

**M.D UNIVERSITY**  
**SCHEME OF STUDIES AND EXAMINATION**  
**B.Tech II YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)**  
**SEMESTER III**  
**'F' Scheme effective from 2010-11**

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
HUM-201-F OR MATH-201-F	ENGG. ECONOMICS OR MATHEMATICS - III	3 3	1 2	- -	4 5	50	100	-	150	3
HUM-203-F	FUNDAMENTALS OF MANAGEMENT (COMMON FOR ALL BRANCHES)	3	1	-	4	50	100	-	150	3
EE-201-F	ELECTRONICS DEVICES & CIRCUITS(ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EE-203-F	NETWORK THEORY (ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EE-205-F	ELECTROMECHANICAL ENERGY CONVERSION (ECE,EI,IC)	3	1	-	4	50	100	-	150	3
CSE-201-F	DATA STRUCTURE USING ' C' (ECE,EI,CSE,IT)	3	1	-	4	50	100	-	150	3
EE-221-F	ELECTRONIC WORKSHOP, PCB DESIGN & CIRCUIT LAB(ECE,EI)	-	-	2	2	25	-	25	50	3
EE-223-F	NETWORK THEORY LAB (ECE,EI,EE,EEE,IC)	-	-	2	2	25	-	25	50	3
EE-225-F	ELECTRICAL WORKSHOP & MACHINE LAB (ECE,EI)	-	-	3	3	50	-	50	100	3
CSE-205-F	DATA STRUCTURE USING 'C' Lab (ECE,EI,CSE,IT)		-	2	2	25	-	25	50	3
	<b>TOTAL</b>	<b>18</b>	<b>7</b>	<b>9</b>	<b>33 Or 34</b>	<b>425</b>	<b>600</b>	<b>125</b>	<b>1150</b>	

NOTE:

**1.Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**

**NOTE:** For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

#### **Section-A**

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

Concepts and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance.

#### **Section-B**

Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand.

Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale.

#### **Section-C**

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.

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

#### **Section-D**

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

Nature and characteristics of Indian economy (brief and elementary introduction), Privatization - meaning, merits and demerits. Globalisation of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement.

#### **TEXT BOOKS :**

1. Principles of Economics : P.N. Chopra (Kalyani Publishers).
2. Modern Economic Theory – K.K. Dewett (S.Chand)

#### **REFERENCE BOOKS :**

1. A Text Book of Economic Theory Stonier and Hague (Longman's Landon)
2. Micro Economic Theory – M.L. Jhingan (S.Chand)
3. Micro Economic Theory - H.L. Ahuja (S.Chand)
4. Modern Micro Economics : S.K. Mishra (Pragati Publications)
5. Economic Theory - A.B.N. Kulkarni & A.B. Kalkundrikar (R.Chand & Co.)
6. Indian Economy : Rudar Dutt & K.P.M. Sundhram

**MATH-201-F**

**MATHEMATICS-III**

(Common to CSE, ME, ECE, BME, EE, EEE, E&I, I&C, IT, CE)

L T P  
3 1 0

Class Work marks : 50  
Theory marks : 100  
Total marks : 150  
Duration of Exam : 3 hr

**NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section-A**

Fourier Series and Fourier Transforms : Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series.

Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

**Section-B**

Functions of Complex Variable : Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions. Limit and Continuity of a function, Differentiability and Analyticity.

Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, application to flow problems. Integration of complex functions. Cauchy-Integral theorem and formula.

**Section-C**

Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series. Zeros and singularities of complex functions, Residues. Evaluation of real integrals using residues (around unit and semi circle only).

Probability Distributions and Hypothesis Testing : Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions.

**Section-D**

Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (applications only), Chi-square test of goodness of fit.

Linear Programming : Linear programming problems formulation, Solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

**TEXT BOOKS :**

1. Engg Mathematics By Babu Ram, Pearson India
2. Advanced Engg. Mathematics : F Kreyszig.
3. Higher Engg. Mathematics : B.S. Grewal.

**REFERENCE BOOKS :**

1. Advance Engg. Mathematics : R.K. Jain, S.R.K. Iyenger.
2. Advanced Engg. Mathematics : Michael D. Greenberg.
3. Operation Research : H.A. Taha.
4. Probability and statistics for Engineers : Johnson. PHI.

L T P  
3 1 0

Class Work marks : 50  
Theory marks : 100  
Total marks : 150  
Duration of Exam : 3 hr

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#### **Section-A**

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

Principles of Management. The Management Functions, Inter-relationship of Managerial functions.

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

#### **Section-B**

Production Management : Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control; its importance and various methods.

#### **Section-C**

Marketing Management - Definition of marketing, Marketing concept, objectives & Functions of marketing. Marketing Research - Meaning; Definition; objectives; Importance; Limitations; Process. Advertising - meaning of advertising, objectives, functions, criticism.

