

Faculty of Engineering & Technology
P.K. University
Shivpuri (MP)



**Syllabus and
Evaluation Scheme**

**DIPLOMA
Electrical & Electronics Engineering**

5TH SEMESTER

(Effective from Session: 2025-26)

EVALUATION SCHEME DIPLOMA –ELECTRICAL & ELECTRONICS ENGG.

Study And Evaluation Scheme For Diploma Electrical & Electronics Engg. SEMESTER-5

SUBJECT CODE	SUBJECTSNAME	STUDY SCHEME Periods/Week			Credits	Marks In Evaluation Scheme						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
DINDUEX501	INDUSTRIAL MANAGEMENT & ENTREPRENEURSHIP DEV.	4	-	-	4	30	-	30	70	-	70	100
DSWITEX502	SWITCH GEAR & PROTECTION	3	1	-	4	30	-	30	70	-	70	100
DMICREX503	MICROPROCESSOR AND APPLICATION	3	1	-	4	30	-	30	70	-	70	100
DCONTEX504	CONTROL SYSTEM	3	1	-	4	30	-	30	70	-	70	100
DELECEX505	ELECTRICAL DRAFTING IN AUTOCAD LAB	0	0	2	1	-	25	25	-	25	25	50
DMICREX506	MICROPROCESSOR AND APPLICATION LAB	0	0	2	1	-	25	25	-	25	25	50
DINDUEX507	INDUSTRIAL TRAINING	-	-	-	2	-	-	-	-	-	50	50
Total		13	3	4	20	120	50	170	280	50	380	550

Department of Electrical & Electronics Engineering
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4	0	0

III Year V Semester

**DINDUEX501: INDUSTRIAL MANAGEMENT AND
ENTREPRENEURSHIP DEVELOPMENT**

1. Principles of Management

- 1.1 Management, Different Functions: Planning, Organizing, Leading, Controlling.
- 1.2 Organizational Structure, Types, Functions of different departments.
- 1.3 Motivation: Factors, characteristics, methods of improving motivation, incentives, pay, promotion, rewards, job satisfaction, job enrichment.
- 1.4 Need for leadership, Functions of a leader, Factors for accomplishing effective leadership, Manager as a leader, promoting teamwork.

2. Human Resource Development

- 2.1 Introduction, objectives and functions of human resource development (HRD) department.
- 2.2 Recruitment, methods of selection, training strategies and career development.
- 2.3 Responsibilities of human resource management – policies and functions, selection – Mode of selection – Procedure – training of workers, Job evaluation and Merit rating.

3. Wages and Incentives

- 3.1 Definition and factors affecting wages, methods of wage payment.
- 3.2 Wage incentive – type of incentive, difference in wage, incentive and bonus; incentives of supervisor.
- 3.3 Job evaluation and merit rating.

4. Human and Industrial Relations

- 4.1 Industrial relations and disputes.
- 4.2 Relations with subordinates, peers and superiors.
- 4.3 Characteristics of group behavior and trade unionism.
- 4.4 Mob psychology.
- 4.5 Grievance, handling of grievances.
- 4.6 Agitations, strikes, Lockouts, Picketing and Gherao.
- 4.7 Labour welfare schemes.
- 4.8 Workers' participation in management.

5. Professional Ethics

- 5.1 Concept of professional ethics
- 5.2 Need for code of professional ethics.

5.3 Professional bodies and their role.

6. Sales and Marketing management

- 6.1 Functions and duties of sales department.
- 6.2 Sales forecasting, sales promotion, advertisement and after sale Services.
- 6.3 Concept of marketing.
- 6.4 Problems of marketing.
- 6.5 Pricing policy, break even analysis.
- 6.6 Distribution channels and methods of marketing.

7. Labour Legislation Act (as amended on date)

- 7.1 Factory Act 1948.
- 7.2 Workmen's Compensation Act 1923.
- 7.3 Apprentices Act 1961.
- 7.4 PF Act, ESI Act.
- 7.5 Industrial Dispute Act 1947.
- 7.6 Employers State Insurance Act 1948.
- 7.7 Payment of Wages Act, 1936.
- 7.8 Intellectual Property Rights Act

8. Material Management

- 8.1 Inventory control models.
- 8.2 ABC Analysis, Safety stock, Economic ordering quantity.
- 8.3 Stores equipment, Stores records, purchasing procedures, Bin card, Cardex.
- 8.4 Material handling techniques.

