4.1 ELECTRICAL MACHINES

L T P
4 - 3

RATIONALE

Electrical machines is a subject where a student will deal with various types of electrical machines which are employed in industries, power stations, domestic and commercial appliances etc. After studying this subject, diploma holder in Instrumentation and Control must be competent to repair and maintain these machines and give suggestions to improve their performance. Practical aspects of the subject will make the students capable of performing various tests on the machines as per latest BIS specifications

DETAILED CONTENTS

1. Three Phase Supply (6 hrs)
   - Advantage of three-phase system over single-phase system.
   - Star Delta connections
   - Relation between phase and line voltage and current in a three phase system
   - Power and power factor in three-phase system and their measurements by one, two and three Wattmeter methods.

2. Transformers (10 hrs)

   Principle of operation and constructional details of single phase and three-phase transformer, core type and shell type transformers, difference between single phase and three phase transformers, advantages and disadvantages.
   - Voltage Regulation of a transformer (No Derivation)
   - Losses in a transformer
   - Efficiency, condition for maximum efficiency and all day efficiency
   - Auto transformers and instrument transformer
   - CTs and PTs (Current transformer and potential transformer)

3. Introduction to Rotating Electrical Machines (10 hrs)
   - E.M.F induced in a coil rotating in a magnetic field.
   - Definition of motor and generator
   - Basic principle of a generator and a motor
   - Torque due to alignment of two magnetic fields and the concept of Torque angle

- Basic Electromagnetic laws
- Common features of rotating electrical machines.

4. DC Machines (14 hrs)
   - Principle of working of d.c motors and d.c generator, their constructional details
   - Function of the commutator for motoring and generating action
   - Factors determining the speed of a DC motor
   - Different types of excitation
   - Characteristics of different types of DC machines
   - Starting of DC motors and starters
   - Application of DC machines

5. A.C. Motors (12 hrs)
   - Revolving magnetic field produced by poly phase supply
   - Brief introduction about three phase induction motors, its principle of operation
   - Types of induction motors and constructional features of squirrel cage and slip-ring motors
   - Starting and speed control
   - Star Delta and DOL (Direct-on-line) starters.
   - Reversal of direction of rotation of 3-phase induction motors
   - Applications of induction motors
   - Principle and Working of Synchronous Machines(motors and generators)
   - Application of Synchronous Machines

6. Single Phase Fractional Kilowatt Motors (12 hrs)
   - Introduction
   - Principle of operation of single phase motors
   - Types of single phase induction motors and their constructional details (i.e. split phase, capacitor start, capacitor start and run, shaded pole and reluctance start)
   - Single phase synchronous motors – reluctance motor (hysteresis motor)
   - Commutator type single-phase motors – Repulsion Induction motor, shaded pole motors, a.c series motor and universal motors

- Introduction to servo- motors and stepper motors
- Concept of micro-motors.

LIST OF PRACTICALS

1. To measure power and power factors in 3 Phase load by two wattmeter method
2. To determine effect of a single phase transformer from the data obtained through open circuit and short circuit test
3. To connect the primary and secondary windings of a three phase transformer and to verify line and phase current and voltage relationship respectively
4. To connect a dc shunt motor with supply through a 3 point starter and to run the motor at different speeds with the help of a field regulator
5. To run a 3 phase squirrel cage induction motor with the help of a star-delta starter and to change the direction of rotation of the motor.
6. To run a 3 phase alternator in synchronism with busbar and to measure its voltage and frequency
7. To run a synchronous motor with a.c supply and to measure speed to verify the relation N=12O f/ P
8. To make connections of starting and running winding of a single phase capacitor motor and to run it with the help a DOL starter and to measure its speed
9. Study construction of a stepper and servo motor and to write their complete specifications.