#### **Section-D**

Introduction of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management. Brief Introduction to the concept of capital structure and various sources of finance.

#### **TEXT BOOKS :**

1. Principles and Practice of Management - R.S. Gupta, B.D.Sharma, N.S. Bhalla. (Kalyani Publishers)
2. Organisation and Management - R.D. Aggarwal (Tata Mc Graw Hill)

#### **REFERENCE BOOKS :**

1. Principles & Practices of Management – L.M. Prasad (Sultan Chand & Sons)
2. Management – Harold, Koontz and Cyrilo Donell (Mc.Graw Hill).
3. Marketing Management – S.A. Sherlikar (Himalaya Publishing House, Bombay).
4. Financial Management - I.M. Pandey (Vikas Publishing House, New Delhi)
5. Management - James A.F. Stoner & R.Edward Freeman, PHI.

**NOTE:** For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

**SECTION-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, Wiedmann-Franz law, super conductivity, effect of magnetic field, conducting materials, applications.

**SECTION-B****SEMICONDUCTORS, CONSTRUCTION AND CHARACTERISTICS OF DEVICES:**

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

Brief introduction to Planar Technology for device fabrication., metal -semiconductor junctions (ohmic and non-ohmic), breakdown mechanisms in p-n junction, zener diode, electrical and optical excitation in diodes, LED, solar cells and photo-detectors. And characteristics.

**SECTION-C TRANSISTORS:**

Transistors: Metal-semiconductor-field-effect-transistors (MESFET), Metal-insulator-semiconductor-field-effect-transistors (MISFET), Metal oxide semiconductor field effect transistor (MOSFET): Construction, Operation and characteristics of above devices.

Bipolar junction transistors: Fundamentals of BJT operation, amplification with BJTs,

**SECTION –D****SOME SPECIAL DEVICES:**

Photodiodes, photo detectors, solar cell, light emitting diodes, semiconductor lasers, light emitting materials. Tunnel Diode: degenerate semiconductors, IMPATT diode; The transferred electron mechanism: The GUNN diode. P-N-P-N diode, semiconductor controlled rectifier (SCR), bilateral devices: DIAC, TRIAC, IGBT

**Text Books:**

1. Agarwal - Foundations of analog & Digital electronic Circuits, Elsevier
2. B. G. Streetman and S. Banerjee "Solid state electronics devices", 5<sup>th</sup> Edition, PHI.
3. Donald Neumaen, "Electronic Circuit Analysis and Design", 3rd Edition, TMH.

**Reference Books:**

1. Alok Dutta, "Semiconductor Devices and circuits", Oxford University Press.
2. Ashby - Engineering Materials : Science and design, Elsevier

L T P  
3 1 0

Class Work marks : 50  
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Duration of Exam : 3 hr

**NOTE:** For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

#### **SECTION-A**

Signal analysis, complex frequency, and network analysis. General characteristics and descriptions of signals, step function and associated wave forms, The unit impulse Introduction to network analysis, network elements, initial and final conditions, step and impulse response, solution of network equations,

#### **SECTION-B**

Review of Laplace transforms, poles and zeroes, initial and final value theorems, The transform circuit, Thevenin's and Norton's theorems, the system function, step and impulse responses, the convolution integral. Amplitude and phase responses. Network functions, relation between port parameters, transfer functions using two port parameters, interconnection of two ports.

#### **SECTION-C**

Hurwitz polynomials, positive real functions. Properties of real immittance functions, Synthesis of LC driving point immittances, Synthesis of RC driving point impedances, Synthesis of RC impedances or RL admittances, properties of RL impedances and RC admittances.

#### **SECTION-D**

Properties of transfer functions, zeroes of transmission, synthesis of  $Y_{21}$  and  $Z_{21}$  with  $1\Omega$  terminations Introduction to active network synthesis, Network Topology and Graph Theory.

#### **Text Books:**

1. Bird - Electric Circuit theory & technology, Elsevier
2. Franklin F. Kuo, "Network Analysis and synthesis", 2<sup>nd</sup> Edition, Wiley India Pvt Ltd.
3. D Roy Choudary, "Network and Systems" New Age International,

#### **Reference Books:**

4. M. E. Van Valkenberg, "Network Analysis", 2<sup>nd</sup> Edition, Prentice Hall of India Ltd.

**EE-205-F      ELECTROMECHANICAL ENERGY CONVERSION**

L T P  
3 1 0

Class Work marks      : 50  
Theory marks            : 100  
Total marks             : 150  
Duration of Exam       : 3 hr

**NOTE:** For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

**SECTION-A**

**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.

**SECTION-B**

**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.

**SECTION -C**

**Synchronous Machine**

Constructional features, Armature winding, EMF Equation, Winding coefficients, equivalent circuit and phasor diagram, Armature reaction, O. C. & S. C. tests, Voltage Regulation