9. Financial Management

- 9.1 Importance of ledger and cashbook.
- 9.2 Profit and loss Account, Balance sheet.
- 9.3 Interpretation of Statements, Project financing, Project appraisal, return on investments.

10. Entrepreneurship Development

- 10.1 Concept of entrepreneur and need of entrepreneurship in the context of prevailing employment conditions.
- 10.2 Distinction between an entrepreneur and a manager.
- 10.3 Project identification and selection.
- 10.4 Project formulation.
- 10.5 Project appraisal.
- 10.6 Facilities and incentives to an entrepreneur.

11. Fundamental of Economics

- 11.1 Microeconomics.
- 11.2 Macroeconomics.

12. Accidents and Safety

- 12.1 Classification of accidents based on nature of injuries, event and place.
- 12.2 Causes and effects of accidents.
- 12.3 Accident-prone workers.
- 12.4 Action to be taken in case of accidents with machines, electric shock, fires and erection and construction accidents.
- 12.5 Safety consciousness and publicity.
- 12.6 Safety procedures.
- 12.7 Safety measures – Do's and Don'ts and good housing keeping

Department of Electrical & Electronics Engineering
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P.K. University, Shivpuri (MP)

III Year V Semester

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DSWITEX502: SWITCH GEAR AND PROTECTION

1. Faults:

Types of faults, three phase symmetrical faults, effects of faults on system Reliability and stability abnormalities, short circuits and their effects, Representation of fault conditions through single line diagrams.

2. Switch Gear:

2.1 Purpose of protective gear, characteristics of a protection system.

2.2 Classification of fuses H.V. Fuses, application and working, grading and co-ordination L.V. Fuses, selection of fuses, characteristics.

2.3 Isolators and switches, outdoor isolators, functions, air break switches Braking capacity of switches.

2.4 Circuit breakers: - requirements of circuit breakers definition of terms Associated with circuit-breakers, reasons for arc formation, principles of arc extinction, types of circuits-breakers, comparison with oil circuit Breaker classification, rating of circuit breakers, working of different

Types of air and oil circuit breaker, specification of circuit breakers, Maintenance schedule. SF-6 and circuit breakers.

2.5 Relays: Requirement of relays, operation principles induction type over Current, directional over current, differential, percentage differential Relays working, applications and characteristics, basic principles of Static relays. Introduction of distance relay.

3. Protective Schemes:

3.1 Protection of alternators, stator faults, rotor faults, mechanical conditions, External faults their reasons, effect and protections used.

3.2 Protection of power transformer: types of faults, its effects, types of Protective schemes over current earth fault, differential protection, Buchholtz devices, winding temp. Protection.

3.3 Motor protection: types of faults and protection in motors, thermal relays, Protection of small motors, under voltage protection.

3.4 Protection of feeders: radial, parallel and ring Feeders protection, Directional time and current Graded schemes differential protection.

4. Protection Against Over Voltages:

4.1 Causes of over voltages, travelling wave's earth wire, protective zone, Lightning arrestors, space-gap and electrolytic arrestors, surge Absorber, location and rating of lightening arrestors Thyrite lightening Arrestor.

5. Different Type of Sub-Stations:-

Layout, single line diagram bus bar arrangement, equipment's their functions, Accessories, study of protective schemes, etc. batteries and their Maintenance, operation of small sub-station.

Reactors: types of reactors, bus bar reactor, tuning reactor, arc-suppression Reactor
connection of reactors in power stations. Uses o reactors.

Neutral grounding: - types of grounding solid grounding, reactance Grounding, arc suppression coil grounding, choice of method of neutral Earthing. Grounding of sub-station, grounding of line structure And substation equipment.

Concept of G.I.S. (Gas Insulated Substation).

