fluid Flow Mechanics : Review of fluid properties, flow regimes, types of flow, stream lines, path lines, streak lines, continuity equation, rotation , circulation, velocity potential, steam function, flow net, general energy equation for steady flow of any fluid, Bernoulli's equation with its applications & limitations, flow measuring devices, Numericals.

Text Books

1. Fluid Mechanics : A.K. Mohanty-Prentice Hall of India, N.D.
2. Strength of Material : G.H. Ryder-ELBS.
3. Engg. Mechanics : A.K. Tayel-Umesh Publishing, N.Delhi.
4. Machine Design :P.C. Sharma & D.K. Agarwal-S.K. Kataria & Sons, New Delhi.

Reference Books

1. Fluid Mechanics : A.K. Jain-Khanna Publications, New Delhi.
2. Hydraulics & Fluid Mechanics : Jagdish Lal-Metropolitan Book Co. Pvt. Ltd. Delhi.

Note : In the semester examination, the examiner will set eight questions in all at least one questions from each unit, and students will be required to attempt only five questions.

CHE-205-C
L T P
- - 3

FLUID FLOW LAB

Class Work : 50 Marks
Exam. : 50 Marks
Total : 100 Marks
Duration of Exam.: 3 Hrs.

List of Experiments :

1. Flow Measurement by Venturimeter.
2. Flow Measurement by Orificemeter.
3. Calibration of Rotameter.
4. Flow Measurement by V-notch.
5. Pressure drop in pipe flow.
6. Verification of Benoulli's Theorem.

EE-213-C **ELECTRICAL WORKSHOP**

L	T	P		
-	-	2	Class Work	: 25 Marks
			Exam.	: 25 Marks
			Total	: 50 Marks
			Duration of Exam.	: 3 Hrs.

List of Experiments :

1. Introduction of tools, electrical materials, symbols and abbreviations.
2. To make T and Straight joints.
3. To study stair case wiring.
4. To study house wiring i.e. batten, cleat, casing-capping and conduit wiring.
5. To study fluorescent tube light.
6. To study high pressure mercury vapour lamp (H.P.M.V.).
7. To study sodium Lamp.
8. To study single phase induction motor using single phase energy meter and double pole main switch.
9. To study three phase induction motor using three phase energy meter, TPN main switch and DOL starter.
10. To study three phase induction motor using three phase energy meter, TPN main switch and Star-delta starter.
11. To study repairing of home appliances such as heater electric iron,fans etc.
12. To study construction of moving iron, moving coil electrodynamics & induction type meter.
13. To design & fabricate single phase transformer.
14. To study fuses, relays, contactors, MCBs and circuit breakers.
15. Insulation testing of electrical equipment.

Note : 1. At least ten experiments have to be performed in the semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-221-C **ELECTRONICS ENGINEERING LAB**

L	T	P			
-	-	2	Class Work	:	25 Marks
			Exam.	:	25 Marks
			Total	:	50 Marks
			Duration of Exam.	:	3 Hrs.

List of Experiments :

1. Study of V-I characteristics of Diode.
2. Study of a Clipping and Clamping circuits.
3. Study of a Half wave rectifier.
4. Study of a Full wave rectifier.
5. Study and Analysis of a Transistor in common Emitter configuration.
6. Study of OP-AMP as Inverter and Comparator.
7. Study of OP-AMP as Differentiator.
8. Study of OP-AMP as Integrator.
9. Study of OP-AMP as Square wave generator.
10. Verification of Truth Tables of AND, OR, NOT Gates.
11. Verification, of Truth Tables of NAND, NOR, and EX-OR Gates.

Note : At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per scope of the syllabus.

INSTRUMENTATION AND CONTROL ENGINEERING SEMESTER-III (1999-2000)

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam.
HUM-201-C	PRINCIPLES & APPLICATIONS OF ECONOMICS (Common for all branches)	3	1	-	4	50	100	---	150	3
MATH-201-C	MATHEMATICS-III (Common for all branches)	3	2	-	5	50	100	--	150	3
EE-201-C	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES (CSE,EE,EL,IC)	3	1	-	4	50	100	--	150	3
EE-203-C	CIRCUIT THEORY (EE,EL,IC)	3	1	-	4	50	100	--	150	3
EE-207-C	ELECTROMECHANICAL ENERGY CONVERSION(EL,IC)	3	1	-	4	50	100	--	150	3
ME-209-C	APPLIED MECHANICS (CHE,EE,IC)	3	1	-	4	50	100	--	150	3
EE-209-C	CIRCUIT THEORY LAB (EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-211-C	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-213-C	ELECTRICAL WORKSHOP (CHE,CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-215-C	ELECTROMECHANICAL ENERGY CONVERSION LAB (EL,IC)	-	-	3	3	50	-	50	100	3
	TOTAL	18	7	9	34	425	600	125	1150	

HUM-201-C PRINCIPLES & APPLICATIONS OF ECONOMICS

L	T	P		
3	1	-	Class Work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Course Objective : The purpose of this course is to :

1. Acquaint the student in the basic economic concepts and their operational significance and
2. Stimulate him to think systematically and objectively about contemporary economic problems.

Unit-I

Definition of Economics- various definitions, Nature of Economic problem. Production possibility curve Economic laws and their nature, Relation between Science, Engineering Technology and economic development.

Basic Concepts : Micro, Macro Economics, Equilibrium-Static & Dynamic, Stock & Flow; Inductive & Deductive Methods.

Unit-II

Concepts and Measurement of Utility, Law of Diminishing Marginal Utility, Law of Equi-Marginal Utility-Its practical application and importance.

Unit-III

Meaning of Demand, Individual and Market Demand schedule, Law of Demand, Shape of Demand Curve, change in Demand Vs, change in quantity Demanded, Demand forecasting, Elasticity of demand, Measurement of Elasticity of Demand, Factors Effecting Elasticity of Demand, practical importance & applications of the concept of Elasticity of Demand.

Unit-IV

Meaning of production and factors of production ; Division of Labour-meaning , its forms merits and demerits; Law of variable proportions, Returns to scale, Internal and External Economies and Diseconomies of scale.

Unit-V

Various concepts of Cost-Fixed Cost, Variable Cost, Average Cost, Marginal Cost, Money Cost, Real Cost Opportunity Cost, Shape of Average Cost, Marginal Cost, Total Cost etc. in Short run and Long run.

Unit-VI

Meaning of Market , Types of Market-Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition (Main features of these markets).

Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in Demand and Supply on prices.

Unit-VII

Nature and characteristics of Indian Economy (brief and elementary introduction), Privatization-meaning Merits and demerits. Globalization of Indian Economy-Merits and demerits.

Text Book :

Principles of Economics : P.N. Chopra-Kalyani Publishers.

Reference Books :

1. Indian Economy : Rudar Dutt & K.P.M. Sundhram
2. Modern Micro Economics : S.K. Mishra-Pragati Publications.
3. Economic Theory : A.B.N. Kulkarni & A.B. Kalkundrikar- R. Chand & Co.
4. Elementary Engg. Economics : Kapoor, Mehra & Gakhar- New Academic Publishing Co.

Note : Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all, however question number I will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be expected to answer any 10 questions.

MATH-201-C **MATHEMATICS-III**

L	T	P		
3	2	-	Class Work	: 50 marks
			Exam.	: 100 marks
			Total	: 150 marks
			Duration of Exam.	: 3 Hrs.

Part-A

Complex Variables :

Functions of a Complex Variable, continuity, derivative, Cauchy-Riemann Equations, Analytic Functions, Harmonic Functions, Integration of a Complex Function, Cauchy's theorem, Cauchy's integral formula. Taylor's and Laurent's series, singularities, residues, residue theorem, calculation of residues, evaluation of real definite integrals around unit circle and semi-circle only).

Fourier Series :

Euler's formulae, conditions for a Fourier expansion, Fourier expansion of functions having points of discontinuity, change of interval, odd and even functions.Half range series, Parseval's formula, Practical Harmonic Analysis.

Part-B

Partial Differential, Equations:

Formation, solution, linear partial differential equations of the first order, integral surfaces passing through a given curve, non-linear partial differential equations of the first order, Charpit's method, classification of linear second order equations, Euler's equations, linear equations with constant co-efficients, methods of separation of variables, applications to the wave equation, one dimentional heat flow, two dimentional heat flow, Laplace equation (two dimensional) and Laplace equation in polor co-ordinates.

Fourier Transform :

Fourier sine and cosine transforms, properties of F-transforms, convolution theorem, Perseval's identity, relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of functions, applications to boundary value problems.

Text Books :

1. Higher Engineering Mathematics : B.S. Grewal-Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics : E.Kreyzing-Wiley Estern Ltd.

Reference Books :

1. Complex Variables and Applications: R.V.Churchil-Mc-Graw Hill.
2. Elements of Partial Differential Equations: IAN, Sneddon.
3. Engineering Mathematics Vol. II : S.S. Sastry, Prentice-Hall of India.

Note : Examiner will set eight questions in all; taking four from Part -A and four from Part-B. Students will be required to attempt five questions, taking atleast two questions from each part.

EE-201-C

ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES

L	T	P
3	1	-

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam. : 3 Hrs.

Part-A

Conducting Materials :

Review of energy bands description of materials, drift velocity, collision time, Mean free path, mobility, conductivity, relaxation time, factors affecting conductivity of materials, types of thermal conductivity, Wiedemann Franz law, superconductivity, effect of magnetic field, conducting materials, applications.

Dielectric Materials :

Behaviour of dielectric materials in static electric field, Dipole moments, Polarization, Dielectric constant, Polarizability, Susceptibility, mechanisms of polarization, behaviour in alternating field, dielectric loss, loss tangent, types of dielectric & insulating materials, electrostriction, Piezo electricity, Applications.

Magnetic Materials :

Permeability, Magnetic susceptibility, magnetic moment, Magnetization, Dipole moment, types of magnetic materials, Magnetostriction, Eddy current & hysteresis losses, applications.

Part-B

Semiconductors :

Review of Si and Ge as semiconducting materials, P-N junction, Drift & Diffusion, Diffusion & Transition capacitance of P-N junction.

Construction and Characteristics of Semiconductor Devices:

Brief introduction to Planar Technology for device fabrication, Diode, Schottky diode, Point contact diode, Zener diode, BJT, FET, MOSFETS, Thyristor, UJT, Diac, Triac, GTO, IGBT, LED, Photo sensitive Devices.

Text Books :

1. Electrical Engineering Materials: A.J. Dekker-PHI.
2. Integrated Electronics : Millman & Halkias-MGH.

Reference Books :

1. Electronic Devices & Circuits : Millman & Halkias-MGH.
2. Text Book of Power Electronics : H.C. Rai-Galgotia Publications.
3. Electronics Devices & Circuits : Motershed-PHI.

Note : Five out of eight questions are to be attempted. four questions are to be set from each part and at least two questions should be attempted from each part.

EE-203-C **CIRCUIT THEORY**

L T P
3 1 0

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam: 3 Hrs.

Unit-I Transient Response :

Transient response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

Unit II-Network Functions :

Terminal pairs or ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behaviour from the pole zero plot.

Unit III - Characteristics and Parametres of two Port Networks :

Relationship of two-port variables, short circuits Admittance parameters, open circuit impedance parameters, Transmission parameters, hybrid parameters, relationships between parameters sets, Inter-connection of two port networks.

Unit IV - Topology :

Principles of network topology, graph matrices, network analysis using graph theory.

Unit V- Types of filters and their Characteristics :

Filter fundamentals, Band reject filter, band pass filter, high pass filter and low pass filter.

Unit VI - Network Synthesis :

Positive real functions, synthesis of one port and two port networks, elementary ideas of Active networks.

Text Books :

1. Network analysis & Synthesis : Umesh Sinha-Satya Prakas Pub.
2. Network Analysis & Synthesis F.F. Kuo-John Wiley & Sons Inc.

Reference Books:

1. Introduction to Modern Network Synthesis: Van Valken Burg John Wiley.
2. Basic Circuit Theory : Dasoer Kuh - Mc Graw Hill.
3. A Course in Electrical Circuit Analysis : Soni & Gupta- Dhanpat Rai Publication.
4. Circuit Analysis : G.K. Mithal-Khanna Publication.

Note : Five out of eight questions are to be attempted. At least one question should be set from each unit.

EE-207-C **ELECTROMECHANICAL ENERGY CONVERSION**

L	T	P
3	1	0

Class Work : 50 Marks
Theory : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Unit-I : Magnetic Circuits and Induction :

Magnetic Circuits, Magnetic materials and their properties, static and dynamic, emfs and force on current carrying conductor, AC operation of Magnetic Circuits, Hysteresis and Eddy current losses.

Unit-II Principles of Electromechanical Energy Conversion :

Force and torque in magnetic field system energy balance, energy and force in singly excited magnetic field system, concept of coenergy, force & torque in system with Permanent magnetic dynamic equation.

Unit-III Transformers :

Basic theory, construction and operation at no load and full load, equivalent circuit, phaser diagram O.C. and S.C. test for parameters determination, efficiency and regulation, autotransformer, introduction to three phase transformer, Current and Potential Transformers. Principle, concstruction, analysis and applications.

Unit-IV DC Machines :

Basic theory of DC generator, brief idea of construction, emf equation, load characteristics, basic theory of DC motor, concept of back emf, torque and power equations, load characteristics, starting and speed control of DC motors, applications.

Unit-V Induction Motor :

Basic theory construction, Phasor diagram, Equivalent circuit, torque equation, Load characteristics, starting and speed control of induction motor, Introduction to single induction phase motor, applications, Fractional H.P. Motors, Introduction to stepper, servo, reluctance and universal motors.

Unit-VI Synchronous Machines :

Construction and basic theory of synchronous generator, emf equation, model of generator, Phasor diagram, Regulation, Basic theory of synchronous motor, v-curves, synchronous condenser, applications.

Text Book : Electrical Machines : Nagarath and Kothari-TMH Pub.

Reference Books :

Electrical Machines : P.S. Bhimhara-Khanna Publication.
Electrical Machines : Mukherjee and Chakrovorti-Dhanpat Rai & Sons.

Note : 1. Five out of eight questions are to be attempted.
2. At least one question should be set from each unit.

ME-209-C **APPLIED MECHANICS**

L T P

3 I -

Class Work : 50 Marks
Theory : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Unit-I

Stress & Strain : Review of simple stresses, simple strains, Hook's Law & elastic constants, general biaxial stress systems, principal planes and principal stresses, principal strains, maximum shear stresses and shear strains in terms of principal stresses & principal strains respectively, Mohr's stress circle, Problems.

Unit-II

Bending & Shear Stresses in Beams : Review of centre of gravity of an area, moment of inertia of the sections, bending stress in beams with symmeterical sections and subjected to pure bending, shear stresses in beams of symmetric sections, shear centre, Problems.

Unit-III

Torsion of Circular Members : Torsion of tube, solid and hollow circular shafts, tapered shafts, stepped shaft & composite concentric shafts, combined bending & torsion, equivalent torque, effect of end thrust, Numericals.

Unit-IV

Bending Moment & Shear Force : Definitions, SF & BM diagrams for centilever & simply supported beam and calculation of max. SF, BM and point of centralflexure under the loads of (i) concentrated load (ii) uniformly distributed load (iii) uniform varying load (iv) combination of load concentrated & UDL loads Numericals.

Unit-V

Theories of failure : Concepts of various theories of elastic failure and governing equations with their graphical representation, applications, Numericals

Unit-VI

General Design Considerations : Introduction, scope & meaning of design, design process, concept of tearing, bearing shearing, crushing, bending etc. selection of materials, factor of safety, stress concentration factor, design stresses for variable & repeated loads, endurance limit, fatigue strength, fits & tolerances, Numericals.

Unit-VII

Cables & Columns : Derivations for cables subjected to concentrated loads and uniformly distributed load per unit horizontal distance separately and cable uniformly loaded per unit length along the cable itself, Derivation of Euler's formula for crippling load of coloumn under different and conditions, Use of Rankin's Formula, Ecentic Loading of short columns of circular & rectangular cross-sections, Numericals.