RECOMMENDED BOOKS

1. Electrical and Electronics Engineering by SK Bhattacharya, Pearson Education, New Delhi
2. Electrical Machine by SK Bhattacharya, Tata Mc Graw Hill, New Delhi
3. Electrical Machines by Ghosh, Pearson Education, New Delhi
4. Electrical Machines by SK Sahdev, Unique International Publications, Jalandhar
5. Electrical Machines by Nagrath and Kothari, Tata Mc Graw Hill, New Delhi
6. Electrical Engineering by JB Gupta, SK Kataria & Sons, New Delhi
7. Electrical Technology Vol. - I and II B.L. Thareja, S Chand and Co. New Delhi

INSTRUCTIONAL STRATEGY

A visit to a small factory (Preferably Transformer Factory) must be organised to give live exposure to students. For this the teacher should visit first to understand the assembly line-up which could be followed by a visit of the students in groups of 10-20 (depending upon the size of the factory), where the instructor can give an idea of the working of the factory without much seeking assistance of the factory staff.

RECOMMENDED BOOKS

1) Electrical Machine by SK Bhattacharya, Tata McGraw Hills, New Delhi

2) Electrical Machines by Nagrath and Kothari, Tata McGraw Hills, New Delhi

3) Experiments in Basic Electrical Engineering: by S.K. Bhattacharya, KM Rastogi: New Age International (P) Ltd. Publishers, New Delhi

4) Electrical Machines by SK Sahdev, Unique International Publications, Jalandhar

5) Electrical Technology Vol. - I and II B.L. Thareja, S Chand and Co. New Delhi

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No.	Topic	Time Allotted (hrs)	Marks Allocation
1.	Three phase Supply	6	10
2.	Transformers	10	15
3.	Introduction to Rotating Electrical Machines	10	15
4.	DC Machines	14	20
5.	A.C. Motors	12	20
6.	Single Phase Fractional Kilowatt Motors	12	20
Total		**64**	**100**

4.2 TESTING AND MEASURING INSTRUMENTS

L	T	P
4	-	2

RATIONALE

Instrumentation and control engineering diploma holders are normally placed in process and manufacturing industries and service sector. They are required to operate and maintain various electrical and electronic systems. This course provides a starting background to the students of diploma programme in Instrumentation and Control acquainting him/her with various electrical and electronic instruments for their principle, operation, testing, calibration and applications. The detailed content of this course has been tailored as per industrial needs. Proper understanding of the measuring techniques, construction and working principles of various instruments will help the students in proper handling, operation and maintenance of industrial plants, control circuits and panels etc. This course will help the diploma students to pursue higher studies as well.

DETAILED CONTENTS

1. Introduction to Testing and Measurements (6 hrs)

Classification, Absolute and secondary instruments, Indicating recording and integrating instruments

1.1 Review of units, dimensions and standards
1.2 Symbolic representation of circuits

2 Measurement of Resistance, Inductance and Capacitance (12 hrs)

2.1 Measurement of resistance: Ohmmeters, Meggers, Wheatstone Bridge, Kelvin Bridge, Potentiometer method, Impedance Measurement:

2.2 Measurement of inductance and capacitance: AC bridge method, Wagner earth devices, Detectors – classification and types, Vibration galvanometers

3. Ammeter, Voltmeter and Multimeter (16 hrs)

Zero error Moving Iron, Permanent Magnet Moving Coil Meters, Range Extension, Thermal type, electrostatic inductor, rectifier instruments, Electronic voltmeter, Digital Voltmeter (DVM)- ramp type and integrating type digital voltmeters, D' Arsonoval Galvanometer, dynamo galvanometer equation of motion, damped, under damped and critical damped

Multimeter: Principle of measurement, Measurement of d.c voltage and a.c voltage, a.c and d.c sensitivity, Shunt and multiplier for range extension

4. Power and Energy Measurements (6 hrs)

   Watt meters – types, definition, classification, 2 Wattmeter and 3 Wattmeter methods, Energy Measurement, Energy meters – types, definition, principle, Maximum demand indicators

5. Frequency and Phase difference Measurement (4 hrs)

   Stroboscopes, synchro-scopes, Power factor meters, Digital frequency meters, phase sequence indicators

6. Illumination Instrument (6 hrs)

   Definition, Flicker, illumination photo meter

7. Cathode ray Oscilloscope (8 hrs)

   Block diagram, Construction of Circuit, Deflection sensitivity, Various controls, X–Y Section, delay line, Horizontal sweep section, synchronization of sweep and triggered sweep, Measurement of voltage, current, phase angle, frequency, CRO probes, dual trace beam, high frequency beam, Digital Storage Oscilloscope (DSO)