**Synchronous Motor:** Starting methods, Effect of varying field current at different loads, V- Curves.

**SECTION-D**

**Three phase Transformer & Induction Machine**

Three Phase Transformer: Review of Single phase transformer. Three Phase transformer: Basics & operation

Induction Machine: Constructional features, Rotating magnetic field, Principle of operation Phasor diagram, equivalent circuit, torque and power equations, Torque- slip characteristics, no load & blocked rotor tests, efficiency, Induction generator & its applications. Introduction of **Single phase Induction Motor, Repulsion motor. AC Commutator Motors:** Universal motor, Single phase a.c. series compensated motor, stepper motors

**Text Books:**

1. D.P.Kothari & I.J.Nagrath, "Electric Machines", Tata Mc Graw Hill
2. Ashfaq Hussain "Electric Machines" Dhanpat Rai & Company

**Reference Books:**

1. P.S.Bimbhra, "Electrical Machines", Khanna Publisher
2. Fitzgerald, A.E., Kingsley and S.D. Umans "Electric Machinery", MC Graw Hill.

**NOTE:** For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

### Section-A

**Overview of 'C' :** Introduction , Flow of Control, Input output functions, Arrays and Structures, Functions

**Data structures and Algorithms: an overview :** concept of data structure, choice of right data structures, types of data structures, basic terminology Algorithms, how to design and develop an algorithm: stepwise refinement, use of accumulators and counters; algorithm analysis, complexity of algorithms Big-oh notation.

**Arrays : Searching Sorting:** Introduction, One Dimensional Arrays, operations defined : traversal, selection, searching, insertion, deletion, and sorting

Searching: linear search, binary search; Sorting: selection sort, bubble sort, insertion sort, merge sort, quick sort, shell sort. Multidimensional arrays, address calculation of a location in arrays.

**Stacks and queues:** Stacks, array representation of stack. Applications of stacks. Queues, Circular queues, array representation of Queues, Deques, priority queues, Applications of Queues.

### Section-B Pointers and Linked Lists;

**Pointers:** Pointer variables, Pointer and arrays, array of pointers, pointers and structures, Dynamic allocation.

**Linked Lists:** Concept of a linked list,. Circular linked list, doubly linked list, operations on linked lists. Concepts of header linked lists. Applications of linked lists, linked stacks, linked Queues.

### Section-C Trees and Graphs

**Trees:** Introduction to trees, binary trees, representation and traversal of trees, operations on binary trees, types of binary trees, threaded binary trees, B Trees, . Application of trees.

**Graphs :** Introduction, terminology, 'set, linked and matrix' representation, operations on graphs, Applications of graphs.

### Section-D file Handling and Advanced data Structure

Introduction to file handling, Data and Information, File concepts, File organization, files and streams, working with files. AVL trees, Sets, list representation of sets, applications of sets, skip lists

### Text Books:

- 1 Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.
- 2 Data Structures using C by A. K. Sharma, Pearson

### Reference Books:

- 1 Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
- 2 Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
- 3 Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
- 4 Data Structures and Program Design in C By Robert Kruse, PHI,
- 5 Theory & Problems of Data Structures by Jr. Seymour Lipschetz, Schaum's outline by TMH
- 6 Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
- 7 Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H



**Objective:** To create interest in Hardware Technology.

1. Winding shop: Step down transformer winding of less than 5VA.
2. Soldering shop: Fabrication of DC regulated power supply
3. PCB Lab: (a) Artwork & printing of a simple PCB.  
(b) Etching & drilling of PCB.
4. Wiring & fitting shop: Fitting of power supply along with a meter in cabinet.
5. Testing of regulated power supply fabricated.

**Experiment to be performed**

1. Introduction & Hands on experience to use circuit creation & simulation software like TINAPRO , P-SPICE or ORCAD etc.
2. Design a full wave centre tapped rectifier & study the effect of capacitive filter & its output on a virtual oscilloscope.
3. Design a RLC resonance circuit & verify the transient & phase response for different values of R,L & C.
4. Design a circuit for a fixed power supply.
5. Design a half adder using discrete components & verify the timing diagrams.
6. Convert the power supply circuit into PCB & simulates its 2D & 3D view.
7. PCB printing using screen printing or any other technique.
8. Etching of the above PCB.
9. UV exposure & Drilling of PCB.
10. Coating of etched PCB to protect it from oxidation.
11. Fabrication & placing of components as per above power supply circuit.
12. Testing of above circuit.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & setup by the concerned institution as per the scope of the syllabus.

## LIST OF EXPERIMENTS :

## A: Simulation based

1. Introduction of circuit creation & simulation software like TINAPRO, P-Spice, Dr.-Spice/other relevant Software
2. Transient response of RC, RL circuit on any of above software.
3. To find the resonance frequency, Band width of RLC series circuit using any of above software.
4. To plot the frequency response of low pass filter and determine half-power frequency.
5. To plot the frequency response of high pass filter and determine the half-power frequency.
6. To plot the frequency response of band-pass filter and determine the band-width.

