

P.K.UNIVERSITY, SHIVPURI (MP)
(FACULTY OF ENGINEERING & TECHNOLOGY)



EVALUATION SCHEME & SYLLABUS

FOR

Diploma in Electronics & Instrumentation Engineering

(III Year- V Semester)

(ON)

CHOICE BASED CREDIT SYSTEM (CBCS)

[Effective from the Session: 2025-26]

**STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME IN
ELECTRONICS & INSTRUMENTATION ENGINEERING**

SEMESTER -V

SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
DINDUEI501	Industrial Management & Entre. Development.	3	1	0	4	30	-	30	70	-	70	100
DMICREI502	Microprocessor & Peripheral Devices	3	1	0	4	30	-	30	70	-	70	100
DINDUEI503	Industrial Control	4	0	0	4	30	-	30	70	-	70	100
DSIGNEI504	Signal Transmission Recording & Display	4	0	0	4	30	-	30	70	-	70	100
DPROGEI505	Programming in C	4	0	0	4	30	-	30	70	-	70	100
DMICREI506	Micro Processor & Peripheral Devices Lab	0	0	2	1	0	25	25	-	25	25	50
DINDUEI507	Industrial Control Lab	0	0	2	1	0	25	25	-	25	25	50
DPROGEI508	Programming in C Lab	0	0	2	1	0	25	25	-	25	25	50
DINDUEI509	Industrial Training	-	-	-	2	-	-	-	-	-	50	50
Total		18	2	6	25	150	75	225	350	75	475	700

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DINDUEI501: INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP

DETAILED CONTENTS

1. Principles of Management

- 1.1 Management, Different Functions: Planning, Organising, 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 team work.

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 cash book.

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 Micro economics.

11.2 Macro economics.

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.

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DMICREI502: MICROPROCESSORS AND PERIPHERAL DEVICES

- 1. Evolution of Microprocessor** (05 Periods)
Typical organization of a microcomputer system and functions of its various blocks. Microprocessor, its evolution, function and impact on modern Society
- 2. Architecture of a Microprocessor** (05 periods)
(With reference to 8085 microprocessor)
- 3. Instruction Timing and Cycles** (05 periods)
Instruction cycle, machine cycle and T-states, Fetch and execute cycle, Timing Cycle Diagram
- 4. Programming (with respect to 8085 microprocessor)** (09 periods)
Brief idea of machine and assembly languages, Machines and Mnemonic codes. Instruction format and Addressing mode. Identification of instructions as to which addressing mode they belong. Concept of Instruction set. Explanation of the instructions of the following groups of instruction set. Data transfer group, Arithmetic Group, Logic Group, Stack, I/O and Machine Control Group. Programming exercises in assembly language. (Examples can be taken from the list of experiments).
- 5. Memories and I/O interfacing** (06 periods)
Concept of memory mapping, partitioning of total memory space. Address decoding, concept of peripheral mapped I/O and memory mapped I/O. Interfacing of memory mapped I/O devices.

6. Interrupts

(06 periods)

Concept of interrupt, Maskable and non-maskable, Edge triggered and level triggered interrupts, Software interrupt, Restart interrupts and its use, Various hardware interrupts of 8085, Servicing interrupts, extending interrupt system

7. Data Transfer Techniques

(06 periods)

Concept of programmed I/O operations, sync data transfer, async data transfer (hand shaking), Interrupt driven data transfer, DMA, Serial output data, Serial input data

8. Peripheral devices

(06 periods)

8255 PPI, 8253 PIT and 8257 DMA controller

(06

9. Architecture of 8086 Microprocessor

periods)

Block diagram

Minimum and Maximum mode

Pin and Signals

Addressing Modes

10. Advance Microprocessors

(02 periods)

-Introduction to Pentium series processors and core 2 duo, dual core (core i3, i5, i7)

RECOMMENDED BOOKS

1. Microprocessor Architecture, Programming and Applications with 8080/8085 by Ramesh S Gaonker, Willey Eastern Ltd. New Delhi
2. Microprocessor and Applications by Badri Ram: Tata McGraw Hill Education Pvt Ltd , New Delhi.
3. Microprocessor programming & applications.by sudhir Goyal, North Publication.
4. Microprocessor and interfacing by Douglas.V.Hall, McGraw Hill Higher Education, New Delhi.
5. E-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