8. Construction, principle and operation of the following Meters and Instruments (6 hrs)

   Q-meter, transistor tester, LCR Bridge, function generator, Tong tester, flux meter, spectrum analyzer

LIST OF PRACTICALS

1. To identify and study of indicating, integrating and recording instruments.
2. Extension of range of a given voltmeter and an ammeter.
3. Use of analog and digital multimeter for measurement of voltage, current (a.c/d.c) and resistance
4. Study the constructional details, working and calibration of an ammeter (moving coil and moving iron type)
5. To measure power, power factor in a 1-phase circuit, using wattmeter and power factor meter and verify results with calculations.
6. Study the constructional details, working of a meggar and measurement of insulation resistance of a given motor.
7. To measure the value of earth resistance using earth tester.
8. To measure unknown resistance with wheat-stone bridge.

9. Connecting appropriate instruments at the supply of an installation to measure supply voltage, current, frequency, power, maximum demand, Phase sequence, energy consumed (Instruments to be used are Maximum demand Indicator, phase sequence indicator, energy meter, power factor meter, wattmeter, voltmeter, ammeter and frequency meter)
10. To measure frequency, power, power factor in a single-phase circuit, using digital frequency meter, wattmeter and power factor meter and to verify results with calculations.
11. Measurement of power and power factor of a three-phase balanced load by two wattmeter method.
12. Use of LCR meter for measuring inductance, capacitance, Q-factor and resistance.
13. Measurement of voltage, frequency, time period, phase and rise time and fall time using CRO.
14. Measurement of voltage, frequency, time and phase using Digital Storage Oscilloscope(DSO).
15. Measurement of illumination at different places using a photometer.

INSTRUCTIONAL STRATEGIES

While teaching this course the teacher should give demonstration in working and calibration of the instruments pertaining to relevant topics in the class. A visit to power plant or industry can also be organized in order to reinforce the classroom teaching and substantiating the course fundamentals

RECOMMENDED BOOKS

1. A Course in Electrical Measurement and Measuring Instruments by AK Sawhney; Dhanpat Rai and Sons, New Delhi
2. Electrical Measurements and Measuring Instruments by EW Golding and Widdis; Wheeler Publishing House, New Delhi
3. Electrical Measurements and Measuring Instruments by SK Sahdev, Unique International Publications, Jalandhar
4. Experiments in Basic Electrical Engineering by SK Bhattacharya and KM Rastogi, New Age International (P) Ltd., Publishers, New Delhi
5. Electrical Measurements by MU Reissland; Wiley Eastern Ltd., New Delhi
6. Electronic Measurement by Ternam Pettat
7. Electronics Test and Instrumentation by Rajiv Sapra, Ishan Publications, Ambala
8. Electronic, Instrumentation Fundamentals by Malvino
9. Electrical Measurement by DR Nagpal

10. Electric Instruments by D. Cooper, Prentice Hall of India, New Delhi
11. Basic Electrical Measurements by Melville B. Staut.
12. Electronics Instrumentation by JB Gupta, Satya Prakashan, New Delhi
13. Modern Electronic Instrumentation and Measurement Techniques by Cooper,
14. Electronics Instrumentation by Umesh Sinha

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No.	Topic	Time Allotted (hrs)	Marks Allocation
1.	Introduction to Testing and Measurements	6	10
2.	Measurement of Resistance, Inductance and Capacitance	12	20
3.	Ammeter, Voltmeter and Multimeter	16	25
4.	Power and Energy Measurements	6	10
5.	Frequency and Phase difference Measurement	4	5
6.	Illumination Instrument	6	10
7.	Cathode ray Oscilloscope	8	15
8.	Construction, principle and operation of the following Meters and Instruments	6	5
Total		**64**	**100**

4.3 TRANSDUCERS AND SIGNAL CONDITIONING

L	T	P
4	-	2

RATIONALE

Signal conditioning is an integral part of any instrumentation system. This subject gives an introduction to various methods of processing a signal available from a transducer to make it worth displaying or computer compatible. Telemetry is an advanced application of communication for instrumentation which lays the foundation for modern means of information transmission and reception like digital data ,satellite based communication.