## B: Hardware Based

7. To calculate and verify "Z" & "Y" parameters of a two port network.
8. To determine equivalent parameter of parallel connections of two port network and study loading effect.
9. To calculate and verify "ABCD" parameters of a two port network.
10. To synthesize a network of a given network function and verify its response.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & setup by the concerned institution as per the scope of the syllabus.

L T P  
0 0 3

Class Work marks : 50  
Theory marks : 50  
Total marks : 100

## LIST OF EXPERIMENTS:

1. Introduction of tools, electrical materials, symbols and abbreviations.
2. To study stair case wiring.
3. To study house wiring i.e., batten, cleat, casing-caping and conduit wirings.
4. To study fuses, relays, contactors, MCBs and circuit breakers, fluorescent tube light.
5. Study of construction of a DC machine.
6. To plot O.C.C of a DC shunt generator 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. Star-delta starting of a three phase induction motor.
11. Plot O.C.C of a synchronous generator.
12. To plot V-curve of a synchronous motor.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & setup by the concerned institution as per the scope of the syllabus.

L T P  
0 0 2

Class Work marks : 25  
Theory marks : 25  
Total marks : 50

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on tables using functions only  
a) Addition b) Subtraction c) Multiplication d) Transpose
4. Using iteration & recursion concepts write the programs for Quick Sort Technique
5. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
6. Write a program for swapping of two numbers using 'call by value' and 'call by reference strategies.
7. Write a program to implement binary search tree.  
(Insertion and Deletion in Binary search Tree)
8. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list
9. Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.
10. Create a linked list and perform the following operations on it  
a) add a node b) Delete a node
11. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.
12. Write a program to simulate the various graph traversing algorithms.
13. Write a program which simulates the various tree traversal algorithms.

**Note: At least 5 to 10 more exercises to be given by the teacher concerned.**

**M.D UNIVERSITY**  
**SCHEME OF STUDIES AND EXAMINATION**  
**BE. II YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)**  
**SEMESTER – IV**  
**Modified 'F' Scheme effective from 2009-10**

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
HUM-201-F OR MATH-201-F	ENGG. ECONOMICS OR MATHEMATICS - III	3	1	-	4	50	100	-	150	3
		3	2	-	5					
EEE 228-F	SIGNALS & SYSTEMS(ECE,EI)	3	-	-	3	50	100	-	150	3
EE-202-F	ANALOG ELECTRONICS(ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EE-204-F	DIGITAL ELECTRONICS(ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EI-210-F	ELECTRONICS MEASUREMENT & MEASURING INSTRUMENTS (EI)	3	1	-	4	50	100	-	150	3
EE-208-F	ELECTRO MAGNETIC THEORY (ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EE-222-F	ANALOG ELECTRONICS LAB(ECE,EI,EE,EEE,IC)	-	-	2	2	25	-	25	50	3
EE-224-F	DIGITAL ELECTRONICS LAB(ECE,EI,EE,EEE,IC)	-	-	2	2	25	-	25	50	3
EI-202-F	ELECTRONICS MEASUREMENT & MEASURING INSTRUMENTS LAB (EI)	-	-	2	2	25	-	25	50	3
MATH-204 -F	NUMERICAL METHODS OF COMPUTATIONAL PROGRAMMING LAB(ECE,EI,EE,EEE,IC)	1	1	2	4	25	-	25	50	3
GP-202-F	GENERAL PROFICIENCY (COMMON FOR ALL BRANCHES)	-	-	2	2	50	-	-	50	3
	<b>TOTAL</b>	<b>19</b>	<b>6 Or 7</b>	<b>10</b>	<b>35 Or 36</b>	<b>450</b>	<b>600</b>	<b>100</b>	<b>1150</b>	

**Note:**

1. **Students will be allowed to use non-programmable scientific calculator. However, sharing of Calculator and other materials will not be permitted in the examination.**
2. **Each student has to undergo practical training of 6 weeks during summer vacation and its evaluation shall be carried out in the V semester.**

L T P  
3 1 0

Class Work marks : 50  
Theory marks : 100  
Total marks : 150  
Duration of Exam : 3 hr

**NOTE:** For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

#### Section-A

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

Concepts and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance.

#### Section-B

Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand.

Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale.

#### Section-C

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.

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

#### Section-D

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

Nature and characteristics of Indian economy (brief and elementary introduction), Privatization - meaning, merits and demerits. Globalisation of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement.