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DINDUEI503: INDUSTRIAL CONTROL

1 INTRODUCTION:

Need of automatic control, classification of control systems:-

- (a) Open loop and closed loop system block diagram of feed back control system and its basic elements.
- (b) Definition of other types of control system e.g.
 - (i) Linear and Nonlinear system.
 - (ii) Single input - Single output (SISO) system and Multi Input - Multi-output (MIMO) system.
 - (iii) Static and dynamic systems.
 - (iv) Continuous and discrete systems.
 - (v) Analog and digital system
 - (vi) Stable and Unstable systems.

2. SYSTEM EXCITATION AND RESPONSE OF SIMPLE SYSTEMS:

- 2.1 Step, ramp and pulse, exponential, sinusoidal type of inputs with examples.
- 2.2 Response of first order and second order systems with examples.
- 2.3 Response due to forcing function, response to step and ramp inputs.
- 2.4 Definitions of over shoot, under shoot, rise time and damping ratio, damping coefficient, settling time and peak time.
- 2.5 Stability Analysis using Routh-Hurwitz criterion

3 INPUT OUTPUT RELATIONSHIP OF CONTROL SYSTEMS:

- 3.1 Concept of laplace transform & reverse laplace of some useful functions
- 3.2 Theorems regarding initial and final values.
- 3.3 Derivation of transfer functions from basic relationship.
- 3.4 Transfer function of a system in cascade.
- 3.5 Transfer function of a system with feed back.
- 3.6 Block diagram representation of control system & simplification technique

4 COMPONENTS AND DEVICES USED IN CONTROL SYSTEMS:

Brief description, working of potentiometer, self balancing potentiometers, Servo motors, Eddy current clutches, Relays and contactors, Timing relays, Saturable core reactor and its use as magnetic amplifier.

5 **THYRISTORS AND THEIR APPLICATIONS:**

5.1 Name, symbol and typical application of members of Thyristor family.

5.2 SCR, TRIAC AND DIAC:

Basic structure, operation V-I characteristics and ratings, gate circuits, ratings Triggering process and ckts, Turn off methods and circuits.

5.3 UJT:

Operation, V-I characteristics, use in relaxation oscillator, use of relaxation oscillations for triggering thyristors.

5.4 HALF WAVE FULL WAVE RECTIFIERS:

Half wave , full wave rectifiers (Including Bridge) single phase and poly phase rectifiers using SCR's, explanation of 3 phase bridge controlled rectifier and its applications.

5.5 Principle of operation of basic inverter circuits, basic series and parallel commutated inverter circuits, Operation of choppers and applications

5.6 Cyclo converter

5.7 Uninterruptible power supply (UPS)

6 **HIGH FREQUENCY HEATING AND WELDING:**

Induction heating, dielectric heating, resistance welding, electronic control of resistance welding and heating processes, Applications in industry.

7 **SOLID STATE MOTOR CONTROL:**

7.1 Application of phase controlled rectifiers and A.C. phase control circuit in illumination control and temperature control.

7.2 D. C. motor speed control.

7.3 A. C. motor speed control.

7.4 Plugging ,Dynamic & Regenerative Braking.

7.5 Introduction to Electric Drives

RECOMMENDED BOOKS:-

- 1 Linear Control Systems by B S Manke, Khanna Publishers
- 2 Power Electronics: Circuit Devices and Application by M.H.Rashid, PHI publication
- 3 Power Electronics by P.S.Bimbhra, Khanna publication
- 4 Elements of Electric Drives by J B Gupta by Katson Publication
- 5 Industrial Electronics and control By S.K. Bhattacharya & S Chattarji

List of Software/Learning Websites <https://en.wikipedia.org/wiki/UPS>
<https://pdf.semanticscholar.org> <https://en.wikipedia.org/wiki/welding>
<https://en.wikipedia.org/wiki/inductionwelding>

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DSIGNEI504: SIGNAL TRANSMISSION RECORDING AND DISPLAY

1 DISPLAY DEVICES:

Classification of display devices, working principles and typical use of various display devices- cathode ray tube (Gen. purpose CRTS, storage CRTS flat CRTS) Light Emitting Diodes, Seven segment display, Liquid Crystal displays, Touch screen display-Introduction, Types of touch screen display, Resistive and capacitive touch screen display concept and construction, Application of touch screen.