After studying the course the students will be able to identify different types of sensors and transducers and their applications in the field of instrumentation and control. The students will be able to select appropriate transducers relating to a process and will also get the relevant technical know how about the conditioning of a signal from a transducer for the purpose of control. Subject teachers are advised to show the students different types of sensors and transducers while teaching the various topics of this course. Further, teachers may give some assignment problems related to industrial signal processing and applications which calls for use of specific transducer and signal conditioning equipment in specifications.

DETAILED CONTENTS

1. Basic concepts (4 hrs)

   - Definition and classification of transducers, selection criteria, characteristics

2. Variable Resistance Transducers (10 hrs)

   Construction, working principle, selection criteria and application of

   - Potentiometer, strain gauge, load cell
   - Hot wire anemometer, photo resistors
   - Resistive temperature transducers
   - Thermistors
   - Carbon Microphones
   - Accelerometer advantages, disadvantage and limitation

3. Variable Inductance transducer (8 hrs)

   Construction, working principles and application of

   - Electromagnetic pick up
   - Induction potentiometer

- Linear variable differential transformer
- Synchronous transmitter and receivers, advantages, disadvantages and limitations

4. Variable capacitance Transducers (10 hrs)

Construction, basis principle selection criteria and application of

- Capacitance pick up
- Condenser microphone
- Differential capacitor pick up advantages, disadvantages and limitations

5. Piezoelectric Transducers (10 hrs)

Construction, basic principle, selection criteria and application of
- Piezoelectric Transducer
- Seismic pick up
- Ultrasonic Transducer
- Advantage, disadvantages and limitations

6. Other types of transducers (10 hrs)

- Transducers based upon hall effect
- Optical transducers-photo diode, photo transistor LDR and LED
- Digital transducer-single shaft encoder
- Techo generator
- Advantage and disadvantage and limitations
- Magnetostrictive transducers

7. Principle of Analog Signal Conditioning (12 hrs)

- Linearization
- Various types of conversions (from V to F, from F to V, V to I converters and I to V converters)
- Filtering and impedance matching

Note: Visits may be arranged to concerned industries

LIST OF PRACTICALS

1. Study of strain gauge and measurement of strain for a given sample
2. Study of piezoelectric pressure transducer
3. Study of RTD (Resistance Temperature detector)
4. Study of thermistors and Measurement of temperature
5. Study of calibration of LVDT

6. Study of capacitive transducer and measurement of angular displacement
7. Study of magnetic pick up
8. Study and draw the characteristics of a capacitance transducer
9. Study of thermocouple
10. To study and draw the characteristics of following
    - LDR
    - Photo diode
    - Photo transistor
    - Capacitance transducers

RECOMMENDED BOOKS

1. Mechanical and industrial measurements by RK Jain, Khanna Publishers,New Delhi
2. Modern Control Engineering by OGATA
3. Fundamentals of Instrumentation by AE Fribance
4. Transducers by Peter Norton
5. Mechatronics by Bolton, Prentice Hall of India, New Delhi
6. Electronics Measurement and Instrumentation by AK Sawhney, Dhanpat Rai and Co, New Delhi

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No.	Topic	Time Allotted (hrs)	Marks Allocation
1.	Basic concepts	4	5
2.	Variable Resistance Transducers	10	15
3.	Variable Inductance transducer	8	15
4.	Variable capacitance Transducers	10	15
5.	Piezoelectric Transducers	10	15
6.	Other types of transducers	10	15
7.	Principle of Analog Signal Conditioning	12	20
Total		**64**	**100**

4.4 PROCESS INSTRUMENTATION – I

L	T	P
3	-	2

RATIONALE

With the advent of technological developments, more and more automation has been introduced in the modern industries. Industrial process is an emerging area in the field of Instrumentation and Control. Industrial process measurement forms a key subject in this course of study. The inputs imparted through this subject will enable the students apprehend the various types of measurement techniques used in industrial process. The syllabus of this course has been designed in two parts to provide insight to the students in the measurement of different process parameters in industry. The course contains different methods of measurement, their selection and limitations. The first part of the course titled "Process Instrumentation – I" includes measurements related to metrology and industrial parameters like mass, weight, torque, power, speed and motion etc.