Unit-VIII

Fluid Flow Mechanics : Review of fluid properties, flow regimes, types of flow, stream lines, path lines, streak lines, continuity equation, rotation , circulation, velocity potential, steam function, flow net, general energy equation for steady flow of any fluid, Bernoulli's equation with its applications & limitations, flow measuring devices, Numericals.

Text Books

1. Fluid Mechanics : A.K. Mohanty-Prentice Hall of India, N.D.
2. Strength of Material : G.H. Ryder-ELBS.
3. Engg. Mechanics : A.K. Tayel-Umesh Publishing, N.Delhi.
4. Machine Design :P.C. Sharma & D.K. Agarwal-S.K. Kataria & Sons, New Delhi.

Reference Books

1. Fluid Mechanics : A.K. Jain-Khanna Publications, New Delhi
2. Hydraulics & Fluid Mechanics : Jagdish Lal-Metropolitan `Book Co. Pvt. Ltd. Delhi.

Note : In the semester examination, the examiner will set eight questions in all at least one question from each unit, and students will be required to attempt only five questions.

EE-209-C **CIRCUIT THEORY LAB**

L T P
- - 2

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

List of Experiments :

1. To study transient response of RL circuit.
2. To study transient response of RC circuit.
3. To find the resonance frequency, Band width and Q-factor of RLC series circuit.
4. To calculate and verify "z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To determine equivalent parameters of parallel connections of two port network.
7. To plot the frequency response of low pass filter and determine half-power frequency.
8. To plot the frequency response of high pass filter and determine half-power-frequency.
9. To plot the frequency response of band pass filter and determine the band-width.
10. To calculate and veryfy "ABCD" parameters of a two port network.
11. To synthesize a network of a given network function and verify its response.
12. Introduction to P-Spice

Note : 1. *At least ten experiments are to be performed in the semester.*

2. *At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.*

EE-211-C **ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES-LAB**

L	T	P
-	-	2

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

List of Experiments

1. To study V-I charateristics of diode, and determination of D.C. model parameters.
2. Use of reverse biased diode as a capacitance.
3. Study of the characteristics of transistor in Common Emitter configuration.
4. Study of the characteristics of transistor in Common Base configuration.
5. Study of I-V characteristics of a photovoltaic cell.
6. To determine the h-parameter of transistor in Common Emitter configuration.
7. Study of characteristics of MOSFET/JFET in CS configuration.
8. Study of characteristics of FET in CD configuration.
9. To determine the mobility of holes & electrons.
10. To plot B-H curve of a magnetic material.
11. To plot characteristic of thyristor.
12. To plot characterstics of UJT and diac.
13. Determination of loss tangent of a dielectric material by an ac bridge.
14. Study of photoresist in metal patterning for planar technology/PCB technology.

Note : *1. At least ten experiments have to be performed in the semester.*

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-213-C **ELECTRICAL WORKSHOP**

L	T	P
-	-	2

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam. : 3 Hrs.

List of Experiments :

1. Introduction of tools, electrical materials, symbols and abbreviations.
2. To make T and Straight joints.
3. To study stair case wiring.
4. To study house wiring i.e. batten, cleat, casing-capping and conduit wiring.
5. To Study fluorescent tube light.
6. To study high pressure mercury vapour lamp (H.P.M.V.)
7. To study Sodium lamp.
8. To study single phase induction motor using single phase energy meter and double pole main switch.
9. To study three phase induction motor using three phase energy meter, TPN main switch and DOL starter.
10. To study three phase inderction on motor using three phase energy meter, TPN main switch and star-delta starter.
11. To study repairing of home appliances such as heater, electric iron, fans etc.
12. To study construction of moving iron, moving coil, electrodynamics & induction type meters.
13. To design & fabricate single phase transformer.
14. To study fuses, relays, contactors, MCBs and circuit breakers.
15. Insulation testing of electrical equipment.

Note : 1. At least ten experiments have to be performed in the semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-215-C **ELECTROMECHANICAL ENERGY CONVERSION-LAB**

L	T	P
-	-	3

Class Work : 50 Marks
Exam. : 50 Marks
Total : 100 Marks
Duration of Exam.: 3 Hrs.

List of Experiments :

1. To find turns, ratio and polarity of a single phase transformer.
2. To perform open and short circuit tests on a single phase transformer.
3. To perform Sumpner's back to back test on single phase transformers.
4. Parallel operation of two phase transformers.
5. Study of construction of a DC machine.
6. To plot OCC of DC shunt genertor and find its critical resistance.
7. To perform direct load Test of a DC motor.
8. Speed control of a DC motor by armature control and field control methods.
9. To perform open circuit and block rotor tests of an induction motor.
10. Stardelta starting of a three phase induction motor.
11. Plot OCC of a synchronous generator.
12. To plot V-curve of a synchronous motor.

Note : At least seven experiments should be performed from above list.Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

IVth Semester

SCHEME OF EXAMINATION FOR COMPUTER SCIENCE & ENGINEERING
SEMESTER-IV (1999-2000)

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam.
HUM-202-C	PRINCIPLES AND PRACTICE OF MANAGEMENT (Common for all branches)	3	1	-	4	50	100	-	150	3
MATH-202-C	COMPUTATIONAL TECHNIQUES(CHE,CSE,EE, EL,IC)	3	1	-	4	50	100	-	150	3
EE-202-C	ANALOG ELECTRONICS (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-204-C	DIGITAL ELECTRONICS (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-208-C	COMMUNICATION ENGINEERING-I (CSE,EL)	3	1	-	4	50	100	-	150	3
ME-212-C	MECHANICAL TECHNOLOGY (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-210-C	ANALOG ELECTRONICS LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-212-C	DIGITAL ELECTRONICS LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-216-C	COMMUNICTION ENGINEERING-I LAB (CSE,EL)	-	-	2	2	25	-	25	50	3
ME-220-C	MECHANICAL TECHNOLOGY LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
GPCSE-202-C	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	3
	TOTAL	18	6	8	32	450	600	100	1150	

Note : Practical Training of 6 weeks duration during summer vacation, Evaluation in V sem.

HUM-202-C **PRINCIPLES & PRACTICE OF MANAGEMENT**

L T P		
3 1 -	Class Work	: 50 Marks
	Theory	: 100 Marks
	Total	: 150 Marks
	Durations of Exam.	: 3 Hrs.

Unit-I

Meaning of management, Definitions of Management, Characteristics of management, Management Vs Administration. Management-Art, Science and Profession Importance of Management.

Principles of Management.

The Management Functions, Inter-relationship of Managerial functions.

Unit-II

Scientific Management-Introduction, Meaning, Principles; Advantages, Criticism, Rationalisation-Introduction. Definitions, Characteristics objectives, stage, various elements or measures, Advantages, Criticism, Measures suggested to overcome the evil effects of rationalisation.

Unit-III

Nature and Significance of staffing, Personnel Management, Functions of personnel management, Manpower planning, Process of Manpower Planning, Recruitment, Selection; Promotion-Seniority Vs. Merit. Training-obectives and types of training.

Unit-IV

Business Finance-definiation and importance; Financial Management-meaning-objectives,Scope & functions. Sources of finance-Shares, Debentures, Public Deposits, Ploughing back of profits; Special financial institutions viz. IFCI, ICICI, NIDC,IDBI,IRCI,SFC etc.

Unit-V

Marketing Management-Definition of marketing, Marketing concept, objectives & Functions of marketing Marketing Research-Meaning; Definition; Objectives; Importance; Limitations; Process; sources of Marketing Research; Survey of Markets.

Unit-VI

Advertising-meaning of advertising, objectives, functions, criticism. Types of advertising media. Sales Management-meaning.

definitions, significance, types of salesman;Qualities of a Successful Salesman, Selection of Salesman;Training of Salesman.

Unit-VII

Labour Legislation in India-working hours, Safety provisions, Welfare measures,age of employment, employment of women, main provisions of Industrial disputes Act 1947; Main provision of minimum Wages Act 1948 & Workmen's Compensation Act 1923, Consumer Protection.

Text Books :

Principles and Practice of Management : R.S. Gupta, B.D.Sharma, N.S. Bhalla-Kalyani Publishers.

Reference Books :

1. Organisation and Management : R.D. Aggarwal-Tata Mc Graw Hill.
2. Business Organisation and Management : M.C. Shukla.

Note : Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all, however question number I will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be excepted to answer any 10 questions.

MATH-202-C **COMPUTATIONAL TECHNIQUES**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Part-A

Finite Differences and Interpolation :

Various difference opertors and relation between them, Newton's forward and backward interpolation formulae, centeral difference interpolation formula, Gauss forward and backward interpolation formulae Lagrenge's interpolation formula and Newton's divided difference formula.

Solution of Algebraic and Transcendental Equations :

Bisection method, method of false position, secant method, iteration method, Newton-Raphson method, Generalized Newton Raphson method.

Solution of Simultaneous Algebraic Equations :

Jacobi's method, Gauss-seidal method, relaxation method.

Numerical Differentiation and Integration :

Formulae for derivatives, Trapezoidal rule, Simpson's 1/3rd and 3/8th rules, Boole's and Weddle's rules, Romberg's integration.

Part-B

Numerical Solution of O.D.E. :

Taylor's series, Picard's method, Euler's method, modified Euler's method and Runge-Kutta second and fourth order methods. Predictor-corrector methods (Adams-Bashforth and Milne methods only).

Numerical Solution of P.D.E.

Finite difference approximations of partial derivatives, solution of Laplace equation (Standard 5-point formula only), One-dimensional heat equation (Schmidt method, Crank-Nicolson DuFort method and Frankel method) and wave equation.

Text Books:

1. Numerical Methods in Engg. & Science : B.S.Grewal-Khanna Publishers.
2. Numerical Methods for Scientific and Engg. Computations : M.K. Jain, S.R.K. Iyengar and R.K. Jain-Wiley Eastern Ltd.

Reference Books :

1. Computer Oriented Numerical methods : V.Rajaraman Prentice-Hall of India.
2. Introduction to Numerical Analysis : C.E. Froberg-Addison Wesley.

Note :i) Students will be asked to write the computer program of the problems discussed.

ii) Examiner will set eight questions in all; taking four from Part-A and four from Part-B. Students will be required to attempt five questions taking atleast two from each part.

EE-202-C ANALOG ELECTRONICS

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam. : 3 Hrs.

Unit-I Semiconductor Diode :

P-N junction, P-N junction as a rectifier, V-I characteristics of P-N junction diode, Switching times of Diode.

Unit-II Diode Circuts :

Diode as a circuit element, the load-line concept, half-wave and full wave rectifiers, clipping circuits, clamping circuits, filter circuits, peak to peak detector and voltage multiplier circuits.

Unit-III Transistor at Low Frequencies :

Bipolar junction transistor : operation. characteristics, Ebers-moll model of transistor, hybrid model, h-parameters (CE,CB,CC configurations), analysis of a transistor Amplifier circuit using h-parameters, emitter follower, Miller's Theorem, frequency response of R-C coupled amplifier.

Unit IV-Transistor Biasing :

Operating point, bias stability, collector to base bias, self bais, emitter bias, bias compensation, thermistor & sensistor compensation.

Unit-V Transistor at High Frequencies :

Hybrid II model, CE short circut current gain, frequency response, alpha, cutoff frequency, gain bandwidth product, emitter follower at high frequencies.

Unit VI Field Effect Transistors :

Junction field effect transistor, pinch off volt-ampere characteristics, small signal model, MOSFET : Enhancement & Depletion mode, V-MOSFET.

Unit-VII Fet Circuits :

Common source amplifier, source follower, biasing of FET, applications of FET as a voltage variable resistor (VVR) unjunction transistor (UJT).

Unit-VIII Regulated Power Supples :

Series and shunt voltage regulators, power supply characteristics, three terminal IC regulators.

Text Book :

Integrated Electronics : Miliman & Halkias-MeGrawHill.

Reference Books :

1. Electronics Principles : Malvino-McGraw Hill.
2. Electronics Circuits : Donald L. Schiling & Charles Beluo-MGH.
3. Electronics Devices & Circuits : Millman & Halkias-McGraw Hill.

Note : Five out of eight questions are to be attempted. At least one question should be set from each unit.

ME-212-C **MECHANICAL TECHNOLOGY**

L T P		
3 1 -	Class Work	: 50 Marks
	Exam.	: 100Marks
	Total	: 150 Marks
	Duration of Exam.	: 3 hours.

Unit-I : Basics of Power Generation: Thermodynamic systems, Thermodynamics properties, States, Processes, Laws of thermodynamics, Concept of entropy and its calculation for various processes, Carnot cycle, Carnot engine, Carnot refrigerator, Carnot heat pump, classification of power cycles-Rankine cycle, Rankine cycle with reheat and regeneration, Gas power cycles, Otto cycle, Diesel cycle, Dual cycle, Brayton cycle, Stirling cycle, Ericsson cycle, Vapour compression refrigeration cycle, Numerical.

Unit-II : Steam Generators: Function of boilers, low pressure Boilers, function of accessories and mountings, energy balance of a boilers, draft systems, properties of steam, use of steam tables and Mollier diagrams, Numericals.

Unit-III : Steam Tubines : Introductions to Nozzle & Condensors Implse & Reaction turbines, compounding of turbines, reheat factor & condtion line. Numericals.

Unit-IV : Hydraulic Turbines : Impulse momentum equation, relative & absolute velocities, diffusers-plane & curved single vanes, angular momentum, similarity laws for turbines, Pelton, Francis & Kaplan turbines-velocity diagrams, Maximum power and efficiencies, characteristic curves, speed regulation, draft tube, Numericals.

Unit-V : Cooling Fin : governing differential equation for steady flow of heat along a rod, heat dissipation from a fin under different initial and boundary conditions fin performance, Numericals.

Unit-VI : Simple lifting Machines : machines & definitions, Ideal machine, frictional losses, performance of simple machine, reversibilities of machine & self locking machines, differential wheel & axle, worm & worm wheel,simple and compound screw jacks, Single purchase winch crab. Numericals.

Unit-VII: Plane Trusses : Review of equalibrium conditions, free body diagrams, and introduction to shear force & bending moment diagrams, types of trusses, reactions at supports

of a truss, determination of axial forces in the members of truss by methods of joints & sections, Numericals.

Text Books :

1. Engg. Thermodymics : P.K. Nag-Tata Mc Graw Hill, New Delhi.
2. Thermal Engineering : A.S. Sarad-Satya Prakashan, New Delhi.
3. Engineering Mechanics : A.K. Tayal-Umesh Publications, New Delhi.

Reference Books :

1. Thermodynamics & Heat Power Engg. : M.L. Mathur, F.S. Mehta-Jain Brothers, New Delhi.
2. Steam & Gas Turbines : R.Yadav, Central Publishing House, Allahabad.
3. An Introduction to Energy Conversion, Vol. I : V. Kadambi & Prasad-Wiley Estern Ltd., New Delhi.
4. Thermal Engineering : R.K. Rajpoot-Laxmi Publication, New Delhi.

Note : 1.In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

2. Steam Tables and Mollier diagram will be supplied in the Examination.

EE-210-C **ANALOG ELECTRONICS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 hours.

List of Experiments :

1. Study of Half wave & full wave rectifiers.
2. Study of power supply filters.
3. Study of Diode as clipper & clamper.
4. Study of Zener diode as a voltage regulator.
5. Study of CE amplifier for voltage & current gains and input, output impedance.
6. Study of CC amplifier as a buffer.
7. Study of 3-terminal IC regulator.
8. Study of transistor as a constant current source in CE configuration.
9. Study of FET as a common source amplifier.
10. Study of FET as a common Drain amplifier.
11. Graphical determination of small signal hybrid parameters of bipolar junction transistor.
12. Study & design of a D.C. voltage doubbler.

Note : 1. At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-212-C **DIGITAL ELECTRONICS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of exam.	: 3 Hours.

List of Experiments :

1. Study of TTL gates-AND,OR NOT, NAND, NOR EX-OR.
2. Design & realize a given function using K-maps and verify its performance.
3. To verify the operation of multiplexer & Demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R,J-K,T & D type flip-flops.
6. To verify the operation of bi-directional shift register.
7. To design & verify the operation of 3 bit synchronous counter.
8. To verify the operation of UP/down decade counter & derive a seven segment display using the same.
9. To design & realize a sequence generator for a given sequence using J-K flip-flop.
10. Study of CMOS gate.
11. Study of switching charateristics of Diode and Transistors.
12. Study of Ring counter.
13. Study of Johnson Counter.