#### TEXT BOOKS :

1. Principles of Economics : P.N. Chopra (Kalyani Publishers).
2. Modern Economic Theory – K.K. Dewett (S.Chand)

#### REFERENCE BOOKS :

1. A Text Book of Economic Theory Stonier and Hague (Longman's Landon)
2. Micro Economic Theory – M.L. Jhingan (S.Chand)
3. Micro Economic Theory - H.L. Ahuja (S.Chand)
4. Modern Micro Economics : S.K. Mishra (Pragati Publications)
5. Economic Theory - A.B.N. Kulkarni & A.B. Kalkundrikar (R.Chand & Co.)
6. Indian Economy : Rudar Dutt & K.P.M. Sundhram

**MATH-201-F**

**MATHEMATICS-III**

(Common to CSE, ME, ECE, BME, EE, EEE, E&I, I&C, IT, CE)

L T P  
3 1 0

Class Work marks : 50  
Theory marks : 100  
Total marks : 150  
Duration of Exam : 3 hr

**NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**Section-A**

Fourier Series and Fourier Transforms : Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series.

Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

**Section-B**

Functions of Complex Variable : Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions. Limit and Continuity of a function, Differentiability and Analyticity.

Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, application to flow problems. Integration of complex functions. Cauchy-Integral theorem and formula.

**Section-C**

Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series. Zeros and singularities of complex functions, Residues. Evaluation of real integrals using residues (around unit and semi circle only).

Probability Distributions and Hypothesis Testing : Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions.

**Section-D**

Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (applications only), Chi-square test of goodness of fit.

Linear Programming : Linear programming problems formulation, Solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

**TEXT BOOKS :**

1. Engg Mathematics By Babu Ram, Pearson India
2. Advanced Engg. Mathematics : F Kreyszig.
3. Higher Engg. Mathematics : B.S. Grewal.

**REFERENCE BOOKS :**

1. Advance Engg. Mathematics : R.K. Jain, S.R.K. Iyenger.
2. Advanced Engg. Mathematics : Michael D. Greenberg.
3. Operation Research : H.A. Taha.
4. Probability and statistics for Engineers : Johnson. PHI.

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**SECTION-A**

**Semiconductor Diode:** Review of P-N junction and Characteristics, P-N junction as a rectifier, Switching characteristics of Diode, 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.

**SECTION-B**

**MOSFET:** Review of device structure operation and V-I characteristics. Circuits at DC, MOSFET as Amplifier and switch, Biasing in MOS amplifier circuits, small-signal operation and models, single stage MOS amplifier, MOSFET internal capacitances and high frequency model, frequency response of CS amplifier

**SECTION -C**

**BJT:** Review of device structure operation and V-I characteristics, BJT circuits at DC, BJT as amplifier and switch, biasing in BJT amplifier circuit, small-signal operation and models, single stage BJT amplifier, BJT internal capacitances and high frequency model, frequency response of CE amplifier.

**SECTION-D**

**Operational Amplifier:** Inverting and non-inverting configurations, difference amplifier, Effect of finite open loop gain and bandwidth on circuit performance, Large signal operation of op-amp.

**Feedback:** The general feed back structure, properties of negative feed back, the four basic feed back topologies, the series-shunt feedback amplifier, the series-series feedback amplifier, the shunt-shunt and shunt series feedback amplifier.

**Differential Amplifier:** MOS differential pair, small signal operation of the MOS differential pair, BJT differential pair, other non-ideal characteristic of the Differential amplifier (DA), DA with active load

**Text Books:**

1. Foundations of Analog & Digital electronic Circuits, Agarwal, Elsevier
2. A. S. Sedra and K. C. Smith, "Microelectronic Circuits", Oxford University Press, 5<sup>th</sup> Ed.
3. Integrated Electronics: Millman & Halkias ; McGrawHill
4. Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH

**Reference Books:**

1. Spencer and Ghausi, Introduction to Electronic Circuit Design, Pearson Education, 2003
2. A. Dutta, Semiconductor Devices and Circuits, Oxford University Press, ND 2008



L T P  
3 0 0Class Work marks : 50  
Theory marks : 100  
Total marks : 150  
Duration of Exam : 3 hr

**NOTE:** For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

**SECTION-A**

**Signals:** Definition, types of signals and their representations: continuous-time/discrete-time, periodic/non-periodic, even/odd, energy/power, deterministic/ random, one-dimensional/multi-dimensional; commonly used signals (in continuous-time as well as in discrete-time): unit impulse, unit step, unit ramp (and their inter-relationships), exponential, rectangular pulse, sinusoidal; operations on continuous-time and discrete-time signals (including transformations of independent variables).