DETAILED CONTENTS

1. Introduction (10 hrs)

   Measurement of length, angle, area, working principle of vernier calipers, micrometer, comparator,.

2. Measurement of Weight, Torque, Power, Speed and Force (13 hrs)

   Various methods

3. Measurement of Stress and Strain (9 hrs)

   Strain gauges, their types, gauge factor, load cells, temperature compensation.

4. Measurement of Motion (7 hrs)

   Displacement, velocity, acceleration; seismic pickups.

5. Thickness Measurement (9 hrs)
   Thickness measurement by using:

   - Resistive method
   - Inductive method
   - Capacitive method
   - Ultrasonic method
   - Nuclear method

Note: Visits may be arranged in concerned industries.

LIST OF PRACTICALS

1. Measurement of speed using Tachometer.
2. Measurement of stress and strain using strain gauge/ load cell.
3. Study of various types of strain gauge and their construction.
4. Measurement of vibration by vibration analyzer.
5. Study of torsion dynamometers for measurement of torque.
6. Measurement of acceleration torque by accelerometer.
7. Measurement of thickness using capacitive transducer.
8. Study of a seismic pickup

RECOMMENDED BOOKS

1. Mechanical and Industrial Measurements by RK Jain, Khanna Publishers,New Delhi
2. Mechanical Measurement and Instrumentation by AK Sawhney, Dhanpat Rai and Co, NewDelhi
3. Mechanical Systems Design and Applications by EO Doeblin.

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No.	Topic	Time Allotted (hrs)	Modified Percentage Weightage
1.	Introduction	10	20
2.	Measurement of Mass, Weight, Torque, Power and Speed	13	30
3.	Measurement of Stress and Strain	9	20
4.	Measurement of Motion	7	10
5.	Thickness Measurement	9	20
Total		**48**	**100**

4.5 INSTRUMENTATION DRAWING AND DOCUMENTATION

L	T	P
-	-	6

RATIONALE

In earlier semesters the students have been taught about the various methods of drawings of components and assemblies. They also acquired the skill of depiction of engineering technology. After the completion of the syllabus of this subject, students will be able to draw and interpret the actual drawings used in the field of Instrumentation and Control.

Note: This subject is like Engineering Drawing. Question paper will be set by the Board of Technical education. The students will work on Drawing Sheets. External examiner will conduct viva examination after the students complete their question paper.

DETAILED CONTENTS

1. Study of Symbols (14 hrs)

   - Electronic symbols
   - Process instrumentation symbols
   - Schematic symbols
   - Balloon symbols
   -Graphical symbols for pipe fittings, valves and piping.

2. Line symbols, colour coding of lines and flow sheet codes. Instrument identification. (10 hrs)

3. Introduction to various diagrams (12 hrs)

   Block diagram, schematic diagram, wiring diagram, graphical panel diagram and blow up diagrams (Exploded views).

4. Installation instrument systems, study of installation procedure of instrument and check-list of good installation procedures. (12 hrs)

5. Instrumentation drawing of a power plant and draw sketches in block diagram or flow chart forms. (10 hrs)

6. Printed Circuit Board (PCB) (08 hrs)

   Introduction to PCBs, their classification-single sided and double-sided boards, PCB layout designing.

7. Sketches of process controllers such as pneumatic, hydraulic and PI etc, control valves and plugs. (14 hrs)

8. Schematic diagrams (16 hrs)

Schematic diagrams of various hydraulic and pneumatic components such as single acting cylinder, double acting cylinder, tandom valve, shuttle valve, spring return cylinder, SOL-SOL valve, pneumatic relay.