Note : 1. At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-216-C **COMMUNICATION ENGINEERING-I LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total marks	: 50 Marks
	Duration of Exam.	: 3 Hours.

List of Experiments :

1. Study and Analysis of waveforms of Amplitude Modulation.
2. To find Modulation index of Amplitude Modulation.
3. Study and Analysis of waveforms of Frequency Modulation.
4. To Find Modulation index of Frequency Modulation.
5. Study and Analysis of waveforms of Phase Modulation.
6. Study of Pulse Amplitude Modulation.
7. Study of Pulse Width Modulation.
8. Study of Pulse Frequency Modulation.
9. Study of Pluse Code Modulation.
10. Study of frequency Shift Keying.
11. Study of ASK.
12. Study of PSK
13. Study of QASK.

Note :1. At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned instititution as per the scope of the syllabus.

ME-220-C	**MECHANICAL TECH. LAB**	
L T P	Class Work	: 25 Marks
- - 2	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 Hours.

List of Experiments Based on ME-212-C

1. To study the low pressure boilers with their accessories & mountings.
2. To study the high pressure boilers with their accessories & mountings.
3. To prepare heat balance sheet for a given boiler.
4. To study Impulse & Reaction Steam Turbines.
5. To calculate the heat dissipation rate for a pin fin in steady state under nature/forced convection.
6. To study and calculate efficiency of the cooling tower.
7. To calculate efficiencies, mechanical advantages and velocity ratios of single and double purchase winch crabs.
8. To calculate the mechanical advantages, velocity ratios and efficiencies of worm and worm sheels of single, double & triple start.
9. To study the working of two stroke and four stroke SI engines.
10. To study the working of four stroke C.I. engine.
11. To study simple and compound screw jacks and a crane and find their mechanical advantages and velocity ratios.
12. To find percentage of error between the observed and calculated values of stresses in the members of JIB crane.
13. To draw SF & BM diagrams for a simply supported beam under point loads.

Note : Any TEN experiments from the above list are required to be performed by the students in the lab.

PRACTICAL TRAINING-I

At the end of fourth Semester each student would undergo six weeks Practical Training in an Industry/Professional Organisation/ Research laboratory with the prior approval of the Director-Principal/ Principal of the concerned college and submit a written typed report alongwith a certificate from the organization. The report will be evaluated by a Board of Examiners to be appointed by the Director-Principal/Principal of the concerned College who will award one of the following grades :

Excellent	:	A
Good	:	B
Satisfactory	:	C
Not Satisfactory	:	F

A student who has been awarded 'F' grade will be required to repeat the practical training. The examination of practical training will be held alongwith the examination of the fifth semester.

SCHEME OF EXAMINATION FOR ELECTRICAL ENGINEERING
SEMESTER-IV (1999-2000)

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam.
HUM-202-C	PRINCIPLES AND PRACTICE OF MANAGEMENT (Common for all branches)	3	1	-	4	50	100	-	150	3
MATH-202-C	COMPUTATIONAL TECHNIQUES (CHE, CSE, EE, EL, IC)	3	1	-	4	50	100	-	150	3
EE-202-C	ANALOG ELECTRONICS (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-204-C	DIGITAL ELECTRONICS (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-206-C	ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS (EE,IC)	3	1	-	4	50	100	-	150	3
ME-212-C	MECHANICAL TECHNOLOGY(CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-210-C	ANALOG ELECTRONICS LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-212-C	DIGITAL ELECTRONICS LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-214-C	ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS LAB (EE,IC)	-	-	2	2	25	-	25	50	3
ME-220-C	MECHANICAL TECHNOLOGY LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
GPEE-204-C	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	3
	TOTAL	18	6	8	32	450	600	100	1150	

Note : Practical Training of 6 weeks duration during summer vacation, Evaluation in V Sem.

HUM-202-C **PRINCIPLES & PRACTICE OF MANAGEMENT**

L T P		
3 1 -	Class Work	: 50 Marks
	Theory	: 100 Marks
	Total	: 150 Marks
	Duration of Exam.	: 3 Hrs.

Unit-I

Meaning of management, Definitions of Management, Characteristics of management, Management Vs Administration. Management-Art, Science and Profession, Importance of Management.

Principles of Management.

The Management Functions, Inter-relationship of Managerial functions.

Unit-II

Scientific Management-Introduction, Meaning, Principles, Advantages, Criticism, Rationalisation-Introduction, Definitions, Characteristics objectives, stage, various elements or measures, Advantages, Criticism, Measures suggested to overcome the evil effects of rationalisation.

Unit-III

Nature and Significance of staffing, Personnel Management, Functions of personnel management, Manpower planning, Process of Manpower Planning, Recruitment, Selection; Promotion-Seniority Vs. Merit. Training-obectives and types of training.

Unit-IV

Business Finance-definiation and importance; Financial Management-meaning-objectives, Scope & functions. Sources of finance-Shares, Debentures, Public Deposits, Ploughing back of profits; Special financial institutions viz. IFCI, ICICI, NIDC,IDBI,IRCI,SFC etc.

Unit-V

Marketing Management-Definition of marketing, Marketing concept, objectives & Functions of marketing, Marketing Research-Meaning; Definition; Objectives; Importance; Limitations; Process; Sources of Marketing Research; Survey of Markets.

Unit-VI

Advertising-meaning of advertising, objectives, functions, criticism. Types of advertising media, Sales Management-meaning,

definitions, significance, types of salesman;Qualities of a Successful Salesman, Selection of Salesman;Training of Salesman.

Unit-VII

Labour Legislation in India-working hours, Safety provisions, Welfare measures, age of employment, employment of women, main provisions of Industrial Disputes Act 1947; Main provisions of Minimum Wages Act 1948 & Workmen's Compensation Act 1923, Consumer Protection.

Text Book :

Principles and Practice of Management : R.S. Gupta, B.D.Sharma, N.S. Bhalla-Kalyani Publishers.

Reference Books :

1. Organisation and Management : R.D. Aggarwal-Tata Mc Graw Hill.
2. Business Organisation and Management : M.C. Shukla.

Note : Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all, however question number I will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be expcepted to answer any 10 questions.

MATH-202-C **COMPUTATIONAL TECHNIQUES**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Part-A

Finite Differences and Interpolation :

Various difference opertors and relation between them, Newton's forward and backward interpolation formulae, centeral difference interpolation formula, Gauss forward and backward interpolation formulae Lagrenge's interpolation formula and Newton's divided difference formula.

Solution of Algebraic and Transcendental Equations :

Bisection method, method of false position, secant method, iteration method, Newton-Raphson method, Generalized Newton-Raphson method.

Solution of Simultaneous Algebraic Equations :

Jacobi's method, Gauss-seidal method, relaxation method.

Numerical Differentiation and Integration :

Formulae for derivatives, Trapezoidal rule, Simpson's 1/3rd and 3/8th rules, Boole's and Weddle's rules, Romberg's integration.

Part-B

Numerical Solution of O.D.E. :

Taylor's series, Picard's method, Euler's method, modified Euler's method and Runge-Kutta second and fourth order methods. Predictor-corrector methods (Adams-Bashforth and Milne methods only).

Numerical Solution of P.D.E.

Finite difference approximations of partial derivatives, solution of Laplace equation (Standard 5-point formula only), One-dimensional heat equation (Schmidt method, Crank-Nicolson DuFort method and Frankel method) and wave equation.

Text Books:

1. Numerical Methods in Engg. & Science : B.S.Grewal-Khanna Publishers.
2. Numerical Methods for Scientific and Engg. Computations : M.K. Jain, S.R.K. Iyengar and R.K. Jain-Wiley Eastern Ltd.

Reference Books :

1. Computer Oriented Numerical Methods : V.Rajaramanm Prentice-Hall of India.
2. Introduction to Numerical Analysis : C.E. Froberg-Addison Wesley.

Note :i) Students will be asked to write the computer program of the problems discussed.

ii) Examiner will set eight questions in all; taking four from Part-A and four from Part-B. Students will be required to attempt five questions taking atleast two from each part.

EE-202-C **ANALOG ELECTRONICS**

L T P		
3 1 -	Class Work	: 50 Marks
	Exam.	: 100 Marks
	Total	: 150 Marks
	Duration of Exam.	: 3 Hrs.

Unit-I Semiconductor Diode :

P-N junction, P-N junction as a rectifier, V-I characteristics of P-N junction diode, Switching times of Diode.

Unit-II Diode Circuits :

Diode as a circuit element, the load-line concept, half-wave and full wave rectifiers, clipping circuits, clamping circuits, filter circuits, peak to peak detector and voltage multiplier circuits.

Unit-III Transistor at Low Frequencies :

Bipolar junction transistor : operation. characteristics, Ebers-moll model of transistor, hybrid model, h-parameters (CE,CB,CC configurations), analysis of a transistor Amplifier circuit using h-parameters, emitter follower, Miller's Theorem, frequency response of R-C coupled amplifier.

Unit IV-Transistor Biasing :

Operating point, bias stability, collector to base bias, self bias, emitter bias, bias compensation, thermistor & sensistor compensation.

Unit-V Transistor at High Frequencies :

Hybrid II model, CE short circut current gain, frequency response, alpha, cutoff frequency, gain bandwidth product, emitter follower at high frequencies.

Unit VI Field Effect Transistors :

Junction field effect transistor, pinch off volt-ampere characteristics, small signal model, MOSFET : Enhancement & Depletion mode, V-MOSFET.

Unit-VII FET Circuits :

Common source amplifier, source follower, biasing of FET, applications of FET as a voltage variable resistor (VVR) unijunction transistor (UJT).

Unit-VIII Regulated Power Supplies :

Series and shunt voltage regulators, power supply characteristics, three terminal IC regulators.

Text Book :

Integrated Electronics : Millman & Halkias-McGraw Hill.

Reference Books :

1. Electronics Principles : Malvino-Mc Graw Hill.
2. Electronics Circuits : Donald L. Schiling & Charles Beluo-MGH.
3. Electronics Devices & Circuits : Millman & Halkias-McGraw Hill.

Note : Five out of eight questions are to be attempted. At least one question should be set from each unit.

EE-204-C **DIGITAL ELECTRONICS**

L T P		
3 1	Class Work	: 50 Marks
	Exam.	: 100 Marks
	Total	: 150 Marks
	Duration of Exam.	: 3 Hrs.

Unit-I Basic Digital Circuits :

Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

Unit-II Number System and Codes :

Boolean Algebra, Binary, Octal and Hexadecimal number systems. Conversion from one number system to another. Signed binary number, sign magnitude, I's complement and 2's complement Binary arithmetic codes; BCD, Excess-3 Gray, EBDIC, ASCII, Error detection and correction.

Unit-III Combinational Circuits :

Design using gates, Karnaugh map simplification. Multiplexers, Demultiplexeres/decoders, Adders, Subtractors, BCD arithmetic, Digital encoders, Priority Encoders, Decoders/Drivers for display devices, Realization of logic functions using multiplexers and demultiplexers.

Unit-IV Sequential Circuits :

Flip-flops (S-R, J-K, T and D Type), master slave, edge triggered flip flops, shifi registers, sequence generators, Counters, Asynchronous and Synchronous Ring counters and Johnson Counter.

Unit-V Digital Logic Families :

Switching mode operation of p-n junction, bipolar and MOS devices, Bipolar logic families : RTL, DTL., DCTL, HTL, TT' ECL, MOS, AND C-MOS logic families. Tristate logic, interfacing of CMOS and TTL families.

Unit-VI Programmable Logic Devices :

ROM,PLA,PAL,FPGA

Text Book : Digital Electronic (Edition-II) Dr. R.P. Jain-TMH.

Reference Books :

1. Digital Integrated Electronics : Taub & Schilling-MGH.
2. Digital Electronics : Malvino-Mc Graw Hill.

Note : Five out of eight questions are to be attempted. At least one question should be set from each unit.

EE-206-C

ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS

Class Work	: 50 Marks
Exam.	:100 Marks
Total	: 150 Mars
Duration of Exam.	: 3 Hrs.

Unit-I Units Standards and Errors :

S.I. units, Absolute standards (International, Primary, Secondary and Working Standards), True, Value, Errors (Gross, Systematic and Random); Static Characteristic of Instruments (Accuracy, Precision, Sensitivity, Resolution and threshold).

Unit-II Measuring System Fundamentals :

Classification of Instruments (Based upon mode of measurement-Absolute and Secondary Instruments, Based upon Principle of Operation, Based upon function-Indicating, Recording and Integrating Instruments), Generalized Instrument (Block diagram and description of various blocks), The three forces in an Electromechanical indicating instrument (Deflecting, controlling and damping forces and the interplay between them), Comparison between gravity and spring controls; comparison of methods of damping and their suitability for bearing supports, Pivot-less supports (Simple suspension and taut band suspension, scale information, Instrument cases (Covers).

Unit-III Measuring Instruments :

Construction, Operating principle, Torque equation, Shape of scale, use as Ammeter or as Voltmeter (Extension of Range), Use on AC/DC or both, Advantages and disadvantages, Errors (Both on AC/DC) of PMMC types, Electrodynamic Type, Moving iron type (attraction, repulsion and combined attraction-repulsion types). Hot wire type, Induction Type, Electrostatic type Instruments.

Unit-IV Wattmeters & Energy Meters :

Construction, Opertaing principle, Torque equation, Shape of scale, Errors, Advantages & Disadantages of Electrodynamic and Induction type Wattmeter, and single phase induction type Energy meter, Compensation and creep in energy meter.

Unit-V Power Factor & Fnquency Meters :

Construction, Operation, Principle, Torque equation, Advantages & disadvantages of Single phase power factor meters (Electrodynamic and Moving Iron types) and Frequency meters (Electrical Resonance Type, Ferrodynamics and Electrodynamics types).

Unit-VI Low and High Resistance Measurements

Limitations of wheatstone bridge, Kelvin's double bridge method, Difficulties in high resistance measurements, Measurement of high resistance by direct deflection, loss of charge method, Megohm bridge and Meggar.

Unit-VII A.C. Bridges :

General balance Equation. Circuit diagram, Phasor diagram, Advantages, Disadvantages and Applications of Maxwell's inductance, Maxwell's Inductance-Capacitance bridge, Hay's Anderson, Owen's Desauty's Schering and Wetas bridges, Shielding and earthing.

Text Book :

A Course in Electrical and Electronic Measurement & Instrumentation : A.K. Sawhney-Dhanpat Rai & Sons, Delhi.

Reference Books :

1. Electrical Measurements : E.W. Golding-A.H.Wheeler & Co. Ltd., Allahabad.
2. Electronic & Electrical Measurement & Instrumentation : J.B. Gupta-Kataria & Sons.
3. Electronic Instrumentation & Measurement Technique : W.D.Cooper & A.D. Helfrick-PHI.
4. Measuring Systems : E.O. Doeblin-McGraw Hill, N.York.

Note : 1. Five out of eight questions are to be attempted.
2. At least one question should be set from each unit.

ME-212-C **MECHANICAL TECHNOLOGY**

L T P		
3 1 -	Class Work	: 50 Marks
	Exam.	: 100Marks
	Total	: 150 Marks
	Duration of Exam.	: 3 Hours.

Unit-I : Basics of Power Generation: Thermodynamic systems, Thermodynamic properties, States, Processes, Laws of thermodynamics, Concept of entropy and its calculation for various processes, Carnot cycle, Carnot engine, Carnot refrigerator, Carnot heat pump, classification of power cycles-Rankine cycle, Rankine cycle with reheat and regeneration, Gas power cycles, Otto cycle, Diesel cycle, Dual cycle, Brayton cycle, Stirling cycle, Ericsson cycle, Vapour compression refrigeration cycle, Numerical.

Unit-II : Steam Generators: Function of boilers, low pressure Boilers, function of accessories and mountings, energy balance of a boilers, draft systems, properties of steam, use of steam tables and Mollier diagrams, Numericals.

Unit-III : Steam Tubines : Introductions to Nozzle & Condensors Implse & Reaction turbines, compounding of turbines, reheat factor & condtion line. Numericals.