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III Year V Semester

DMICREX503: MICROPROCESSOR AND APPLICATION

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1. OVERVIEW OF MICROCOMPUTERS SYSTEM:

1.1 Functional block.

- (a) CPU.
- (b) Memory.
- (c) Input/Out devices (Keyboard, Floppy drive, Hard disk drive, Tape drive, VDU, Printer, Plotter).

1.2 Concept of programme and data memory.

- (a) Registers (general purpose).
- (b) External memory for storing data and results.

1.3 Data transfer between registers.

1.4 Concept of tristatebus.

1.5 Control on registers.

2. INTRODUCTION OF 8085MICROPROCESSOR:

Evolution of Microprocessor, Register Structure, ALU, BUS Organization, Timing and Control.
Internal Architecture of 8085 microprocessor, Pin diagram and input output(in detail)

3. INTRODUCTION OF 8086MICROPROCESSOR:

Internal organization of 8086, Bus Interface Unit, Execution Unit, Unit, register, Organization, Sequential Memory Organization, Bus Cycle.

4. ASSEMBLY LANGUAGE PROGRAMMING:

Addressing Modes, Data Transfer, Instructions, Arithmetic and Logic Instruction, Program Control Instructions (Jumps, Conditional Jumps, Subroutine Call) Loop and String Instructions, Assembler Directives.

5. BASIC I/O INTERFACING:

Programmed I/O, Interrupt Driven I/O, DMA, Parallel I/O (8255-PPI, Centronics Parallel Port), Serial I/O(8251/8250, RS-232 Standard), 8259-Programmable Interrupt Controller, 8237-DMA Controller, 8253/8254-Programmable Timer/Counter, A/D and D/A conversion.

6. MEMORY INTERFACING:

Types of Memory, RAM and ROM Interfacing with Timing Considerations, DRAM Interfacing. Memory organization, Extension of memory in word length and depth, Memory mapping, Bus contention and How to avoid it.

7. ADVANCE MICROPROCESSOR AND MICRO CONTROLLERS:

Brief idea of Microcontroller 8051, Pentium and Power PC

NOTE: Study of Popular ICs Read/WriteChips-8155/8156,2114,2148,2164. ROM Chips- 8355,2716,2732,8755.Othersupport chips - 8279,8257,8275,8205.

LIST OF BOOKS

- 1. Singh, B. P. - Advanced Microprocessor and Microcontrollers- New Age International.
- 2. Singh, B. P. - Microprocessor Interfacing and Application -New Age International.
- 3. Brey, Barry B.-INTELMicroprocess-Prentice Hall (India)-4thEdition.
- 4. Liu and Gibson G.A. - Microcomputer System-The 8086/8088 Faimly- Prentice Hall (India) 2ndEdition.
- 5. Sombir Singh- Microprocessor and Its Application-Jai Prakesh Publication, Meerut

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III Year V Semester

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DCONTEX504: CONTROL SYSTEM

1 . Introduction:

Need of automatic control, Concept of open loop and closed loop control, Block diagram of feedback control system and its basic elements, definition and explanation of following control system.

- (i) Linear and Non-Linear Systems.
- (ii) Continuous and discrete Systems.
- (iii) Static and Dynamic Systems.
- (iv) Single Input Single Output (SISO) System and Multi input Multi output (MIMO) System.

Process and Process characteristics, Analogy with electrical system, Concept of process time delay.

2 . Components & Devices Used In Control System:

Brief description and working of potentiometer, self-balancing potentiometer, differential transformer, synchros, servomotors, tacho generators, DC Servo motors and DC Techo Generator, Eddy current clutch.

3 . Input Output Relationship of System & Control system Components:

- (i) Concept of transfer function and its use in control system.
- (ii) Derivation of transfer functions of following systems and components.
 - (a) Simple RC low pass network.
 - (b) First order thermal system and fluid level system.
 - (c) General Feedback Control System.

4 . Performance of Control System:

- (i) Step Ramp, Pulse and sinusoidal type inputs and their Laplace Transforms.
- (ii) Time domain response of First order and second order system with step input.
- (iii) Definitions of Rise time, Peak overshoot, Settling time, Natural frequency and Damping Ratio pertaining to second order system.
- (iv) Initial value and final value theorems and their use in control systems.
- (v) Types of feedback systems and error constants.