RECOMMENDED BOOKS

1. Applied Instrumentation by WG Andrews
2. Instrumentation Engineers Hand Book by BG Liptik Vol.2
3. Handbook of Applied Instrumentation by DM Considine
4. Mechanical and Industrial Measurements by RK Jain, Khanna Publishers,New Delhi

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No.	Topic	Time Allotted (hrs)	Marks Allocation
1.	Study of Symbols	14	15
2.	Line symbols, colour coding of lines and flow sheet codes. Instrument identification.	10	10
3.	Introduction to various diagrams	12	10
4.	Installation instrument systems, study of installation procedure of instrument and check-list of good installation procedures.	12	10
5.	Instrumentation drawing of a power plant and draw sketches.	10	10
6.	Printed Circuit Board (PCB)	8	10
7.	Sketches of process controllers such as pneumatic, hydraulic and PI etc, control valves and plugs.	14	15
8.	Schematic diagrams	16	20
Total		**96**	**100**

4.6 MICROPROCESSORS, MICROCONTROLLERS AND THEIR APPLICATIONS

L T P
4 - 3

RATIONALE

A diploma holder in industry is called upon to design, modify and troubleshoot such control circuits. Microprocessors and microcontrollers are being extensively used in the field of instrumentation and control. The students studying this subject will understand the architecture of typical microprocessor and a microcontroller and their application in control systems. In addition, Microcontrollers have also assumed great significance in field of electrical and electronics engineering. It is very easy and cost effective to operate a device using microcontroller. They are even replacing microprocessors. The knowledge of architecture, software and interfacing techniques leads to understanding of CPU in a microcomputer. The course will deal with the architecture, instruction sets and control application of 8085 microprocessor and 8051 microcontroller.

DETAILED CONTENTS

Microprocessors

1. Introduction – evolution, importance and application. (04 hrs)

2. Architecture of a Microprocessor- 8085 (12 hrs)

   a) Concept of a bus and bus organization.
   b) Functional block diagram and function of each block.
   c) Pin details of 8085 and related signals.
   d) Demultiplexing of address/data bus and memory read/write cycles.

3. Programming (with respect to 8085 microprocessor) (12 hrs)

   a) Brief idea of machine and assembly languages, Machines and Mnemonic codes.
   b) Instruction format and Addressing modes. Identification of instructions as to which addressing mode they belong.
   c) Concept of Instruction set. Explanation of the instructions of the following groups of instruction set
   d) Data transfer groups, Arithmetic Group, Logic Group, Stack, I/O and Machine Control Group.
   e) Programming exercises in assembly language. (Examples can be taken from the list of experiments).

4 Interfacing and Data Transfer Schemes (08 hrs)

   a) Memory mapped I/O and I/O mapped schemes.
   b) Interrupts of 8085, maskable and non-maskable interrupts, software interrupts, marking of interrupts

5. I/O Chips (08 hrs)

   a) 8255 : pin configuration & block diagram
   b) 8259: pin configuration & block diagram
   c) 8257: pin configuration & block diagram

Micro controllers

6. Introduction (10 hrs)

Ccomparison of microcontroller and microprocessor, Architecture of 8051, hardware I/O pins, ports, connecting external memory, counters, timers serial port, I/O interrupts.

7. Instruction set and Addressing Modes (06 hrs)

- Addressing Modes and its types
- Basic Instruction like: - Data Transfer, Conditional and Arithmetic)

8. Assembly Language Programming (04 hrs)

- Assemblers and Compilers
- Programming based on basic instructions

LIST OF PRACTICALS

1. Familiarization with 8085 based kit.
2. Familiarization of micro-controller (8051) based kit
3. Application of 8051 instruction set to develop various programs regarding arithmetic, data transfer and conditional operations (two experiments each)
4. Testing of general Input/output on Micro controller Board.
5. Use of software development tools like KEIL Compiler.