2 DISPLAY SYSTEMS:

Elements of controlling a display system, Use and implementation of Code converter, latches and shift registers, Counters in display systems. LED display, LCD display other displays.

3 RECORDER:

Necessity of recorder, Basic requirements of recording systems, classification of recorders- Analog (Graphic, Oscillographic and magnetic recorders) and Digital recorder.

3.1 Graphic Recorders: X-T and X-Y recorders.

3.2 Digital Recorders

Basic concept of Digital recorder, types of Digital recorder:

(i) Electro magnetic recorder (Digital type recorder).

(ii) Introduction and uses of Bar Code Reader & Recorder(Optical).

(iii) Introduction and uses of Quick Response (QR) code reader and recorder optical).

4 DATA TRANSMISSION AND TELEMETRY:

4.1 Methods of Data Transmission - Electrical and Electronic.

4.2 Definition of Telemetry, General requirements of Telemetry system.

4.3 Types of Telemetry

(i) Voltage Telemetry.

(ii) Current Telemetry.

(iii) Position Telemetry

(iv) A. C. Telemetry-Concept of modulation and demodulation

(A.M., F.M. and Phase Modulation).

(v) Pulse Telemetry System - Analog pulse telemetry (PAM, PFM, PDM, PPM) and Concept of Digital telemetry- PCM, Delta Modulation (Basic Principle Only)

4.4 Transmission Channels And Multiplexing

(Concept only) wire line channels, Radio channels, Microwave channels, Power line carrier channel(Concept only) and optical fiber channels, Time division multiplexing (TDM) and frequency division multiplexing (FDM), Concept of CDMA (Code Division Multiple Access).Introduction to DE-multiplexing.

4.5 Introduction to Standard Protocol: RS232,RS485,MODBUS,HART (Highway Addressable Remote Transmitters)

5 INSTRUMENTATION AMPLIFIER:

Introduction and Characteristics of instrumentation amplifiers in respect of input impedance, output impedance, drift, d.c. offset noise, gain, common mode rejection ratio, frequency response, slew rate etc.. Relating the suitability of these characteristics for amplifying signals from various Transducers. Applications

6 DATA ACQUISITION SYSTEMS (DAS):

6.1 General concept, Importance of DAS to instrumentation. Types of DAS components of

(i) Analog data acquisition system.

(ii) Digital data acquisition system.

Use of Data Acquisition system. Use of recorder in digital data acquisition systems.

6.2 Modern trends in DAS – Introduction of microprocessor in DAS.

RECOMMENDED BOOKS

- 1 1. Electrical and Electronics Measurement and Instrumentation by A.K. Shawney, Dhanpat Rai and Co., New Delhi
- 2 Telemetry Principles by D Patranabis , Tata McGraw-Hill Education.
- 3 OP. Amp. & Linear Integrated circuit by R.A. Gayakward, Prentice Hall of india New delhi
- 4 Electronic Communication System by Georgy Kennedy ,Tata McGraw-Hill
- 5 Communication System by Simon Haykin,John Wiley & Sons

List of Software/Learning Websites

<https://en.wikipedia.org/wiki/TouchScreen>

<https://pdf.semanticscholar.org>

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DPROGEI505: PROGRAMMING IN C

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 (06 Periods) Steps in de

1. Algorithm and Programming Development

Programme Debugging Basis of C programming

2. Program Structure

(09 Periods)

- 2.1 I/O statements, assign statements
- 2.2 Constants, variables and data types
- 2.3 Operators and Expressions
- 2.4 Standards and Formatted IOS
- 2.5 Data Type Casting

3. Control Structures

(09 Periods)

- 3.1 Introduction, Decision making with IF – statement
- 3.2 I F – Else and Nested IF
- 3.3 While and do-while, for loop
- 3.4 Break. Continue, GoTo and switch statements

4. Pointers

(10 Periods)