**SECTION-B****Fourier Transforms (FT):**

- (i) Definition, conditions of existence of FT, properties, magnitude and phase spectra, Some important FT theorems, Parseval's theorem, Inverse FT, relation between LT and FT
- (ii) Discrete time Fourier transform (DTFT), inverse DTFT, convergence, properties and theorems, Comparison between continuous time FT and DTFT

**SECTION-C****Time and frequency domain analysis of systems**

Analysis of first order and second order systems, continuous-time (CT) system analysis using LT, system functions of CT systems, poles and zeros, block diagram representations; discrete-time system functions, block diagram representation, illustration of the concepts of system bandwidth and rise time through the analysis of a first order CT low pass filter

**SECTION D****Laplace-Transform (LT) and Z-transform (ZT):**

- (i) One-sided LT of some common signals, important theorems and properties of LT, inverse LT, solutions of differential equations using LT, Bilateral LT, Regions of convergence (ROC) (ii) One sided and Bilateral Z-transforms, ZT of some common signals, ROC, Properties and theorems, solution of difference equations using one-sided ZT, s- to z-plane mapping .

**Text Book:** `Signal and Systems' I J NAGRATH, R. RANJAN & Sharan, 2009 Edn., TMH, New Delhi

**Reference Books:**

1. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'Signals & System', PEARSON Education, Second Edition, 2003.
2. Schaume Series on Signals & Systems, HSU & RANJAN, TMH, India

**NOTE:** For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

**SECTION-A**

Digital system and binary numbers: Signed binary numbers, binary codes, cyclic codes, error detecting and correcting codes, hamming codes.

Gate-level minimization: The K-map method up to five variable, don't care conditions, POS simplification, NAND and NOR implementation, Quine Mc-Clusky method (Tabular method)

**SECTION-B**

Combinational Logic: Combinational circuits, analysis procedure, design procedure, binary adder-subtractor, decimal adder, binary multiplier, magnitude comparator, decoders, encoders, multiplexers, demultiplexers

**SECTION -C**

Synchronous Sequential logic: Sequential circuits, storage elements: latches, flip flops, analysis of clocked sequential circuits, state reduction and assignments, design procedure.

Registers and counters: Shift registers, ripple counter, synchronous counter, other counters

**SECTION- D**

Memory and programmable logic: RAM, ROM, PLA, PAL. Design at the register transfer level: ASMs, design example, design with multiplexers. Asynchronous sequential logic: Analysis procedure, circuit with latches, design procedure, reduction of state and flow table, race Free State assignment, hazards

**Text Book:**

1. M. Morris Mano and M. D. Ciletti, "Digital Design", 4<sup>th</sup> Edition, Pearson Education
2. Pedroni - Digital Electronics & Design, Elsevier
3. R.P. Jain , "Modern digital electronics" , 3rd edition , 12th reprint TMH Publication, 2007.
4. Digital Design and computer organization: Nasib Singh Gill & J. B. Dixit, university press(Laxmi Publication)

**REFERENCE BOOKS :**

1. Grout - Digital Design using FPGA'S & CPLD's, Elsevier
2. F. Vahid: Digital Design: Wiley Student Edition, 2006
3. J. F. Wakerly, *Digital Design Principles and Practices*, Fourth Edition, Prentice-Hall, 2005.
4. R. L. Tokheim, *Digital electronics, Principles and applications*, 6th Edition, Tata McGraw Hill Edition, 2003

L T P  
3 1 0Class Work marks : 50  
Theory marks : 100  
Total marks : 150  
Duration of Exam : 3 hr

**NOTE:** For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

**SECTION-A**

**Classification of Instruments-** Absolute Instruments, Secondary Instruments, Characteristics of Instruments, Static-Accuracy, Precision, sensitivity, Resolution, Static error, Reproducibility, Drift, Dead zone. Dynamic- speed of response, Lag, Fidelity, Dynamic error. Types of error- Gross, Systematic, Random. Units of measurement fundamental. Standards and their classification- International, Primary, Secondary, Working. Calibration of Instruments. Grounds- Importance of ground, Grounding, Equipment of grounding for safety.

**SECTION –B:****Analog DC and AC Meters**

Classification of Analog Instruments. Definition of Average & RMS value. PMMC- Working Principle, Construction, Sources of torque. Analog DC Ammeters & Voltmeters. Analog AC Ammeter, Voltmeter & Wattmeter. Analog Multimeter- Block Diagram of Analog Multimeter and operation only. How to use Basic meters.

**SECTION –C****Digital Meters**

Concepts of ADC & DAC only. Resolution, Sensitivity and Accuracy of digital display. Digital frequency meter- Block Diagram and operation only. Digital Voltmeter-Ramp type DVM, Integrating type, Successive approximation type DVM, Dual slope type DVM. (Block diagram, Operation and waveform if required). Digital Multimeter- Block Diagram and operation only. LCR, Q meter- Block diagram and operation only. Digital phase meter- Block diagram and operation only.

**SECTION-D****Oscilloscope, Signal Generator and Analyser**

Oscilloscope subsystems- Display subsystems- CRT, Deflection of electron beam in CRT, Electrostatic and Electromagnetic deflection sensitivity. CRO-Block diagram of single beam dual trace and dual beam oscilloscope. Block diagram of Digital storage oscilloscope. Uses of CRO- Frequency and phase measurement.