Unit-IV : Hydraulic Turbines : Impulse momentum equation, relative & absolute velocities, diffusers-plane & curved single vanes, angular momentum, similarity laws for turbines, Pelton Francis & Kaplan turbines-velocity diagrams, Maximum power and efficiencies, characteristic curves, speed regulation, draft tube, Numericals.

Unit-V : Cooling Fin : governing differential equation for steady flow of heat along a rod, heat dissipation from a fin under different initial and boundary conditions fin performance, Numericals.

Unit-VI : Simple lifting Machines : machines & definitions, Ideal machine, frictional losses, performance of simple machine, reversibilities of machine & self locking machines, differential wheel & axle, worm & worm wheel,simple and compound screw jacks, Single purchase winch crab, Numericals.

Unit-VII: Plane Trusses : Review of equalibrium conditions, free body diagrams, and introduction to shear force & bending moment diagrams, types of trusses, reactions at supports

of a truss, determination of axial forces in the members of truss by methods of joints & sections, Numericals.

Text Books :

1. Engg. Thermodymics : P.K. Nag-Tata Mc Graw Hill, New Delhi.
2. Thermal Engineering : A.S. Sarad-Satya Prakashan, New Delhi.
3. Engineering Mechanics : A.K. Tayal-Umesh Publications, New Delhi.

Reference Books :

1. Thermodynamics & Heat Power Engg. : M.L. Mathur, F.S. Mehta-Jain Brothers, New Delhi.
2. Steam & Gas Turbines : R.Yadav, Central Publishing House, Allahabad.
3. An Introduction to Energy Conversion, Vol. I : V. Kadambi & Prasad-Wiley Estern Ltd., New Delhi.
4. Thermal Engineering : R.K. Rajpoot-Laxmi Publication, New Delhi.

Note : 1. In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

2. Steam Tables and Mollier diagram will be supplied in the Examination.

EE-210-C **ANALOG ELECTRONICS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 hours.

List of Experiments :

1. Study of Half wave & full wave rectifiers.
2. Study of Power supply filters.
3. Study of Diode as clipper & clamper.
4. Study of Zener diode as a voltage regulator.
5. Study of CE amplifier for voltage & current gains and input-output impedance.
6. Study of CC amplifier as a buffer.
7. Study of 3-terminal IC regulator.
8. Study of transistor as a constant current source in CE configuration.
9. Study of FET as a common source amplifier.
10. Study of FET as a common Drain amplifier.
11. Graphical determination of small signal hybrid parameters of bi-polar junction transistor.
12. Study & design of a D.C. voltage doubbler.

Note : 1. At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-212-C **DIGITAL ELECTRONICS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 Hours.

List of Experiments :

1. Study of TTL gates-AND,OR NOT, NAND, NOR EX-OR.
2. Design & realize a given function using K-maps and verify its performance.
3. To verify the operation of multiplexer & Demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R,J-K,T & D type flip-flops.
6. To verify the operation of bi-directional shift register.
7. To design & verify the operation of 3 bit synchronous counter.
8. To verify the operation of UP/down decade counter & derive a seven segment display using the same.
9. To design & realize a sequence generator for a given sequence using J-K flip-flop.
10. Study of CMOS gate.
11. Study of switching charateristics of Diode and Transistors.
12. Study of Ring Counter.
13. Study of Johnson Counter.

Note : 1. At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus

EE-214-C **ELECTRICAL MEASURMENT AND MEASURING INSTRUMENTS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 Hours.

List of Experiments :

1. To identify the meters from the given lot.
2. To convert and calibrate a D' Arsonnal type galvanometer into a voltmeter and an ammeter.
3. To calibrate an energy with the help of a standard wattmeter and a stop watch.
4. To measure power and p.f. by three ammeter method.
5. To measure power and p.f. by three voltmeter method.
6. *To measure power and p.f. in three phase circuit by two* wattmeter method.
7. To measure capacitance by De Sauty's bridge.
8. To measure inductance by Maxwell's bridge.
9. To measure frequency by Wien's bridge.
10. To measure the power with the help of C.T. and P.T.
11. To measure magnitude and phase angle of a voltage by rectangular type potentiometer.
12. To measure magnitude and phase angle of a voltage by polar type potentiometer.
13. To measure low resistance by Kelvin's double bridge.
14. To measure high resistance by loss of charge method.

Note : 1. At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

ME-220-C	**MECHANICAL TECH. LAB**	
L T P	Class Work	: 25 Marks
- - 2	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam	: 3 hours

List of Experiments Based on ME-212 C

1. To study the low pressure boilers with their accessories & mountings.
2. To study the high pressure boilers with their accessories & mountings.
3. To prepare heat balance sheet for a given boiler.
4. To study Impulse & Reaction Steam Turbines.
5. To calculate the heat dissipation rate for a pin fin in steady state under natural/forced convection.
6. To study and calculate efficiency of the cooling tower.
7. To calculate efficiencies, mechanical advantages and velocity ratios of single and double purchase winch crabs.
8. To calculate the mechanical advantages, velocity ratios and efficiencies of worm and worm wheels of wingle, double & triple start.
9. To study the working of two stroke and four stroke SI engines.
10. To study the working of four stroke C.I. engine.
11. To study simple and compound screw jacks and a crane and find their mechanical advantages and velocity ratios.
12. To find percentage of error between the observed and calculated values of stresses in the members of JIB crane.
13. To draw SF & BM diagrams for a simply supported beam under point loads.

Note : Any TEN experiments from the above list are required to be performed by the students in the lab.

PRACTICAL TRAINING-I

At the end of fourth Semester each student would undergo six weeks Practical Training in an industry/Professional Organisation/ Research laboratory with the prior approval of the Director-Principal/ Principal of the concerned college and submit a written typed report alongwith a certificate from the organization. The report will be evaluated by a Board of Examiners to be appointed by the Director-Principal/Principal of the concerned College who will award one of the following grades :

Excellent	:	A
Good	:	B
Satisfactory	:	C
Not Satisfactory	:	F

A student who has been awarded 'F' grade will be required to repeat the practical training. The examination of practical training will be held alongwith the examination of the fifth semester.

SCHEME OF EXAMINATION FOR ELECTRONICS & COMMUNICATION ENGINEERING
SEMESTER-IV (1999-2000)

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam.
HUM-202-C	PRINCIPLES AND PRACTICE OF MANAGEMENT (Common for all branches)	3	1	-	4	50	100	--	150	3
MATH-202-C	COMPUTATIONAL TECHNIQUES (CHE, CSE, EE, EL, IC)	3	1	-	4	50	100	-	150	3
EE-202-C	ANALOG ELECTRONICS (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-204-C	DIGITAL ELECTRONICS (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-208-C	COMMUNICATION ENGINEERING-I(CSE,EL)	3	1	-	4	50	100	-	150	3
ME-212-C	MECHANICAL TECHNOLOGY (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-210-C	ANALOG ELECTRONICS LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-212-C	DIGITAL ELECTRONICS LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-216-C	COMMUNICATION ENGINEERING-I LAB (CSE,EL)	-	-	2	2	25	-	25	50	3
ME-220-C	MECHANICAL TECHNOLOGY LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
GPEE-202-C	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	3
	TOTAL	18	6	8	32	450	600	100	1150	

Note : Practical Training of 6 weeks duration during Summer vacation, Evaluation in Vth Semester.

HUM-202-C **PRINCIPLES & PRACTICE OF MANAGEMENT**

L T P		
3 1 -	Class Work	: 50 Marks
	Theory	: 100 Marks
	Total	: 150 Marks
	Durations of Exam.	: 3 Hrs.

Unit-I

Meaning of Management, Definitions of Management, Characteristics of Management, Management Vs Administration. Management-Art, Science and Profession Importance of Management.

Principles of Management.

The Management Functions, Inter-relationship of Managerial functions.

Unit-II

Scientific Management-Introduction, Meaning, Principles, Advantages, Criticism, Rationalisation-Introduction. Definitions, Characteristics objectives, stages, various elements or measures, Advantages, Criticism, Measures suggested to overcome the evil effects of rationalisation.

Unit-III

Nature and Significance of staffing, Personnel Management, Functions of Personnel Management, Manpower Planning, Process of Manpower Planning, Recruitment, Selection; Promotion-Seniority Vs. Merit. Training-obectives and types of training.

Unit-IV

Business Finance-definiation and importance; Financial Management-meaning-objectives, scope & functions. Sources of finance-Shares, Debentures, Public Deposits, Ploughing back of profits; Special financial Institutions viz. IFCI, ICICI, NIDC,IDBI,IRCI,SFC etc.

Unit-V

Marketing Management-Definition of marketing, Marketing concept, objectives & Functions of Marketing. Marketing Research-Meaning; Definition; Objectives; Importance; Limitations; Process; sources of Marketing Research; Survey of Markets.

Unit-VI

Advertising-meaning of advertising, objectives, functions, criticism. Types of Advertising media. Sales Management-meaning,

definitions, significance, types of salesman;Qualities of a Successful Salesman, Selection of Salesman;Training of Salesman.

Unit-VII

Labour Legislation in India-working hours, Safety provisions, Welfare measures,age of employment, employment of women, main provisions of Industrial disputes Act 1947; Main provision of minimum wages Act 1948 & workmen's compensation Act 1923, Consumer Protection.

Text Books :

Principles and Practice of Management : R.S. Gupta, B.D.Sharma, N.S. Bhalla-Kalyani Publishers.

Reference Books :

1. Organisation and Management : R.D. Aggarwal-Tata Mc Graw Hill.
2. Business Organisation and Management : M.C. Shukla.

Note : Eight questions are to be set, atleast one question from each unit and the students will have to attempt five questions in all, however question number I will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be expcepted to answer any 10 questions.

MATH-202-C **COMPUTATIONAL TECHNIQUES**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Part-A

Finite Differences and Interpolation :

Various difference operators and relation between them, Newton's forward and backward interpolation formulae, centeral difference interpolation formula, Gauss forward and backward interpolation formulae Lagrenge's interpolation formula and Newton's divided difference formula.

Solution of Algebraic and Transcendental Equations :

Bisection method, method of false position, Secant method, Iteration method, Newton-Raphson method, Generalized Newton Raphson method.

Solution of Simultaneous Algebraic Equations :

Jacobi's method, Gauss-seidal method, relaxation method.

Numerical Differentiation and Integration :

Formulae for derivatives, Trapezoidal rule, Simpson's 1/3rd and 3/8th rules, Boole's and Weddle's rules, Romberg's integration.

Part-B

Numerical Solution of O.D.E. :

Taylor's series, Picard's method, Euler's method, modified Euler's method and Runge-Kutta second and fourth order methods. Predictor-corrector methods (Adams-Bashforth and Milne methods only).

Numerical Solution of P.D.E.

Finite difference approximations of partial derivatives, solution of Laplace equation (Standard 5-point formula only), One-dimensional heat equation (Schmidt method, Crank-Nicolson DuFort method and Frankel method) and wave equation.

Text Books:

1. Numerical Methods in Engg. & Science : B.S.Grewal-Khanna Publishers.
2. Numerical Methods for Scientific and Engg. Computations : M.K. Jain, S.R.K. Iyengar and R.K. Jain-Wiley Eastern Ltd.

Reference Books :

1. Computer Oriented Numerical methods : V.Rajaramanm Prentice-Hall of India.
2. Introduction to Numerical Analysis : C.E. Froberg-Addison Wesley.

Note :i) Students will be asked to write the computer program of the problems discussed.

ii) Examiner will set eight questions in all; taking four from Part-A and four from Part-B. Students will be required to attempt five questions taking atleast two from each part.

EE-202-C **ANALOG ELECTRONICS**

L T P		
3 1 -	Class Work	: 50 Marks
	Exam.	: 100 Marks
	Total	: 150 Marks
	Duration of Exam.	: 3 Hrs.

Unit-I Semiconductor Diode :

P-N junction, P-N junction as a rectifier, V-I characteristics of P-N junction diode, Switching times of Diode.

Unit-II Diode Circuits :

Diode as a circuit element, the load-line concept, half-wave and full wave rectifiers, clipping circuits, clamping circuits, filter circuits, peak to peak detector and voltage multiplier circuits.

Unit-III Transistor at Low Frequencies :

Bipolar junction transistor : operation, characteristics, Ebers-moll model of transistor, hybrid model, h-parameters (CE,CB,CC configurations), analysis of a transistor Amplifier circuit using h-parameters, emitter follower, Miller's Theorem, frequency response of R-C coupled amplifier.

Unit IV-Transistor Biasing :

Operating point, bias stability, collector to base bias, self bias, emitter bias, bias compensation, thermistor & sensistor compensation.

Unit-V Transistor at High Frequencies :

Hybrid II model, CE short circut current gain, frequency response, alpha, cutoff frequency, gain bandwidth product, emitter follower at high frequencies.

Unit VI Field Effect Transistors :

Junction field effect transistor, pinch off volt-ampere characteristics, small signal model, MOSFET : Enhancement & Depletion mode, V-MOSFET.

Unit-VII FET Circuits :

Common source amplifier, source follower, biasing of FET, applications of FET as a voltage variable resistor (VVR) uni-Junction transistor (UJT).

Unit-VIII Regulated Power Supplies :

Series and shunt voltage regulators, power supply characteristics, three terminal IC regulators.

Text Book :

Integrated Electronics : Millman & Halkias-McGraw Hill.

Reference Books :

1. Electronics Principles : Malvino-McGraw Hill.
2. Electronics Circuits : Donald L. Schiling & Charles Beluo-MGH.
3. Electronics Devices & Circuits : Millman & Halkias-McGraw Hill.

Note : Five out of eight questions are to be attempted. At least one question should be set from each unit.

EE-204-C **DIGITAL ELECTRONICS**

L T P		
3 1 -	Class Work	: 50 Marks
	Exam.	: 100 Marks
	Total	: 150 Marks
	Duration of Exam.	: 3 hrs.

Unit-I Basic Digital Circuits :

Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

Unit-II Number System and Codes :

Boolean Algebra, Binary, Octal and Hexadecimal number systems. Conversion from one number system to another. Signed binary number, sign magnitude, I's complement and 2's complement Binary arithmetic codes; BCD, Excess-3 Gray, EBDIC, ASCII, Error detection and correction.

Unit-III Combinational Circuits :

Design using gates, Karnaugh map simplification. Multiplexers, Demultiplexers/decoders, Adders, Subtractors, BCD arithmetic, Digital encoders, Priority Encoders, Decoders/Drivers for display devices, Realization of logic functions using multiplexers and demultiplexers.

Unit-IV Sequential Circuits :

Flip-flops (S-R, J-K, T and D Type), master slave, edge triggered flip flops, shift registers, sequence generators, Counters, Asynchronous and Synchronous Ring counters and Johnson Counter.

Unit-V Digital Logic Families :

Switching mode operation of p-n junction, bipolar and MOS devices, Bipolar logic families : RTL, DTL, DCTL, HTL, TT, ECL, MOS, and C-MOS logic families. Tristate logic, interfacing of C-MOS and TTL families.

Unit-VI Programmable Logic Devices :

ROM,PLA,PAL,FPGA

Text Book : Digital Electronic (Edition-II) Dr. R.P. Jain-TMH.

Reference Books :

1. Digital Integrated Electronics : Taub & Schilling-MGH.
2. Digital Electronics : Malvino-Mc Graw Hill.

Note : Five out of eight questions are to be attempted. At least one question should be set from each unit.

EE-208-C **COMMUNICATION ENGINEERING-I**

L T P		
3 1 -	Class Work	: 50 Marks
	Exam.	:100 Marks
	Total	: 150 Mars
	Duration of Exam.	: 3 hrs.

Unit-1 : Introduction to Communication

Classification of Signals, Fourier Analysis of a signal, Model of a communication system.

Unit-2 : Amplitude Modulation

Amplitude modulation, Generation of AM waves, Demodulation of AM waves, Double side band suppressed carrier, Generation of DSBSC waves, Coherent detection of DSBSC waves, single side band modulation, generation of SSB waves, demodulation of SSB waves, vestigial side band modulation(VSB).