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III Year V Semester

DELECEX505: ELECTRICAL DRAFTING IN AUTO CAD LAB

1. INTRODUCTION TO AUTOCAD ELECTRICAL:

What are AutoCAD electrical, drawing files, electrical files, electrical components and wires, design methodologies.

PROJECT FILES:

Project files, Project manager interface, Accessing project files, Opening a drawing, Create a drawing to a project file, Managing drawings in projects, Project manager drawing list.

2. SCHEMATICS - I SINGLE WIRES/COMPONENTS:

Referemcomg, Ladders, Insert wires, Edit wires, Addrungs wire setup, Wire numbers, Source and destination signal arrows, Insert component, Parret/Child component.

3. SCHEMATICS - II MULTI WIRE AND CIRCUITS:

Dashed link lines, 3 phase ladders, Multiple wire bus, 3 Phase wire numbering, cable markers, fan in. out, insert saved circuits, save circuits to icon menu, block circuits, move circuit, copy circuit, circuit builder.

4. EDITING COMMANDS:

Edit component, Project Task list, Move components, Copy components, Align, Delete component, Surfer command, Copy catalog assignment, Copy installation/location code values, Attribute editing commands.

5. PANEL DRAWINGS:

Insert Foot Print (Icon Menu), Insert Foot Print (Schematic List), Insert Component (Panel List), Edit Foot Print, Assign Item Numbers, Add Balloons.

6. TERMINALS:

Insert terminal symbols, multiple level terminals, multiple insert component command, Insert jumpers, Terminal strip editor, Din rail command.

7. PLCSYMBOLS:

Insert PLC (Parametric), Insert PLC (Full Units), Insert individual PLC I/o points, PLC based taffing, Spread sheetto PLC I/o Utility.

8. POINT TO POINT WIRING DRAWINGS:

Insert connectors, editing connectors, Insert spliess, Insert multiple wires, Bend wires.

9. SYMBOL CREATIONS:

Schematic symbol, Naming convention, Icon menu wizard, AutoCad electrical databases, Projects database, Catalogue Database, Foot Print Lookup Database, PLC data base, Pin list data as, Terminal properties database.

10. TITLE BLOCKS:

Update Title Blocks, Title Block Setup.

11. REPORTING TOOLS:

Create Reports, Save to External Files, Put on Drawing, Configure Reports Templates, running Automatic Reports, Electrical Audit.

12. SETTING AND TEMPLATES:

Project Properties, Drawing properties, Panel Drawing configuration, Templates Files, Sharing Symbol Libraries and Database

13. DRAWING UPDATE TOOLS:

Project-wide update/Retag, Project-wide utilities, Plot project, Export to spreadsheet, Copy project, Swap/Update block, Mark drawing, Verify drawing.

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III Year V Semester

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DMICREX506: MICROPROCESSORS AND APPLICATIONS LAB

List of Practical's

- 1 . Assembly language programming: -Programming of simple problems. Assembly Language Programming using addition, subtraction, multiplication, division, larger, largest, smaller, smallest, positive and negative, etc. 8bitand 16 bit based programming.
- 2 . Simple programming problems using 8085 and 8086 Trainer kit to gain competence in the use of
 - (a) 8085 and 8086 Instruction set.
 - (b) Support chips of 8085 and8086.

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III Year V Semester

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DINDUEX507:INDUSTRIAL TRAINING

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 4 weeks duration to be organized during the semester break starting after second year i.e. after 4th 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. Students should be encouraged to write daily report in their diary to enable them to write final report and its presentation later on.

An external assessment of 50 marks has been provided in the study and evaluation scheme of 5th 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.

Teachers and students are requested to see the footnote below the study and evaluation scheme of 4th semester for further details.

The teacher along with field supervisors will conduct performance assessment of students. The components of evaluation will include the following:

Punctuality and regularity 15%

Initiative in learning new things 15%

Presentation and VIVA 15%

Industrial training report 55%