Concept of oscillator. Signal generator-AF and RF type- Block diagram and operation only. Function generator and pulse generator- Block diagram, Simple controls and operation only. Spectrum & Logic analyzer- Block diagram and operation only.

**TEXT BOOKS:**

1. Electronic Measurements & Instrumentations BY Morris, Elsevier.
2. A Course in Electrical and Electronic Measurement & Instrumentation : A. K. Sawhney; Dhanpat Rai
3. Kalsi Electronic Instruments Tata Mc Graw Hill

**REFERENCE BOOKS:**

1. Electrical Measurements : E.W. Golding
2. Electronic & Electrical Measurement & Instrumentation : J.B. Gupta; Kataria & Sons.
3. Electronic Instrumentation & Measurement Technique : W.D.Cooper & A.D.Helfrick.

**EE-208-F      ELECTROMAGNETIC FIELD THEORY**

L T P  
3 1 0

Class Work marks      : 50  
Theory marks            : 100  
Total marks             : 150  
Duration of Exam       : 3 hr

**NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.**

**SECTION-A**

Coordinate systems and transformation: Cartesian coordinates, circular cylindrical coordinates, spherical coordinates Vector calculus: Differential length, area and volume, line surface and volume integrals, del operator, gradient of a scalar, divergence of a vector and divergence theorem, curl of a vector and Stoke's theorem, Laplacian of a scalar

**SECTION-B**

Electrostatics: Electrostatic fields, Coulombs law and field intensity, Electric field due to charge distribution, Electric flux density, Gauss's Law – Maxwell's equation, Electric dipole and flux lines, energy density in electrostatic fields. Electric field in material space: Properties of materials, convection and conduction currents, conductors, polarization in dielectrics, dielectric constants, continuity equation and relaxation time, boundary condition. Electrostatic boundary value problems: Poisson's and Laplace's equations, general procedures for solving Poisson's or Laplace's equations, resistance and capacitance, method of images.

**SECTION-C**

Magnetostatics: Magneto-static fields, Biot-Savart's Law, Ampere's circuit law, Maxwell's equation, application of ampere's law, magnetic flux density- Maxwell's equation, Maxwell's equation for static fields, magnetic scalar and vector potential.  
Magnetic forces, materials and devices: Forces due to magnetic field, magnetic torque and moment, a magnetic dipole, magnetization in materials, magnetic boundary conditions, inductors and inductances, magnetic energy

**SECTION-D**

Waves and applications: Maxwell's equation, Faraday's Law, transformer and motional electromotive forces, displacement current, Maxwell's equation in final form.  
Electromagnetic wave propagation: Wave propagation in lossy dielectrics, plane waves in lossless dielectrics, plane wave in free space, plane waves in good conductors, power and the pointing vector, reflection of a plane wave in a normal incidence. Transmission lines: Transmission line parameters, Transmission line equations, input impedance, standing wave ratio and power,

**Text Books:**

1. M. N. O. Sadiku, "Elements of Electromagnetic", 4<sup>th</sup> Ed, Oxford University Press.

**Reference Books:**

1. W. H. Hayt and J. A. Buck, "Electromagnetic field theory", 7<sup>th</sup> edition TMH
2. Electromagnetic Field theory by Balmain and Jordan

L T P  
0 0 2

Class Work marks : 25  
Theory marks : 25  
Total marks : 50

**Objective:** To attain expertise in lab equipment handling and understanding the basic devices, their properties, characteristics in detail. Along with their practical usage in the circuit

1. **Study of lab equipments and components:** CRO, Multimeter, Function Generator, Power supply- Active, Passive Components & Bread Board.
2. **P-N Junction Diode:** Characteristics of PN Junction diode-Static and dynamic resistance measurement from graph.
3. **Applications of PN junction diode:** Half & Full wave rectifier- Measurement of  $V_{rms}$ ,  $V_{dc}$ , and ripple factor-use of filter- ripple reduction (RC Filter)-Clipper & Clamper
4. **Properties of junctions** Zener diode characteristics. Heavy doping alters the reverse characteristics. Graphical measurement of forward and reverse resistance.
5. **Application of Zener diode:** Zener diode as voltage regulator. Measurement of percentage regulation by varying load resistor.
6. **Characteristic of BJT:** BJT in CB and CE configuration- Graphical measurement of h parameters from input and output characteristics. Measurement of  $A_v$ ,  $A_i$ ,  $R_o$  and  $R_i$  of CE amplifier with potential divider biasing.
7. **Characteristic of FET:** FET in common source configuration. Graphical measurement of its parameters  $g_m$ ,  $r_d$  &  $m$  from input and output characteristics.
8. **Characteristic** of silicon-controlled rectifier.
9. **To plot** V-I Characteristics of DIAC .
10. **To draw** V-I characteristics of TRIAC for different values of Gate Currents.
11. Study of frequency response of active filters LP, HP & BP.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & setup by the concerned institution as per the scope of the syllabus.