Unit-3 : Angle Modulation

Basic definitions : Phase modulation (PM) & frequency modulation(FM), narrow band frequency modulation, wide band frequency modulation, generation of FM waves, Demodulation of FM waves.

Unit-4 : Pulse Analog Modulation

Sampling theory, time division multiplexing, pulse amplitude modulation (PAM), pulse time modulation.

Unit-5 : Pulse Digital Modulation

Elements of pulse code modulation, noise in PCM systems, Measure of information, channel capacity, channel capacity of a PCM system, differential pulse code modulation (DPCM) Delta modulation (DM).

Unit-6 : Introduction to noise :

External noise, Internal noise.

Text Book :

Electronics Communication systems 3/e; Kennedy-T.M.H.

Reference Books :

1. Introduction to Modern Comm: Theory-P.D.Sharma.
2. Principles of Communication system 2/e: Taub & Schilling-TMH.
3. Communication Systems : Bruce Carlson-TMH.

Note : 1. Five out of eight questions are to be attempted.

2. At least one question should be set from each unit.

ME-212-C **MECHANICAL TECHNOLOGY**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Exam.	: 100Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 hours.

Unit-I : Basics of Power Generation: Thermodynamic systems, Thermodynamic properties, States, Processes, Laws of thermodynamics, Concept of entropy and its calculation for various processes, Carnot cycle, Carnot engine, Carnot refrigerator, Carnot heat pump, classification of power cycles-Rankine cycle, Rankine cycle with reheat and regeneration, Gas power cycles, Otto cycle, Diesel cycle, Dual cycle, Brayton cycle, Stirling cycle, Ericsson cycle, Vapour compression refrigeration cycle, Numerical.

Unit-II : Steam Generators: Function of boilers, low pressure Boilers, function of accessories and mountings, energy balance of a boilers, draft systems, properties of steam, use of steam tables and Mollier diagrams, Numericals.

Unit-III : Steam Turbines : Introductions to Nozzle & Condensors Impulse & Reaction turbines, compounding of turbines, reheat factor & condition line. Numericals.

Unit-IV : Hydraulic Turbines : Impulse momentum equation, relative & absolute velocities, diffusers-plane & curved single vanes, angular momentum, similarity laws for turbines, Pelton, Francis & Kaplan turbines-velocity diagrams, Maximum power and efficiencies, characteristic curves, speed regulation, draft tube, Numericals.

Unit-V : Cooling Fin : governing differential equation for steady flow of heat along a rod, heat dissipation from a fin under different initial and boundary conditions fin performance, Numericals.

Unit-VI : Simple lifting Machines :Simple machines & definitions, Ideal machine, frictional losses, performance of simple machine, reversibilities of machine & self locking machines, differential wheel & axle, worm & worm wheel,simple and compound screw jacks. Single purchase winch crab, Numericals.

Unit-VII: Plane Trusses : Review of equilibrium conditions, free body diagrams, and introduction to shear force & bending mo-

ment diagrams, types of trusses, reactions at supports of a truss, determination of axial forces in the members of truss by methods of joints & sections, Numericals.

Text Books :

1. Engg. Thermodynamics : P.K. Nag-Tata Mc Graw Hill, New Delhi.
2. Thermal Engineering : A.S. Sarad-Satya Prakashan, New Delhi.
3. Engineering Mechanics : A.K. Tayal-Umesh Publications, New Delhi.

Reference Books :

1. Thermodynamics & Heat Power Engg. : M.L. Mathur, F.S. Mehta-Jain Brothers, New Delhi.
2. Steam & Gas Turbines : R.Yadav, Central Publishing House, Allahabad.
3. An Introduction to Energy Conversion, Vol. I : V. Kadambi & Prasad-Wiley Eastern Ltd., New Delhi.
4. Thermal Engineering : R.K. Rajpoot-Laxmi Publication, New Delhi.

Note : 1. In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

2. Steam Tables and Mollier diagram will be supplied in the Examination.

EE-210-C **ANALOG ELECTRONICS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 hours.

List of Experiments :

1. Study of Half wave & full wave rectifiers.
2. Study of Power supply filters.
3. Study of Diode as clipper & clamper.
4. Study of Zener diode as a voltage regulator.
5. Study of CE amplifier for voltage & current gains and input-output impedance.
6. Study of CC amplifier as a buffer.
7. Study of 3-terminal IC regulator.
8. Study of transistor as a constant current source in CE configuration.
9. Study of FET as a common source amplifier.
10. Study of FET as a common Drain amplifier.
11. Graphical determination of small signal hybrid parameters of bi-polar junction transistor.
12. Study & design of a D.C. voltage doubbler.

Note :1.At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-212-C **DIGITAL ELECTRONICS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 hours.

List of Experiments :

1. Study of TTL gates-AND,OR NOT, NAND, NOR EX-OR.
2. Design & realize a given function using K-maps and verify its performance.
3. To verify the operation of multiplexer & Demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R,J-K,T & D type flip-flops.
6. To verify the operation of bi-directional shift register.
7. To design & verify the operation of 3 bit synchronous counter.
8. To verify the operation of UP/down decade counter & derive a seven segment display using the same.
9. To design & realize a sequence generator for a given sequence using J-K flip-flop.
10. Study of CMOS gate.
11. Study of switching charateristics of Diode and Transistors.
12. Study of Ring Counter.
13. Study of Johnson Counter.

Note : 1. At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-216-C **COMMUNICATION ENGINEERING-I LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total marks	: 50 Marks
	Duration of Exam.	: 3 hours.

List of Experiments :

1. Study and Analysis of waveforms of Amplitude Modulation.
2. To find Modulation index of Amplitude Modulation.
3. Study and Analysis of waveforms of Frequency Modulation.
4. To Find Modulation index of Frequency Modulation.
5. Study and Analysis of waveforms of Phase Modulation.
6. Study of Pulse Amplitude Modulation.
7. Study of Pulse Width Modulation.
8. Study of Pulse Frequency Modulation.
9. Study of Pluse Code Modulation.
10. Study of frequency Shift Keying.
11. Study of ASK.
12. Study of PSK
13. Study of QASK.

Note :1. At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

ME-220-C	**MECHANICAL TECH. LAB**	
L T P	Class Work	: 25 Marks
- - 2	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 Hours.

List of Experiments Based on ME-212-C

1. To study the low pressure boilers with their accessories & mountings.
2. To study the high pressure boilers with their accessories & mountings.
3. To prepare heat balance sheet for a given boiler.
4. To study Impulse & Reaction Steam Turbines.
5. To calculate the heat dissipation rate for a pin fin in steady state under natural/forced convection.
6. To study and calculate efficiency of the cooling tower.
7. To calculate efficiencies, mechanical advantages and velocity ratios of single and double purchase winch crabs.
8. To calculate the mechanical advantages, velocity ratios and efficiencies of worm and worm wheels of single, double & triple start.
9. To study the working of two stroke and four stroke SI engines.
10. To study the working of four stroke C.I. engine.
11. To study simple and compound screw jacks and a crane and find their mechanical advantages and velocity ratios.
12. To find percentage of error between the observed and calculated values of stresses in the members of JIB crane.
13. To draw SF & BM diagrams for a simply supported beam under point loads.

Note : Any TEN experiments from the above list are required to be performed by the students in the lab.

PRACTICAL TRAINING-I

At the end of fourth Semester each student would undergo six weeks Practical Training in an industry/Professional Organisation/ Research laboratory with the prior approval of the Director-Principal/ Principal of the concerned college and submit a written typed report alongwith a certificate from the organization. The report will be evaluated by a Board of Examiners to be appointed by the Director-Principal/Principal of the concerned College who will award one of the following grades :

Excellent	:	A
Good	:	B
Satisfactory	:	C
Not Satisfactory	:	F

A student who has been awarded 'F' grade will be required to repeat the practical training. The examination of practical training will be held alongwith the examination of the fifth semester.

SCHEME OF EXAMINATIONS FOR MECHANICAL ENGINEERING
SEMESTER-IV (1999-2000)

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam.
HUM-202-C	PRINCIPLES AND PRACTICE OF MANAGEMENT (Common for all branches)	3	1	-	4	50	100	-	150	3
ME-202-C	MANUFACTURING TECHNOLOGY	3	1	-	4	50	100	-	150	3
ME-204-C	MATERIAL SCIENCE	4	-	-	4	50	100	-	150	3
ME-206-C	STRENGTH OF MATERIALS-II	3	1	-	4	50	100	-	150	3
ME-208-C	FLUID MECHANICS	3	1	-	4	50	100	-	150	3
ME-210-C	ENERGY CONVERSION	3	1	-	4	50	100	-	150	3
ME-214-C	FLUID MECHANICS LAB	-	-	2	2	25	-	25	50	3
ME-216-C	ENERGY CONVERSION LAB	-	-	2	2	25	-	25	50	3
ME-218-C	WORKSHOP PRACTICE-III	-	-	3	3	25	-	25	50	3
ME-222-C	MATERIAL SCIENCE LAB	-	-	2	2	25	-	25	50	3
GPME-202-C	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	3
	TOTAL	19	5	9	33	450	600	100	1150	

Note : Practical Training of 6 weeks duration during summer vacation, Evaluation in V Sem.

HUM-202-C **PRINCIPLES & PRACTICE OF MANAGEMENT**

L T P		
3 1 -	Class Work	: 50 Marks
	Theory	: 100 Marks
	Total	: 150 Marks
	Duration of Exam.	: 3 Hrs.

Unit-I

Meaning of Management, Definitions of Management, Characteristics of Management, Management Vs Administration. Management-Art, Science and Profession, Importance of Management.

Principles of Management.

The Management Functions, Inter-relationship of Managerial functions.

Unit-II

Scientific Management-Introduction, Meaning, Principles, Advantages, Criticism, Rationalisation-Introduction, Definitions, Characteristics objectives, stages, various elements or measures, Advantages, Criticism, Measures suggested to overcome the evil effects of rationalisation.

Unit-III

Nature and Significance of staffing, Personnel Management, Functions of Personnel Management, Manpower Planning, Process of Manpower Planning, Recruitment Selection; Promotion-Seniority Vs. Merit. Training-obectives and types of training.

Unit-IV

Business Finance-definition and importance; Financial Management-meaning-objectives,Scope & functions. Sources of finance-Shares, Debentures, Public Deposits, Ploughing back of profits; Special financial institutions viz. IFCI, ICICI, NIDC,IDBI,IRCI,SFC etc.

Unit-V

Marketing Management-Definition of Marketing, Marketing concept. Objectives & Functions of Marketing Marketing Research-Meaning: Definition: Objectives; Importance: Limitations; Process; Sources of Marketing Research; Survey of Markets.

Unit-VI

Advertising-Meaning of advertising, objectives, functions, criticism. Types of advertising media. Sales Management-meaning,

definitions, significance, types of salesman;Qualities of a Successful Salesman, Selection of Salesman;Training of Salesman.

Unit-VII

Labour Legislation in India-working hours, Safety provisions, Welfare measures,age of employment, employment of women, main provisions of Industrial disputes Act 1947; Main provision of Minimum Wages Act 1948 & Workmen's Compensation Act 1923, Consumer Protection.

Text Book :

Principles and Practice of Management : R.S. Gupta, B.D.Sharma, N.S. Bhalla-Kalyani Publishers.

Reference Books :

1. Organisation and Management : R.D. Aggarwal-Tata Mc Graw Hill.
2. Business Organisation and Management : M.C. Shukla.

Note : Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all, however question number 1 will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be expcepted to answer any 10 questions.

ME-202-C **MANUFACTURING TECHNOLOGY**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Unit-I : Pattern Design : Design consideration for casting, Pattern design, core and core box design, Running system design, Pattern making materials, Steps in pattern making for job shop and mass production, Colour codifications for pattern and core box, Sand metallic moulding methods.

Unit-II : Melting, Solidification & Casting defects : Melting furnaces, Electric & arc furnaces, Melting of ferrous and non-ferrous alloys such as alloys of cast, iron, aluminium & copper, Rate of Solidification, directional solidification, Use of chills, casting defects & remedies.

Unit-III: Special casting processes : Centrifugal casting, slush casting, die casting, investment casting, Co2 mould casting, shell mould casting, Ceramic mould casting, continous casting.

Unit-IV : Arc welding : Fundamentals of welding, joint preparation, electrodes, types, specifications & selection of electrodes Arc welding processes, Carbon arc, Metal arc, submerged arc, TIG,MIG and Plasma arc and electroslag welding, welding defects and their remedies

Unit-V : Solid state Welding : diffusion welding, Ultrasonic welding, Explosive welding, Thermit welding, Electron beam welding, Under water welding.

Unit-VI : Resistance welding : Spot, Seam, Butt, Flash & Percussion welding, Advantages, Disadvantages & applications of each welding process.

Unit-VII : Brazing & Soldering : Principles & procedures of brazing, surface & joint preparation, Filler alloys and fluxes used, Advantages, Limitations and Applications of brazing. Principles of good soldering process, soldering joint design, selection of soldering alloys & fluxes, soldering methods, Advantages, limitations and applications of soldering.

Unit-VIII : Metal Working Process : Cold working-common characteristics of cold working, cold working presses, Shearing,

Punching, Blanking, Stamping and Piercing Operations and their merits, Demerits and applications, Fundamental of forming, Bending, Stretch forming, High energy rate forming.

Drawing fundamentals, Drawing and deep drawing, Spinning, Advantages, and application of these processes.

Text Books :

1. Welding Technology : O.P. Khanna-Dhanpat Rai & Sons, Delhi.
2. Production Technology : R.K. Jain-Khanna Publication Ltd., New Delhi.

Reference Books :

1. Foundary Technology : K.P. Sinha, D.B.Goel-Roorkee Publishing house.
2. Principal of Metal Casting : Rosenthal-Tata Mc Grawhill, New Delhi.
3. Manufacturing Science : Ghose A; Mallik A.K.-Affiliated Eastwest Press RA Ltd. New Delhi.
4. Production Technology Vol I & II : O.P.Khanna & M.Lal,-Dhanpat Rai & sons.
5. Manufacturing Processes and Systems : Ostwald Phillip F., Munoz, Jairo-9/e, John Wiley & Sons (Asia) Pvt. Ltd.

Note : In the semester Examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

ME-204-C **MATERIAL SCIENCE**

L T P
4 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Unit-I : Crystallography : Review of crystal structure, Space lattice,Crystal, planes and crystal directions, Coordination number, Number of atoms per unit cell, atomic packing factor, Numericals related to Crystallography.

Unit-II : Imperfection in metal crystals : Crystal imperfections and their classifications, point defects, Line defects, Edge & screw dislocations, Surface defects, Volume defects & effects of imperfection on metal properties.

Unit-III : Solid solution and Phase diagram : Introduction to single and multiphase solids, solid solution & types of solid solution, Importance and objectives of phase diagram, Systems, Phase and structural constitutents, Cooling curves, Unary & Binary phase diagrams, Gibb's Phase Rule, Lever rule, Eutectic and Peritectoid and Proeutectoid Eutectoid systems, Peritectic & peritectoid systems, Iron carbon Equilibrium diagram & TTT diagram.

Unit-IV : Heat Treatment : Principles, Purpose, Classification of heat treatment processes, annealing, Normalizing, Stress relieving, Hardening, Tempering, Carburizing, Nitriding, Cyniding, Flame and Induction Hardening , Allotropic Transformation of Iron and Steel, properties of austenite, ferrite, pearlite, martensite.

Unit-V : Deformation of Metal : Elastic and Plastic deformation. Mechanism of Plastic Deformation, Twining, Conventional and True stress strain curves for polycrystalline materials, Yield point Phenomena, Strain Ageing, Work hardening ,Bauschinger Effect, Season Creacking, Recovery, Recrystallization & Grain growth.

Unit-VI : Failures of Metals : Failure Analysis, Fracture, process of fracture, Types of fracture, Mechanism of fracture, Fatigue, Characteristics of Fatigue, Fatigue Limit, Mechanism of Fatigue, Factors effecting Fatigue, S-N Curve, Fatigue loading & damages.

Unit-VII : Creep & Corrosion : Definition and concept, creep curve, mechanism of creep, impact of time and temperature in creep, creep fracture, creep testing and prevention against creep, Corrosion, Mechanism and effect of Corrosion, Prevention of Corrosion.