- 4.1 Introduction to Pointers
- 4.2. Address operator and pointers
- 4.3 Declaring and Initializing pointers,
- 4.4 Single pointer,

5. Functions

(11 Periods)

- 5.1 Introduction to functions
- 5.2 Global and Local Variables
- 5.3 Function Declaration
- 5.4 Standard functions
- 5.5 Parameters and Parameter Passing
- 5.6 Call - by value/reference
- 5.7 Recursion

6. Arrays

(11 Periods)

- 6.1 Introduction to Arrays
- 6.2 Array Declaration, Length of array
- 6.3 Single and Multidimensional Array.
- 6.4 Arrays of characters
- 6.5 Passing an array to function
- 6.6 Pointers to an array

RECOMMENDED BOOKS- 1. Let us C by Yashwant Kanetkar

- 2. Programming in ANSI C by E Balaguruswami, Tata McGraw Hill Education Pvt Ltd, New Delhi
- 3. Programming in C by Reema Thareja; Oxford University Press, New Delhi
- 4. Programming in C by Gottfried, Schaum Series, , Tata McGraw Hill Education Pvt Ltd , New Delhi
- 5. Exploring C by Yashwant Kanetkar; BPB Publications, New Delhi
- 6. E-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh

Websites for Reference: <http://swayam.gov.in>

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DMICREI506: MICROPROCESSORS AND PERIPHERAL DEVICES LAB

LIST OF PRACTICALS (minimum 8 practical)

1. Familiarization of different keys of 8085 microprocessor kit and its memory map Steps to enter, modify data/program and to execute a programme on 8085 kit
2. Writing and execution of ALP for addition and subtraction of two 8 bit numbers.
3. Writing and execution of ALP for multiplication and division of two 8 bit numbers
4. Writing and execution of ALP for arranging 10 numbers in ascending/descending order
5. Writing and execution of ALP for 0 to 9 BCD counters (up/down counter according to choice stored in memory)
6. Interfacing exercise on 8255 like LED display control.
7. Interfacing exercise on 8253 programmable interval TIMER
8. Interfacing exercise on 8279 programmable KB/display interface like to display the hex code of key pressed on display
9. Writing and execution of different ALP for 8086 (any four)
10. Generation of Square wave of desired frequency using 8255.

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DINDUEI507: INDUSTRIAL CONTROL LAB

LIST OF PRACTICALS (Any eight practicals)

1. To plot the time response of a first order electrical system.
2. To plot time response of second order electrical system and find out transfer function of a LCR circuit.
3. To draw the characteristic curves of S.C.R., Diac and Triac.
4. To study a power rectifier using SCR and draw input and output wave forms.
5. To study a Single Phase Inverter Circuit using S.C.R. and draw input and output wave forms.
6. To fabricate a S. C. R. chopper circuit, test it and determine duty cycle.
7. To study the effect of variation in firing angle on a C.R.O. and to plot the wave shapes.
8. To Fabricate a circuit for illumination control of Light Source using SCR .
9. To Fabricate a circuit for temperature control of a heating element using Thiresters.
10. To fabricate the Traic -Diac motor speed control circuit and draw input output (Speed) characteristics.

NOTE- Actual laboratory and practical work, model/prototype making, assembly and disassembly exercises and viva-voce

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DPROGEI508: PROGRAMMING IN C LAB

LIST OF PRACTICALS

1. Programming exercises on executing and editing a C program.
2. Programming exercises on defining variables and assigning values to variables.
3. Programming exercises on arithmetic and relational operators.
4. Programming exercises on arithmetic expressions and their evaluation.
5. Programming exercises on formatting input/output using print f and scan f and their return type values.
6. Programming exercises using if statement.
7. Programming exercises using if – Else.
8. Programming exercises on switch statement.
9. Programming exercises on do – while, statement.
10. Programming exercises on for – statement.
11. Programs on one-dimensional array.
12. Programs on two-dimensional array.
13. (i) Programs for putting two strings together.
(ii) Programs for comparing two strings.
14. Simple programs using structures.
15. Simple programs using pointers.
16. Simple programs using union.

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DINDUEI509: INDUSTRIAL TRAINING