RECOMMENDED BOOKS

1. Microprocessors Architecture, Programming and Applications by Gaonkar; New Age Publications, New Delhi.
2. An introduction to Microprocessors by AP Mathur; Tata McGraw Hill Publishers, New Delhi.
3. Fundamentals of Microprocessors and Microcomputers by B Ram
4. 8051 Microprocessors, Architecture, Programming and Applications by Udaykumar, Pearson Education, Sector 62, Noida
5. Microprocessor and Interfacing, Programming and Hardware by Douglas V.Half.
6. 8051 Microcontroller Architecture and Programming by Ayalar Penram; International Publications.
7. Design with Microcontroller by C Nagra, Murthy, S Rampal Joshi,B Peatman; Tata McGraw Hill Publishers, New Delhi.
8. 8051 Architecture, Programming and design by Kennith J. Ayala
9. 8051 Microcontrollers by Mackenzie, Pearson Education, Sector 62, Noida
10. 8051 Microcontrollers, Architecture, Programming and Applications by Uma Rao, Pearson Education, Sector 62, Noida

SUGGESTED DISTRIBUTION OF MARKS FOR FACILITATING THE PAPER SETTER

Sr. No.	Topic	Time Allotted (hrs)	Modified Percentage Weightage
Microprocessors			
1.	Introduction	4	5
2.	Architecture of a Microprocessor- 8085	12	20
3.	Instruction Set for Intel 8085	12	20
4.	Programming (with respect to 8085 microprocessor)	08	15
5.	I/O Chips	08	15
Microcontrollers			
6.	Interfacing and Data Transfer Schemes	10	15
7.	Instruction set and Addressing Modes	06	10
8.	Assembly Language Programming	04	10
Total		**64**	**100**

ENTREPRENEURIAL AWARENESS CAMP

The employment opportunities for diploma holders especially in public sector are dwindling. The diploma holders need to explore the possibilities of becoming entrepreneurs. For this, they must be acquainted with entrepreneurial development, scope of setting up small scale industry, existing business opportunities, financial support available and various aspects of managing business. In this context, an entrepreneurial awareness camp is suggested. During the camp, experts from various organizations such as banks, financial corporations, service institutes etc. may be invited to deliver expert lectures. Successful entrepreneurs may also be invited to interact with the students. In addition, the students may be encouraged to read papers or give seminar during the camp on Entrepreneurship Development and related topics.

The camp is to be organized preferably at a stretch for two to three days during 4th semester(second year). Expert Lectures will be delivered on the following broad topics. There will be no examination for this subject/camp.

1. Who is an entrepreneur?
2. Need for entrepreneurship, entrepreneurial career and wage employment
3. Scenario of development of small scale industries in India
4. Entrepreneurial history in India, Indian values and entrepreneurship
5. Assistance from District Industries Centres, Commercial Banks. State Financial Corporations, Small industries Service Institutes, Research and Development Laboratories and other financial and development corporations
6. Considerations for product selection
7. Opportunities for business, service and industrial ventures
8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs)
9. Legal aspects of small business
10. Managerial aspects of small business

INDUSTRIAL TRAINING OF STUDENTS

(after IV Semester examinations)

It is needless to emphasize further the importance of Industrial Training of students during their 3 years of studies at Polytechnics. It is industrial training, which provides an opportunity to students to experience the environment and culture of industrial production units and commercial activities undertaken in field organizations. It prepares student for their future role as diploma engineers in the world of work and enables them to integrate theory with practice. Polytechnics have been arranging industrial training of students of various durations to meet the above objectives.

This document includes guided and supervised industrial training of a minimum of 6 weeks duration to be organised during the semester break starting after second year i.e. after IV Semester examinations. The concerned HODs along with other teachers will guide and help students in arranging appropriate training places relevant to their specific branch. It is suggested that a training schedule may be drawn for each student before starting of the training in consultation with the training providers. Students should also be briefed in advance about the organizational setup, product range, manufacturing process, important machines and materials used in the training organization.

Equally important with the guidance is supervision of students training in the industry/organization by the teachers. A minimum of one visit per week by the teacher is recommended. Students should be encouraged to write daily report in their diary to enable them to write final report and its presentation later on.

An internal assessment of 50 and external assessment of 50 marks have been provided in the study and evaluation scheme of V Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations. The formative and summative evaluation may comprise of weightage to performance in testing, general behaviour, quality of report and presentation during viva-voce examination. It is recommended that such evaluations may be carried out by a team comprising of concerned HOD, teachers and representative from industry.

Teachers and students are requested to see the footnote below the study and evaluation scheme of IV Semester for further details.