Unit-VIII: Plastic, composites & Ceramics : Polymers, formation of polymers, Polymer structure & Crystallinity, Polymers to plastics, types of plastic, composite materials, fibre-reinforced, particle-strengthened and dispersion strenghten composites, Ceramic materials, Types of ceramics, Properties of Ceramics Ceramic forming techniques, mechanical behaviour of Ceramic.

Text Book :

1. Material Science & Engineering-V.Raghavan, Prentice Hall of India Pvt. Ltd., New Delhi.

Reference Books :

1. A Text Book of Material Science & Metallurgy : O.P. Kharna, - Dhanpat Rai & Sons., Delhi.
2. Material Science and Engineering : An Introduction, Callister, W.D.,4e; John Wiley & Sons (ASIA) Pvt., Ltd. New Delhi.
3. Elements of Meterial Science and Engineering : Vlack Van-6e, Wesley Pub. Comp.
4. Engineering Materials : Kenneth G. Budinski-Prentice Hall of India, New Delhi.

Note : In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

ME-206-C **STRENGTH OF MATERIALS-II**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Unit-I : Strain Energy & Impact Loading : Definitions, expressions for strain energy stored in a body when load is applied (i) gradually, (ii) suddenly, and (iii) with impact, strain energy of beams in bending, beam in bending beam deflections, strain energy of shafts in twisting, energy methods in determining spring deflection, Castigliano's & Maxwell's Theorems Numericalls.

Unit-II : Theories of Elastic Failure : Various theories of elastic failures with derivations and graphical representations, applications to problems of 2-dimensional stress systems with (i) combined direct loading and bending, and (ii) combined torsional and direct loading, Numericalls.

Unit-III : Unsymmetrical Bending : Properties of beam crosssection, product of inertia, ellipse of inertia, slope of the neutral axis, stresses & deflections, shear centre and the flexural axis, Numericals.

Unit-IV : Fixed Beams : Deflections, reactions and fixing moments with SF & BM Calculations & diagrams for fixed beams under (i) concentrated loads, (ii) uniformly distributed load and (iii) a combination of condentrated loads and uniformly distributed load.

Unit-V : Thick Cylinders & Spheres : Derivation of Lame's equations, radial & hoop stresses and strains in thick, and compound cylinders and spherical shells subjected to internal fluid pressure only, wire wound cylinders, hub shrunk on solid shaft, Numericals.

Unit-VI : Rotating Rims & Discs : Stresses in uniform rotating rings & discs, rotating discs of uniform strength, stresses in (i) rotating rims, negecting the effect of spokes, (ii) rotaing cylinders, hollow cylinders & soilds cylinders. Numericals.

Unit-VII :Bending of Curved Bars : Stresses in bars of initial large radius of curvature, bars of initial small radius of curvature, stresses in crane hooks, rings of circular & trapezoidal sec-

tions, deflection of curved bars & rings, deflection of rings by Castiagliano's Theorem, stresses in simple chain link, deflection of simple chain links, Problems.

Unit-VIII: Springs : Stresses in open coiled helical spring subjected to axial loads and twisting couples, leaf springs, flat spiral spings, concentric springs, Numericals.

Text Book :

1. Strength of Meterial : Ryder G.H.-ELBS.

Reference Books :

1. Strength of Materials : D.S. Bedi-S.Chand & Co. Ltd.
2. Strength of Materials : Sadhu Singh-Khanna Publications, New Delhi.
3. Strength of Materials : R.K. Bansal-Khanna Publications, New Delhi.
4. Book of Solid Mechanics : Kazmi-Tata Mc Graw Hill.
5. Mechanics of Materials : Beer & Johnson-MGH New Delhi.

Note : In the semester examination, the examiner will set 8 questions in all, at least one questions from each unit, and students will be required to attempt only 5 questions.

ME-208-C **FLUID MECHANICS**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Unit-I : Fluid properties & Fluid Statics : Definition of fluid, types of fluid, properties of fluid, pressure at a point, hydrostatic & atmospheric pressures, manometry, hydrostatic force on bodies, detremination of metacentric height, centrifugal body force, Numericals.

Unit-II: Fluid Kinematics : Velocity field, acceleration of a fluid element, conservation of mass, momentum and momentum of momentum with their equations, stream lines, stream tube and stream function, Rotaion of a fluid element, Euler's Equation, moving vanes, Jet propulsion, Propellers, Control volume under gravitational acceleration, free fall & flight of a rocket, Numericals.

Unit-III:Bernolli's Equation & Applications : Bernolli's Equation along a stream line and an irrotational flow; hydrostatic, hydrodynamic, static & total pressures, losses due to geometric charges, flow measuring devices-pitot tube, Venturimeter, orifices, mouthpices, time dependant flow, Numericals.

Unit-IV: Two Dimensional Flow of Fluids : Rotational & Irrotational flows, velocity potential, circulation, relationship between stream function & potential function, uniform flow, source or sink, doublet, free vortex, forces vortex, Numericals.

Unit-V : Viscous Flow : Couette flow through a pipe, laminar & turbulent regimes, flow potential and flow resistance, flow through branched pipes, Navier-stokes equation, concept of boundary layer, boundary layer equations, Numericals.

Unit-VI : Laminar Flow : Momentum integral equation, solution of the momentum integral equation for flow over a flat plate, displacement and momentum thicknesses, momentum integral equation in terms of displacement & momentum thicknesses separation, drag, aero foils, enterance region, Numericals.

Unit-VII :Turbulent Flow : Laminar turbulent transition, time mean

and time dependant description, conservation of mass, momentum equation and Reynolds stresses, shear stress models, fully developed turbulent flow through a pipe, turbulent boundry layer over a flat plate, Numericals.

Unit- VIII : Dimensional Analysis & Hydraulic Similitude : Buckingham Pi theorem and its applications, calculation of dimensionless groups, Types of similarity, significance of dimensionless nos.-Reynolds, Euler & Weber nos., Numericals.

Text Book

1. Fluid Mechanics : A.K. Mohanty-Prentice Hall of India Pvt. Ltd. New Delhi.

Reference Books :

1. Mechanics of Fluids : Shames, I Mc Graw Hill Book Co.
2. Mechanics of Fluid : Messey, B.S. Van Nostrand.
3. Fluid Mechanics : Rao, Richard, H.F.-J.Wiley, New York.
4. Fluid Mechanics : Manohar, M.A. Asia.
5. Fluid Mechanics : D.S. Kumar-Katson Publishing House, Delhi.
6. Fluid Mechanics : Daugherty, R.L. & Ingersoil, A.C.-Mc Graw Hill, New York.

Note : In the semester examination, the examiner will set 8 questions in all at least one question from each unit, and students will be required to attempt only 5 questions.

ME-210-C **ENERGY CONVERSION**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Unit-I : Principles of Thermal Energy Release : Structure of Hydrocarbons, analysis of fuels, combustion, mass balance, energy release in combustion, adiabatic flame temperature, combustion in steady flow, second law analysis of combustion processes, absolute entropy and the third law, availability of fuels, irreversibility in adiabatic combustion, Numericals.

Unit-II : Steam Generators : Low and High pressure boilers, boiler accessories and mountings, feed water treatment, boiler loading and manner of operation, flue gas analysis, boiler energy balance, draft systems, different types of furnance for burning coal, oil and gas, Numericals.

Unit-III : Principles of Thermal Energy Conversion to Work : Phase change cycles-Carnot, Rankine, Reheat, Regenerative and Binary vapour cycles, Non-phase change cycles-Stirling, Otto, Diesel, Dual, Atkinson, Joule or Bravton and Ericson and Lenoir cycles, optimization of reheat pressure and degree of regeneration, coupled cycles, Numericals.

Unit-IV : Steam Nozzle : Steady flow energy equation, nozzle efficiency, mass of discharge through a nozzle, throat pressure for maximum discharge, critical pressure, idea of total or stagnation enthalpy and pressure, supersaturated flow in nozzles, Numericals.

Unit-V : Steam Turbines : Impulse and reaction turbines, compounding of turbines, optimum velocity ratio, reheat factor and condition line, parallel exhausts, losses in steam turbines, steam turbine governing, Numericals.

Unit-VI : Steam Condensers : Types of condensers, loss of vacuum and air leakage, vacuum efficiency, condenser efficiency, air ejector and cooling towers, Numericals.

Unit-VII : Reciprocating and Rotory Air compressors : work input for single stage compression, effects of clearance, real indicator diagrams, multistage air compressor, optimum interstage pressure, energy exchange in multi-stage compression, introduction to rotory compressors (roots blower, vane type and centrifugal type), Numericals.

ME-214-C **FLUID MECHANICS LAB**

L T P
- - 2

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam.: 3 Hrs.

List of Experiments Based on ME-208C

1. To determine the coefficient of Impact for vanes.
2. To determine the coefficient of discharge of an Orificemeter.
3. To determine the coefficient of discharge of a Notch (V and Rectangular types).
4. To determine the friction factor for the pipes.
5. To determine the coefficient of discharge of venturimeter.
6. To determine the coefficients of discharge, contraction & velocity of an orifice.
7. To verify the Bernoulli's Theorem.
8. To find critical Reynolds number for a pipe flow.
9. To determine the meta-centric height of a floating body.
10. To determine the minor losses due to sudden enlargement, sudden contraction and bends.
11. To show the velocity and pressure variation with radius in a forced vertex flow.

Note : Atleast NINE experiments from the above list will be performed by the students in the lab.

ME-216-C **ENERGY CONVERSION LAB**

L T P
- - 2

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam.: 3 Hrs.

List of Experiments Based on ME-210 C

1. To study low pressure boilers and their accessories and mountings.
2. To study high pressure boilers and their accessories and mountings.
3. To prepare heat balance sheet for a given boiler.
4. To study the working of impulse and reaction steam turbines.
5. To find dryness fraction of steam by separating and throttling calorimeter.
6. To find power output & efficiency of a steam turbine.
7. To find the condensor efficiencies.
8. To study and find volumetric efficiency of a reciprocating air compressor.
9. To study cooling tower and find its efficiency.
10. To find colorific value of a sample of fuel using Bomb calorimeter.
11. Calibration of Thermometers and pressure guages.

Note : 1. At least nine experiments from the above list will be performed by the students in the lab.

2. A factory/plant visit shall be arranged for students to apprise them the applications of the subject ME-210-C. It will carry 5 marks which will be adjusted in the sessional marks.

ME-218-C **WORKSHOP PRACTICE-III**

L	T	P
-	-	3

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam.: 3 Hrs.

List of Experiments Based on ME-202-C

1. To make the layout of a pattern (for a given casting) with all the necessary allowances, parting line, running system details.
2. To investigate the casting defects and suggest the remedial action.
3. To make a component involving horizontal and vertical welding.
4. To study the Welding defects and suggest their remedies.
5. To make Male-Female matching Joints in fitting section.
6. To drill and tap holes on a plate and investigate the accuracy of tapped hole.
7. To prepare a job on milling machine involving face milling, side milling & slotting.
8. To prepare a job on surface grinder/cylindrical grinder and measure the various parameters of the ground piece.

ME-222-C **MATERIAL SCIENCE LAB**

L T P
- - 2

Class Work : 25 Marks
Exam. : 25 Marks
Total : 50 Marks
Duration of Exam.: 3 Hours.

List of Experiments Based on ME-204-C

1. To study crystal structures of given specimen.
2. To study crystal imperfections in given specimen.
3. To study micro-structures of metals/alloys.
4. To prepare solidification curve for a given specimen.
5. To study heat treatment processes (hardening and tempering) steel specimen.
6. To study micro-structure of heat treated steel.
7. To study thermo-setting of plastics.
8. To study the creep behavior of a given specimen.
9. To study the mechanism of chemical corrosion and its protection.
10. To study the properties of various types of plastics.

Note : Atleast EIGHT experiments from the above list will be performed by the students in the class.

PRACTICAL TRAINING-I

At the end of fourth Semester each student would undergo six weeks Practical Training in an Industry/Professional Organisation/ Research laboratory with the prior approval of the Director-Principal/ Principal of the concerned college and submit a written typed report alongwith a certificate from the organization. The report will be evaluated by a Board of Examiners to be appointed by the Director-Principal/Principal of the concerned College who will award one of the following grades :

Excellent	:	A
Good	:	B
Satisfactory	:	C
Not Satisfactory	:	F

A student who has been awarded 'F' grade will be required to repeat the practical training. The examination of practical training will be held alongwith the examination of the fifth semester.

SCHEMEOF EXAMINATION FOR CHEMICAL ENGINEERING
SEMESTER-IV (1999-2000)

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam
HUM-202-C	PRINCIPLES AND PRACTICE OF MANAGEMENT (Common for all branches)	3	1	-	4	50	100	-	150	3
MATH-202-C	COMPUTATIONAL TECHNIQUES (CHE,CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
CHE-202-C	TRANSPORT PHENOMENA	4	2	-	6	100	200	-	200	3
CHE-204-C	MACHANICAL OPERATIONS	3	1	-	4	50	100	-	150	3
CHE-206-C	MATERIAL TECHNOLOGY	3	1	-	4	50	100	-	150	3
CH-202-C	ORGANIC CHEMISTRY	3	1	-	4	50	100	-	150	3
CHE-208-C	MECHANICAL OPERATIONS LAB	-	-	3	3	50	-	50	100	3
CH-204-C	ORGANIC CHEMISTRY LAB	-	-	2	2	25	-	25	50	3
GPCHE-202-C	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	3
	TOTAL	19	7	5	31	475	600	75	1150	

Note : Practical Training of 6 weeks duration during summer vacation, Evaluation in V sem.

HUM-202-C **PRINCIPLES & PRACTICE OF MANAGEMENT**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Unit-I

Meaning of Management. Definitions of Management, Characteristics of Management, Management Vs Administration. Management-Art, Science and Profession, Importance of Management.

Principles of Management.

The Management Functions, Inter-relationship of Managerial functions.

Unit-II

Scientific Management-Introduction, Meaning, Principles, Advantages, Criticism, Rationalisation-Introduction. Definitions, Characteristics objectives, stages, various elements or measures, Advantages, Criticism, Measures suggested to overcome the evil effects of rationalisation.

Unit-III

Nature and Significance of staffing, Personnel Management, Functions of Personnel Management, Manpower Planning, Process of Manpower Planning, Recruitment, Selection; Promotion-Seniority Vs. Merit. Training-Obectives and Types of Training.

Unit-IV

Business Finance-Definiation and Importance; Financial Management-Meaning-Objectives,Scope & Functions. Sources of Finance-Shares, Debentures, Public Deposits, Ploughing Back of Profits; Special Financial Institutions viz. IFCI, ICICI, NIDC,IDBI,IRCI,SFC etc.

Unit-V

Marketing Management-Definition of Marketing, Marketing Concept, objectives & Functions of Marketing Marketing Research-Meaning, Definition, Objectives; Importance, Limitations; Process; Sources of Marketing Research; Survey of Markets.

Unit-VI

Advertising-Meaning of Advertising, Objectives, Functions, criticism Types of Advertising Media. Sales Management-

Meaning, Definitions, Significance. Types of Salesman:Qualities of a Successful Salesman, Selection of Salesman:Training of Salesman.

Unit-VII

Labour Legislation in India-Working hours, Safety Provisions, Welfare Measures, Age of employment, employment of women, main provisions of Industrial Disputes Act 1947; Main provision of minimum wages Act 1948 & Workmen's Compensation Act 1923, Consumer Protection.

Text Book :

Principles and Practice of Management : R.S. Gupta, B.D.Sharma, N.S. Bhalla-Kalyani Publishers.

Reference Books :

1. Organisation and Management : R.D. Aggarwal-Tata Mc Graw Hill.
2. Business Organisation and Management : M.C. Shukla.

Note : Eight questions are to be set atleast one question from each unit and the students will have to attempt five questions in all, however question number 1 will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be excepted to answer any 10 questions.

MATH-202-C **COMPUTATIONAL TECHNIQUES**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Part-A

Finite Differences and Interpolation :

Various difference opertors and relation between them, Newton's forward and backward interpolation formulae, centeral difference interpolation formula, Gauss forward and backward interpolation formulae Lagrenge's interpolation formula and Newton's divided difference formula.