**Objective:** To understand the digital logic and create various systems by using these logics.

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, concept of  $V_{cc}$  and ground, verification of the truth tables of logic gates using TTL ICs.
2. Implementation of the given Boolean function using logic gates in both SOP and POS forms.
3. Verification of state tables of RS, JK, T and D flip-flops using NAND & NOR gates.
4. Implementation and verification of Decoder/De-multiplexer and Encoder using logic gates.
5. Implementation of 4x1 multiplexer using logic gates.
6. Implementation of 4-bit parallel adder using 7483 IC.
7. Design, and verify the 4-bit synchronous counter.
8. Design, and verify the 4-bit asynchronous counter.
9. Static and Dynamic Characteristic of NAND and Schmitt-NAND gate(both TTL and MOS)
- 10 Study of Arithmetic Logic Unit.
11. Mini Project.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & setup by the concerned institution as per the scope of the syllabus.

L T P  
0 0 2

Class Work marks : 25  
Theory marks : 25  
Total marks : 50

## LIST OF EXPERIMENTS:

1. Compare the specifications of Analog and Digital multimeter.
2. Measure DC Voltage & DC Current using PMMC instruments.
3. Find the RMS & Average value from the measurement.
4. Measurement of R.L.C & quality factor using LCR, Q meter.
5. Measure phase using Digital phase meter.
6. Study front panel controls of specification of typical CRO.
7. Measure frequency, voltage, phase difference (by time measurement) using CRO.
8. Testing of component using CRO.
9. Using Lissagous pattern find frequency & phase difference of unknown signal.
10. Study & use of DSO.
11. Measurement of parameter of a Signal generator (Impedance, Distortion, Range).
12. Measure frequency & voltage of the different o/p waveforms of function generator.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & setup by the concerned institution as per the scope of the syllabus.

## **MATH-204 –F NUMERICAL METHODS OF COMPUTATIONAL PROGRAMMING LAB**

L T P  
1 1 2

Class Work marks : 25  
Theory marks : 25  
Total marks : 50

**THIS LAB IS DESIGNED IN manner where every lab will have first hour as lecture on Numerical methods and followed by 2 hours of programming Lab.**

### THEORY TO BE TAUGHT

Interpolation and curve fitting : Interpolation problem, Lagrangian polynomials, Divided differences, Least square approximations.

Non-Linear Equations : Bisection method, Linear Interpolation methods, Newton's method, Muller's method, fixed-point method.

Simultaneous Linear Equations : Elimination method, Gauss and Gauss-Jordan method, Jacobi's method, Gauss-Seidal method, Relaxation method.

Numerical Solution of Ordinary Differential Equations : Taylor series method, Euler and modified Euler method, Runge-Kutta methods, Milne's method, Adams-Moulton method, Power method for Eigen values by iteration.

Numerical Solution of Partial Differential Equations : Finite difference approximations of partial derivatives, solution of Laplace equation

### TEXT BOOKS :

1. Phillips - Theory & Applications & Numerical analysis, Elsevier
2. Applied Numerical Analysis : Curtis F. Gerald and Patrick G. Wheatley-Pearson, Education Ltd.
3. Numerical Methods By Babu Ram, Pearson
4. Numerical Method : E. Balagurusamy T.M.H.

### REFERENCE BOOKS :

1. Numerical Methods in Engg. & Science : B.S. Grewal.

### **LAB SESSION ( ANY TEN PROGRAMM TO BE DEVELOPED)**

#### **WRITE DOWN AND EXECUTE THE FOLLOWING PROGRAMS USING C/C++**

1. To find the roots of non-linear equation using Bisection method.
2. To find the roots of non-linear equation using Newton's method.
3. Curve fitting by least - square approximations.
4. To solve the system of linear equations using Gauss- Elimination method.
5. To solve the system of linear equations using Gauss-Seidal iteration method.
6. To solve the system of linear equations using Gauss-Jorden method.
7. To Integrate numerically using Trapezoidal rule.
8. To Integrate numerically using Simpson's rules.
9. To find the largest eigen value of a matrix by power-method.
10. To find numerical solution of ordinary differential equations by any one methods Euler's/ Runge-Kutta method.
11. To find the numerical solution of Laplace equation.
12. Department specific problem given by lecturer.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & setup by the concerned institution as per the scope of the syllabus.



GP-202 F

**GENERAL PROFICIENCY**

L. T. P  
- - 2

**Marks for Class Work ;50**  
**Total Marks: 50**

- Quiz & Aptitude
- Comprehension
- Communication for Specifics
- Lets Speak
- Composition Sills – Instead of the given content we should teach the students formal letter writing based on the trends in practice in corporate culture.
- Training on etiquettes & manners should be carried further and should be observed during the general classes, if required, even the faculty should imparted some training on the same.