Solution of Algebraic and Transcendental Equations :

Bisection method, method of false position, secant method, iteration method, Newton-Raphson method, Generalized Newton Raphson method.

Solution of Simultaneous Algebraic Equations :

Jacobi's method, Gauss-seidal method, relaxation method.

Numerical Differentiation and Integration :

Formulae for derivatives, Trapezoidal rule, Simpson's 1/3rd and 3/8th rules, Boole's and Weddle's rules, Romberg's integration.

Part-B

Numerical Solution of O.D.E. :

Taylor's series, Picard's method, Euler's method, modified Euler's method and Runge-Kutta second and fourth order methods. Predictor-corrector methods (Adams-Bashforth and Milne methods only).

Numerical Solution of P.D.E.

Finite difference approximations of partial derivatives, solution of Laplace equation (Standard 5-point formula only), One-dimensional heat equation (Schmidt method, Crank-Nicolson DuFort method and Frankel method) and wave equation.

Text Books:

1. Numerical Methods in Engg. & Science : B.S.Grewal-Khanna Publishers.
2. Numerical Methods for Scientific and Engg. Computations : M.K. Jain, S.R.K. Iyengar and R.K. Jain-Wiley Eastern Ltd.

Reference Books :

1. Computer Oriented Numerical methods : V.Rajaraman Prentice-Hall of India.
2. Introduction to Numerical Analysis : C.E. Froberg-Addison Wesley.

Note :i) Students will be asked to write the computer program of the problems discussed.

ii) Examiner will set eight questions in all; taking four from Part-A and four from Part-B. Students will be required to attempt five questions taking atleast two from each part.

CHE-202-C **TRANSPORT PHENOMENA**

L T P		
4 2 -	Class Work	: 100 Marks
	Exam.	: 100 Marks
	Total	: 200 Marks
	Duration of Exam.	: 3 Hrs.

Unit-I

Similarity between momentum, heat and mass transfer. The continum hypothesis, Basic laws of fluid, motion, Newton's second law of motion, principle of balance of momentum, Principle of conservation of energy, Newton's Law of viscosity, Science of Rheology, Prediction of viscosity, Boundary conditions, shell balance approach for stress distribution and velocity profile, Equation of continuity and equation of motion and their application in fluid flow problems, Unsteady state momentum transport, Flow near a wall suddenly set in motion, Momentum transport phenomena in turbulent flows.

Unit-II :

Fourier's law heat conduction, Thermal conductivities, Boundary conditions, shell balance approach for energy transfer problem, Heat sources, Principle of extended surface, Types of cooling fins, Free and forced convection, Unsteady state heat transport, Unsteady heat conduction in solids, Heating of semi-infinite slab, Heating of a finite slab.

Unit-III :

Concentration, velocities and mass fluxes, Fick's law of diffusion, Boundary conditions, Shell balance approach for mass transfer problems, Problems of diffusion with chemical reaction in porous catalyst, The effectiveness factor, Equation of continuity for multicomponent mixtures.

Text Books :

1. Transport Phenomena : R.B. Bird, W.E. Stewart and E.N. Lightfoot-John Wiley & Sons.
2. Transport Processes and Unit Operations : C.J. Geankoplis-Prentice Hall of India.

Reference Books :

1. Transport Phenomena-A unified approach : R.S. Brodkey & H.C. Hershey-McGraw Hill.
2. Unit Operations of Chemical Engineering : W.L. Mc Cabe & J.C.Smith-McGraw Hill.

Note : Five out of eight questions are to be attempted. At least two questions (but not more than three) are to be set from each unit.

CHE 204-C **MECHANICAL OPERATIONS**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Exam.	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Unit-I :

Particle size and shape, Particulate mass, Size and Shape distributions, Measurement and analysis, Concept of average diameter, Size reduction, Crushing, Grinding and ultrafine grinding, Grindability and selection of equipment, Laws of grinding, agglomeration and compaction, Screening, Design of screens.

Unit-II :

Flow around a single particle, Drag force and drag coefficient, Settling velocity of a particle in a fluid, concept of relative velocity.

Unit-III :

Packed beds, Bed porosity, flow through a bed particles, Ergun's equation, Application to filtration, Hindered & free settling of particles, Thickeners, gravity separation, Fluidised beds and tranport of particles.

Unit-IV :

Storage of Solids, Flow of solids by gravity, Transport of solids by screw/belt conveyors Cyclones, Bagfilters, Electrostatic precipitators, particle collection systems.

Text Books :

1. Chemical Engineering : J.M. Coulson & J.F. Richrdson Vol. II Pergamon Press.
2. Unit Operations : G.G. Brown-Asia Publishing House.

Reference Books :

1. Principles of Unit Operations : A.S. Foust et al-John Wiley.
2. Unit-Operations of Chemical Engineering : W.L.McCabe & J.C.Smith-McGraw Hill.
3. Mechanical Operations for Chemical Engineers : B.C. Bhattacharya & C.M. Naryanan-Khanna Publishers.

Note : Five out of eight questions are to be attempted. At least one question (but not more than three) is to be set from each unit.

CHE-206-C **MATERIAL TECHNOLOGY**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Exam.	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

Unit-I

Factors affecting the selection of meterial for constructional purpose in chemical industries, Metallic and Non-Metallic materials of construction, Ferrous and Non-Ferrous metals.

Unit-II

Mechanical properties of various materials, Various modes of deformation, Crystal defects. Cold and hot working of metals and their effects on mechanical properties, Structure of solid phases, Different types of structure B.C.C,F.C.C and H.C.P., Binary equilibria involving solid solution, Eutectic and Peitectic systems, Cu.Ni,Cu-Zn,Fe-C diagrams, Heat treatment, General principles, TTT-curves, Annealing, normalizing, hardening, tempering and age hardening.

Unit-III

Corrosion, Various types, Mechanism, Methods of prevention and control.

Unit-IV

Ferrous Metals, Grey and white cast iron, Malleable, Mechanite and nodular cast iron, Plain Carbon Steels : Classification, properties and applications, Alloy Steels : Stainless Steels, Ferritic, austenitic and matenstic, mechanism of development of corrosion resistance in austenitic stainless steels, applications of stainless steels in chemical industries, Alloy tool steels ultra high strength steels.

Unit-V

Non-Ferrous Metals, Copper, Brass, Bronze, Aluminium and their Mechanical Properties, workability and applications, Corrosion resistance.

Unit-VI

Non-Metallic materials of construction: (a) Ceramics : Various types, speciallity glasses and refractories, properties and application (b) Polymers : Classifications, Comparison and properties of various polymers and their relationship with chain stucture, Some application in chemical industries.

Text Books

1. Material Science & Engineering : V. Raghvan-Prentice Hall.

2. Engineering Materials : Properties & Selection : Budinski-Prentice Hall (V-Edition).

Reference Books

1. Engineering Meterials : Longman Vol.-I & II.
2. Materials of Engineering : Concepts and Applications : Van Vlack, L., Addison-Wesley.

Note : Five out of eight questions are to be attempted. At least one question (not more then two) is to be set from each unit..

CH-202-C **ORGANIC CHEMISTRY**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Exam.	: 100 Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hrs.

I. Classification of organic reactions :-Types of Mechanism, Types of reactions, The mechanism of the following type of reactions.
Addition: Electrophillic, nuclephillic, free radical, pericyclic
Elimination : Elimination (E1 & E2 type).
Rearrangements : Migration with one electron pair (nucleophillic), migration with one electron (free radical), migration without electron (electrophillic).
Oxidation and reduction.

II. Chemistry of Hydrocarbons :
Sources, preparation and uses of alkanes, cycloalkanes, alkynes, dienes aromatic hydrocarbons, concept of aromaticity (Huckel rule, 4n+2rule), and directive effect.

III. Chemistry of functional groups.
preparation, general properties and uses of organic halides, Grignard reagents and organolithiums, alcohols, aldehydes, ketones, carboxylic acids and their derivatives, ethers and epoxides, amines, diazonium salts, heterocyclic compounds, (pyridine and pyrrole), poly-functional compounds (glycerol, ethylene glycol).

IV. Chromatography-Introduction classification, Solid liquid-TLC, Liquid Liquid-partition, HPLC,GPC,Liquid Gas-Gas Liquid chromatography.

Text Books

1. Advanced Organic Chemistry (Reaction Mechanism and Structure) : Jerry March-Wiley Easterm 3rd Edition.
2. Organic Chemistry : Morrison Boyed P.H.I.
3. Chromatography : B.K. Sharma-Goel Publishing, Meerut.

Reference Books :

1. Organic Chemistry Vol-I :I.L.Finar ELBS.
2. Organic Chemistry :-Franics A. Carey-T.M.H.
3. Organic Reaction Mechanism : R.K. Bansal-3rd Edition T.M.H.

Note : Eight questions will be set, the candidates will be required to attempt five questions.

CHE-208-C **MECHANICAL OPERATIONS LAB**

L	T	P		
-	-	3	Class Work	: 50 Marks
			Exam.	: 50 Marks
			Total	: 100 Marks
			Duration of Exam.	: 3 Hrs.

List of Experiments :

1. Setting of single particle.
2. Sedimentation.
3. Size reduction by Jaw Crusher & Pulverizer.
4. Grinding in a Ball Mill.
5. Screen analysis.
6. Separation of dust particles from air.
7. Determination of pressure drop across a fluidized bed and a packedbed.
8. Filtration of slurry.

Note : Five out of eight questions are to be attempted.

CH-204-C **ORGANIC CHEMISTRY LAB**

L	T	P		
-	-	3	Class Work	: 50 Marks
			Theory	: 50 Marks
			Total	: 100 Marks
			Duration of Exam.	: 3 hrs.

I.A. Identification of organic compounds :

Preliminary tests (elemental analysis, ignition, colour,odor and determination of physical constants) .Functional group analysis, preparation of derivatives.

List of compounds for identification and analysis :

Organic acids-benzioc, phthallic, oxalic, succinic.

Aldehydes-acetaldehyde, benzaldehyde.

Ketones-acetone, acetophanone benzophenone .

Amines -acetamide, benzamide.

Phenols-phenol, a-Naphthol, b-naphthol, resorcinol, cresols, catechol.

Amines-aniline-o-toluidine-p-toluidine, and b-naphthyl-amine

Carbohydrates-glucose, fructose, sucrose, lactose, maltose,

Hydrocarbons-Naphthlene, anthracene

Preparation of asprin, acetanilide, p-nitro acetanilide, p-nitroaniline, methyl-orange.

B Quantitative organic analysis; Estimation of phenol, aniline, formaldehyde.

2. Chromatographic separation :

i) To separate a mixture of fluoroscein and methylene blue by column chromatography.

ii) To separate & identify the component of a mixture of phenols (o-nitrophenols-m-cresols & resorcinol).

Books :

1. Qualitative Organic Analysis : A.I. Vogel-ELBS Longmans.

2. Quantitative Organic Analysis : AI. Vogel-ELBS Longmans.

3. Advanced Organic Analysis : Satish Aggarwal & R.C. Aggrwal-Pragati Prakshan.

4. Practical Organic Chemistry : G. Mann, Longmans.

PRACTICAL TRAINING-I

At the end of fourth Semester each student would undergo six weeks Practical Training in an Industry/Professional Organisation/ Research laboratory with the prior approval of the Director-Principal/ Principal of the concerned college and submit a written typed report alongwith a certificate from the organization. The report will be evaluated by a Board of Examiners to be appointed by the Director-Principal/Principal of the concerned College who will award one of the following grades :

Excellent	:	A
Good	:	B
Satisfactory	:	C
Not Satisfactory	:	F

A student who has been awarded 'F' grade will be required to repeat the practical training. The examination of practical training will be held alongwith the examination of the fifth semester.

SCHEME OF EXAMINATION FOR INSTRUMENTATION AND CONTROL ENGINEERING
SEMESTER-IV (1999-2000)

Course No.	Course Title	Teaching Schedule L	T	P	Total	Marks of Class Work	Examination Theory	Practical	Total Marks	Duration of Exam.
HUM-202-C	PRINCIPLES AND PRACTICE OF MANAGEMENT (Common for all branches)	3	1	-	4	50	100	-	150	3
MATH-202-C	COMPUTATIONAL TECHNIQUES (CHE, CSE, EE, EL, IC)	3	1	-	4	50	100	-	150	3
EE-202-C	ANALOG ELECTRONICS (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-204-C	DIGITAL ELECTRONICS (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-206-C	ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS (EE,IC)	3	1	-	4	50	100	-	150	3
ME-212-C	MECHANICAL TECHNOLOGY (CSE,EE,EL,IC)	3	1	-	4	50	100	-	150	3
EE-210-C	ANALOG ELECTRONICS LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-212-C	DIGITAL ELECTRONICS LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
EE-214-C	ELECTRICAL MESUREMENT & MEASURING INSTRUMENTS LAB (EE,IC)	-	-	2	2	25	-	25	50	3
ME-220-C	MECHANICAL TECHNOLOGY LAB (CSE,EE,EL,IC)	-	-	2	2	25	-	25	50	3
GPIC-202-C	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	3
	TOTAL	18	6	8	32	450	600	100	1150	

Note : Practical Training of 6 weeks duration during Summer vacation. Evaluation in Vth Semester.

HUM-202-C **PRINCIPLES & PRACTICE OF MANAGEMENT**

L T P		
3 1 -	Class Work	: 50 Marks
	Theory	: 100 Marks
	Total	: 150 Marks
	Durations of Exam.	: 3 Hrs.

Unit-I

Meaning of Management, Definitions of Management, Characteristics of Management, Management Vs Administration. Management-Art, Science and Profession Importance of Management.

Principles of Management.

The Management Functions, Inter-relationship of Managerial functions.

Unit-II

Scientific Management-Introduction, Meaning, Principles, Advantages, Criticism, Rationalisation-Introduction. Definitions, Characteristics objectives, stages, various elements or measures, Advantages, Criticism, Measures suggested to overcome the evil effects of rationalisation.

Unit-III

Nature and Significance of staffing, Personnel Management, Functions of Personnel Management, Manpower Planning, Process of Manpower Planning, Recruitment, Selection; Promotion-Seniority Vs. Merit. Training-obectives and types of training.

Unit-IV

Business Finance-definiation and importance; Financial Management-meaning-objectives, scope & functions. Sources of finance-Shares, Debentures, Public Deposits, Ploughing back of profits; Special financial Institutions viz. IFCI, ICICI, NIDC,IDBI,IRCI,SFC etc.

Unit-V

Marketing Management-Definition of marketing, Marketing concept, objectives & Functions of Marketing. Marketing Research-Meaning; Definition; Objectives; Importance; Limitations; Process; sources of Marketing Research; Survey of Markets.

Unit-VI

Advertising-meaning of advertising, objectives, functions, criticism. Types of Advertising media. Sales Management-meaning,

Functions, significance, Types of salesman;Qualities of a Successful Salesman, Selection of Salesman;Training of Salesman.

Unit VII

Labour Legislation in India-working hours, Safety provisions, Welfare measures,age of employment, employment of women, main provisions of Industrial disputes Act 1947; Main provision of minimum wages Act 1948 & Workmen's Compensation Act 1923., Consumer Protection.

Text Books :

Principles and Practice of Management : R.S. Gupta, B.D.Sharma, N.S. Bhalla-Kalyani Publishers.

Reference Books :

1. Organisation and Management : R.D. Aggarwal-Tata Mc Graw Hill.
2. Business Organisation and Management : M.C. Shukla.

Note : Eight questions are to be set, atleast one question from each unit and the students will have to attempt five questions in all, however question number I will be compulsory having internal choice, this question will consist of short answer type 12 questions covering the entire syllabus and students will be excepted to answer any 10 questions.

MATH-202-C **COMPUTATIONAL TECHNIQUES**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam.: 3 Hrs.

Part-A

Finite Differences and Interpolation :

Various difference operators and relation between them, Newton's forward and backward interpolation formulae, centeral difference interpolation formula, Gauss forward and backward interpolation formulae Lagrenge's interpolation formula and Newton's divided difference formula.

Solution of Algebraic and Transcendental Equations :

Bisection method, method of false position, Secant method, Iteration method, Newton-Raphson method, Generalized Newton Raphson method.

Solution of Simultaneous Algebraic Equations :

Jacobi's method, Gauss-seidal method, relaxation method.

Numerical Differentiation and Integration :

Formulae for derivatives, Trapezoidal rule, Simpson's 1/3rd and 3/8th rules, Boole's and Weddle's rules, Romberg's integration.

Part-B

Numerical Solution of O.D.E. :

Taylor's series, Picard's method, Euler's method, modified Euler's method and Runge-Kutta second and fourth order methods. Predictor-corrector methods (Adams-Bashforth and Milne methods only).

Numerical Solution of P.D.E.

Finite difference approximations of partial derivatives, Solution of Laplace equation (Standard 5-point formula only), One-dimensional heat equation (Schmidt method, Crank-Nicolson DuFort method and Frankel method) and wave equation.

Text Books:

1. Numerical Methods in Engg. & Science : B.S Grewal-Khanna Publishers.
2. Numerical Methods for Scientific and Engg. Computations : M.K. Jain, S.R.K. Iyengar and R.K. Jain-Wiley Eastern Ltd.

Reference Books :

1. Computer Oriented Numerical methods : V.Rajaramanm Prentice-Hall of India.
2. Introduction to Numerical Analysis : C.E. Froberg-Addison Wesley.

Note : i) Students will be asked to write the computer program of the problems discussed.

ii) Examiner will set eight questions in all; taking four from Part-A and four from Part-B. Students will be required to attempt five questions taking atleast two from each part.

EE-202-C **ANALOG ELECTRONICS**

L T P
3 1 -

Class Work : 50 Marks
Exam. : 100 Marks
Total : 150 Marks
Duration of Exam. : 3 Hrs.

Unit-I Semiconductor Diode :

P-N junction, P-N junction as a rectifier, V-I characteristics of P-N junction diode, Switching times of Diode.

Unit-II Diode Circuits :

Diode as a circuit element, the load-line concept, half-wave and full wave rectifiers, clipping circuits, clamping circuits, filter circuits, peak to peak detector and voltage multiplier circuits.

Unit-III Transistor at Low Frequencies :

Bipolar junction transistor : operation, characteristics, Ebers-moll model of transistor, hybrid model, h-parameters (CE,CB,CC configurations), analysis of a transistor Amplifier circuit using h-parameters, emitter follower, Miller's Theorem, frequency response of R-C coupled amplifier.

Unit IV-Transistor Biasing :

Operating point, bias stability, collector to base bias, self bias, emitter bias, bias compensation, thermistor & sensistor compensation.

Unit-V Transistor at High Frequencies :

Hybrid II model, CE short circuit current gain, frequency response, alpha, cutoff frequency, gain bandwidth product, emitter follower at high frequencies.

Unit VI Field Effect Transistors :

Junction field effect transistor, pinch off volt-ampere characteristics, small signal model, MOSFET : Enhancement & Depletion mode, V-MOSFET.

Unit-VII FET Circuits :

Common source amplifier, source follower, biasing of FET, applications of FET as a voltage variable resistor (VVR) uni-Junction transistor (UJT).

Unit-VIII Regulated Power Supplies :

Series and shunt voltage regulators, power supply characteristics, three terminal IC regulators.

Text Book :

Integrated Electronics : Millman & Halkias-McGraw Hill.

Reference Books :

1. Electronics Princip... Malvino-McGraw Hill.
2. Electronics Circuits : Donald L. Schilling & Charles Belove-MGH.
3. Electronics Devices & Circuits : Millman & Halkias-McGraw Hill.

Note : Five out of eight questions are to be attempted. At least one question should be set from each unit.

EE-204-C **DIGITAL ELECTRONICS**

L T P		
3 1 -	Class Work	: 50 Marks
	Exam.	: 100 Marks
	Total	: 150 Marks
	Duration of Exam.	: 3 Hrs.

Unit-I Basic Digital Circuits :

Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

Unit-II Number System and Codes :

Boolean Algebra, Binary, Octal and Hexadecimal number systems. Conversion from one number system to another. Signed binary number, sign magnitude, 1's complement and 2's complement Binary arithmetic codes; BCD, Excess-3 Gray, EBDIC, ASCII, Error detection and correction.

Unit-III Combinational Circuits :

Design using gates, Karnaugh map simplification. Multiplexers, Demultiplexers/decoders, Adders, Subtractors, BCD arithmetic, Digital encoders, Priority Encoders, Decoders/Drivers for display devices, Realization of logic functions using multiplexers and demultiplexers.

Unit-IV Sequential Circuits :

Flip-flops (S-R, J-K, T and D Type), master slave, edge triggered flip flops, shift registers, sequence generators, Counters, Asynchronous and Synchronous Ring counters and Johnson Counter.

Unit-V Digital Logic Families :

Switching mode operation of p-n junction, bipolar and MOS devices, Bipolar logic families : RTL, DTL, DCTL, HTL, TT, ECL, MOS, and C-MOS logic families. Tristate logic, interfacing of C-MOS and TTL families.

Unit-VI Programmable Logic Devices :

ROM,PLA,PAL,FPGA

Text Book : Digital Electronic (Edition-II) Dr. R.P. Jain-TMH.

Reference Books :

1. Digital Integrated Electronics : Taub & Schilling-MGH.
2. Digital Electronics : Malvino-Mc Graw Hill.

Note : Five out of eight questions are to be attempted. At least one question should be set from each unit.

EE-206-C **ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS**

L T P		
3 1 -	Class Work	: 50 Marks
	Exam.	:100 Marks
	Total	: 150 Mars
	Duration of Exam.	: 3 Hrs.

Unit-I Units Standards and Errors :

S.I. units, Absolute standards (International, Primary, Secondary and Working Standards), True, Value, Errors (Gross, Systematic and Random); Static Characteristic of Instruments (Accuracy, Precision, Sensitivity, Resolution and threshold).

Unit-II Measuring System Fundamentals :

Classification of Instruments (Based upon mode of measurement-Absolute and Secondary Instruments, Based upon Principle of Operation, Based upon function-Indicating, Recording and Integrating Instruments), Generalized Instrument (Block diagram and description of various blocks), The three forces in an Electromechanical indicating instrument (Deflecting, controlling and damping forces and the interplay between them), Comparison between gravity and spring controls; comparison of methods of damping and their suitability for bearing supports, Pivot-less supports (Simple suspension and taut band suspension, scale information, Instrument cases (Covers).

Unit-III Measuring Instruments :

Construction, Operating principle, Torque equation, Shape of scale, use as Ammeter or as Voltmeter (Extension of Range), Use on AC/DC or both, Advantages and disadvantages, Errors (Both on AC/DC) of PMMC types, Electrodynamic Type, Moving iron type (attraction, repulsion and combined attraction-repulsion types). Hot wire type, Induction Type, Electrostatic type Instruments.

Unit-IV Wattmeters & Energy Meters :

Construction, Opertaing principle, Torque equation, Shape of scale, Errors, Advantages & Disadantages of Electrodynamic and Induction type Wattmeter, and single phase induction type Energy meter, Compensation and creep in energy meter.

Unit-V Power Factor & Fnquency Meters :

Construction, Operation, Principle, Torque equation. Advantages & disadvantages of Single phase power factor meters (Electrodynamic and Moving Iron types) and Frequency meters (Electrical Resonance Type. Ferrodynamics and Electrodynamics types).

Unit-VI Low and High Resistance Measurements

Limitations of wheatstone bridge, Kelvin's double bridge method, Difficulties in high resistance measurements, Measurement of high resistance by direct deflection, loss of charge method, Megohm bridge and Meggar.

Unit-VII A.C. Bridges :

General balance Equation. Circuit diagram, Phasor diagram, Advantages, Disadvantages and Applications of Maxwell's inductance, Maxwell's Inductance-Capacitance bridge, Hay's Anderson, Owen's Desauty's Schering and Wetas bridges, Shielding and earthing.

Text Book :

A Course in Electrical and Electronic Measurement & Instrumentation : A.K. Sawhney-Dhanpat Rai & Sons, Delhi.

Reference Books :

1. Electrical Measurements : E.W. Golding-A.H.Wheeler & Co. Ltd., Allahabad.
2. Electronic & Electrical Measurement & Instrumentation : J.B. Gupta-Kataria & Sons.
3. Electronic Instrumentation & Measurement Technique : W.D.Cooper & A.D. Helfrick-PHI.
4. Measuring Systems : E.O. Doeblin-McGraw Hill, N.York.

Note : 1. Five out of eight questions are to be attempted.
2. At least one question should be set from each unit.

ME-212-C **MECHANICAL TECHNOLOGY**

L	T	P		
3	1	-	Class Work	: 50 Marks
			Exam.	: 100Marks
			Total	: 150 Marks
			Duration of Exam.	: 3 Hours.

Unit-I : Basics of Power Generation: Thermodynamic systems, Thermodynamics properties, States, Processes, Laws of thermodynamics, Concept of entropy and its calculation for various processes, Carnot cycle, Carnot engine, Carnot refrigerator, Carnot heat pump, classification of power cycles-Rankine cycle, Rankine cycle with reheat and regeneration, Gas power cycles, Otto cycle, Diesel cycle, Dual cycle, Brayton cycle, Stirling cycle, Ericsson cycle, Vapour compression refrigeration cycle, Numerical.

Unit-II : Steam Generators: Function of boilers, low pressure Boilers, function of accessories and mountings, energy balance of a boilers, draft systems, properties of steam, use of steam tables and Mollier diagrams, Numericals.

Unit-III : Steam Turbines : Introductions to Nozzle & Condensors Impulse & Reaction turbines, compounding of turbines, reheat factor & condition line. Numericals.

Unit-IV : Hydraulic Turbines : Impulse momentum equation, relative & absolute velocities, diffusers-plane & curved single vanes, angular momentum, similarity laws for turbines, Pelton, Francis & Kaplan turbines-velocity diagrams, Maximum power and efficiencies, characteristic curves, speed regulation, draft tube, Numericals.

Unit-V : Cooling Fin : governing differential equation for steady flow of heat along a rod, heat dissipation from a fin under different initial and boundary conditions fin performance, Numericals.

Unit-VI : Simple lifting Machines :Simple machines & definitions, Ideal machine, frictional losses, performance of simple machine, reversibilities of machine & self locking machines, differential wheel & axle, worm & worm wheel,simple and compound screw jacks, Single purchase winch crab. Numericals.

Unit-VII: Plane Trusses : Review of equilibrium conditions, free body diagrams, and introduction to shear force & bending mo-

ment diagrams, types of trusses, reactions at supports of a truss, determination of axial forces in the members of truss by methods of joints & sections, Numericals.

Text Books :

1. Engg. Thermodynamics : P.K. Nag-Tata Mc Graw Hill, New Delhi.
2. Thermal Engineering : A.S. Sarad-Satya Prakashan, New Delhi.
3. Engineering Mechanics : A.K. Tayal-Umesh Publications, New Delhi.

Reference Books :

1. Thermodynamics & Heat Power Engg. : M.L. Mathur, F.S. Mehta-Jain Brothers, New Delhi.
2. Steam & Gas Turbines : R.Yadav, Central Publishing House, Allahabad.
3. An Introduction to Energy Conversion, Vol. I : V. Kadambi & Prasad-Wiley Eastern Ltd., New Delhi.
4. Thermal Engineering : R.K. Rajpoot-Laxmi Publication, New Delhi.

Note : 1. In the semester examination, the examiner will set 8 questions in all, at least one question from each unit, and students will be required to attempt only 5 questions.

2. Steam Tables and Mollier diagram will be supplied in the Examination.

EE-210-C **ANALOG ELECTRONICS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3Hours.

List of Experiments :

1. Study of Half wave & full wave rectifiers.
2. Study of Power supply filters.
3. Study of Diode as clipper & clamper.
4. Study of Zener diode as a voltage regulator.
5. Study of CE amplifier for voltage & current gains and input-output impedance.
6. Study of CC amplifier as a buffer.
7. Study of 3-terminal IC regulator.
8. Study of transistor as a constant current source in CE configuration.
9. Study of FET as a common source amplifier.
10. Study of FET as a common Drain amplifier.
11. Graphical determination of small signal hybrid parameters of bi-polar junction transistor.
12. Study & design of a D.C. voltage doubbler.

Note :1.At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-212-C **DIGITAL ELECTRONICS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 Hours.

List of Experiments :

1. Study of TTL gates-AND,OR NOT, NAND, NOR EX-OR.
2. Design & realize a given function using K-maps and verify its performance.
3. To verify the operation of multiplexer & Demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R,J-K,T & D type flip-flops.
6. To verify the operation of bi-directional shift register.
7. To design & verify the operation of 3 bit synchronous counter.
8. To verify the operation of UP/down decade counter & derive a seven segment display using the same.
9. To design & realize a sequence generator for a given sequence using J-K flip-flop.
10. Study of CMOS gate.
11. Study of switching charateristics of Diode and Transistors.
12. Study of Ring Counter.
13. Study of Johnson Counter.

Note : 1. At least ten experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

EE-214-C **ELECTRICAL MEASURMENT AND MEASURING INSTRUMENTS LAB**

L T P		
0 0 2	Class Work	: 25 Marks
	Exam.	: 25 Marks
	Total	: 50 Marks
	Duration of Exam.	: 3 hours.

List of Experiments :

1. To identify the meters from the given lot.
2. To convert and calibrate a D' Arsonnal type galvanometer into a voltmeter and an ammeter.
3. To calibrate an energy with the help of a standard wattmeter and a stop watch.
4. To measure power and p.f. by three ammeter method.
5. To measure power and p.f. by three voltmeter method.
6. To measure power and p.f. in three phase circuit by two wattmeter method.
7. To measure capacitance by De Sauty's bridge.
8. To measure inductance by Maxwell's bridge.
9. To measure frequency by Wien's bridge.
10. To measure the power with the help of C.T. and P.T.
11. To measure magnitude and phase angle of a voltage by rectangular type potentiometer.
12. To measure magnitude and phase angle of a voltage by polar type potentiometer.
13. To measure low resistance by Kelvin's double bridge.
14. To measure high resistance by loss of charge method.

Note : 1. At least experiments are to be performed in the Semester.

2. At least seven experiments should be performed from above list. Remaining three experiment may either be performed from the above list or designed & set by the concerned institutioned as per the scope of the syllabus.

ME-220-C **MECHANICAL TECH. LAB**

L	T	P		
-	-	2	Class Work	: 25 Marks
			Exam.	: 25 Marks
			Total	: 50 Marks
			Duration of Exam.	: 3 hours.

List of Experiments Based on ME-212C

1. To study the low pressure boilers with their accessories & mountings.
2. To study the high pressure boilers with their accessories & mountings.
3. To prepare heat balance sheet for a given boiler.
4. To study Impulse & Reaction Steam Turbines.
5. To calculate the heat dissipation rate for a pin fin in steady state under natural/forced convection.
6. To study and calculate efficiency of the cooling tower.
7. To calculate efficiencies, mechanical advantages and velocity ratios of single and double purchase winch crabs.
8. To calculate the mechanical advantages, velocity ratios and efficiencies of worm and worm wheels of single, double & triple start.
9. To study the working of two stroke and four stroke SI engines.
10. To study the working of four stroke C.I. engine.
11. To study simple and compound screw jacks and a crane and find their mechanical advantages and velocity ratios.
12. To find percentage of error between the observed and calculated values of stresses in the members of JIB crane.
13. To draw SF & BM diagrams for a simply supported beam under point loads.

Note : Any TEN experiments from the above list are required to be performed by the students in the lab.

PRACTICAL TRAINING-I

At the end of fourth Semester each student would undergo six weeks Practical Training in an industry/Professional Organisation/ Research laboratory with the prior approval of the Director-Principal/ Principal of the concerned college and submit a written typed report alongwith a certificate from the organization. The report will be evaluated by a Board of Examiners to be appointed by the Director-Principal/Principal of the concerned College who will award one of the following grades :

Excellent	:	A
Good	:	B
Satisfactory	:	C
Not Satisfactory	:	F

A student who has been awarded 'F' grade will be required to repeat the practical training. The examination of practical training will be held alongwith the examination of the fifth semester.