Multidisciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501EC95	Digital Logic Design	FC	2	1		3	50	50	100	-
2501EE01	Basic Electrical & Electronics Engineering	FC	2		2	4	50	50	100	-
2501MB01	Engineering Economics & Management	FC	2			2	50	50	100	-
Total			**6**	**1**	**2**	**9**				

Digital Logic Design

(Common for CSE, AIML, DS and IT)

Course Code: 2501EC95	L	T	P	C
	2	1	0	3

Course Outcomes:
At the end of the course, student will be able to:

- **CO 1:** Understand various number systems, perform conversions between them, and apply binary codes in digital representations. (BTL: 2)
- **CO 2:** Understand basic Boolean algebra rules and simplify Boolean expressions using Karnaugh maps. (BTL:
- **CO 3:** Design and implement basic combinational logic circuits such as adders, decoders, and multiplexers.
- **CO 4:** Apply the concepts of flip-flops to implement basic sequential circuits like registers, and counters.
- **CO 5:** Develop logic circuits using PLDs such as PROM, PAL, and PLA by utilizing programming tables.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1	3	2						2	1		1
CO2	2	2						2	1		1
CO3	2	2	3	1				2	1		1
CO4	2	2	3	1				2	1		1
CO5	2	2	3	1				2	1		1

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2
CO1		2
CO2		2
CO3		3
CO4		3
CO5		3

UNIT–I:

Digital Systems and Binary Numbers
Digital Systems, Binary Numbers, Number based Conversions, Octal & Hexadecimal Numbers, Complements – r's complement, (r-1)'s complement, Signed binary Numbers, Arithmetic addition and subtraction, Binary Codes: BCD, 2421, 8421, Excess-3, Gray codes.

UNIT–II:

Concept of Boolean algebra and Gate Level Minimization
Basic Definitions, Axioms and laws, Basic Theorems & Properties of Boolean algebra, Boolean Functions, Canonical and Standard Forms, Digital logic gates, The Map Method –

Two-Variable, Three-Variable, Four-Variable K-Maps. Product of Sums Simplification, Sum of Products Simplification, Don't Care Conditions.

UNIT–III:

Combinational Logic
Review of adders, half subtractor, full subtractor, ripple carry adder, 4-bit binary adder/subtractor circuit, BCD adder, Decoders, encoders, priority encoder, multiplexers, de-multiplexers, one bit comparator, realization of Boolean functions using decoders & multiplexers.

UNIT–IV:

Sequential Circuits
Introduction to Sequential Circuits, Latches, RS- Latch Using NAND and NOR Gates, Flipflops, Truth Tables. RS, JK, D and T Flip Flops, Truth and Excitation Table.
Registers and Counters
Registers, Shift Registers, Universal Shift register, Ripple Counters – Binary Ripple counter, BCD ripple counter, Synchronous Counters – Binary counter, Up-down Counter, BCD counter, Ring Counter, Johnson Counter

Unit-V:

Programmable Logic Devices: Introduction to PLDs: PROM, PAL, PLA-Basics structures, realization of Boolean function with PLDs, comparison, merits & demerits of PROM, PAL, PLA.

Text Books:

1. Switching and Finite Automata Theory, ZviKohavi& Niraj K.Jha, 3rdEdition, ISBN: 978-0521857482.
2. Digital Design, Morris Mano, Pearson, 3rd Edition, ISBN: 978-8178085555.

Reference Books:

1. Modern Digital Electronics, RP Jain, Tata Mc Graw Hill, 5thEdition, 2022, ISBN: 978-9355321770.
2. Fundamentals of Logic Design, Charles H. Roth Jr., Jaico Publishers, ISBN: 978-0534378042.

Web Links:

1. http://nptel.ac.in/courses/117/106/117106086/ (By Prof. Goutam Saha, Electronics & Electrical Communication Engineering Dept, IIT Kharagpur)
2. www.nptelvideos.in/2012/12/digital-circuits-and-systems.html(By Prof. Santanu Chattopadhyay, Electronics & Electrical Communication Engineering Dept, IIT Kharagpur).
3. https://www.smartzworld.com/notes/switching-theory-and-logic-design-stld/.

Basics of Electrical & Electronics Engineering

(Common to CE,ME,ECE,CSE,IT,AIML,CSE(DS),PT&Min.E)

	L	T	P	C
Course Code: 2501EE01	**2**	**0**	**2**	**4**

Course Outcomes:

At the end of the course, student will be able to:

- **CO 1:** Analyze the concepts associated to AC and DC circuits.
- **CO 2:** Explain the operating principles of motors, generators and measuring instruments.
- **CO 3:** Analyze the Different Energy Resources and Equipment Safety Measures.
- **CO 4:** Explain the concept and the applications of semiconductor Diodes.
- **CO 5:** Analyze the Basic Electronic Circuits and interpret numeric information in different code formats.

Mapping of course outcomes with program outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	3	1		1				2	2	
CO2	2	3	1						2	2	
CO3	3	2	1						2	2	
CO4	3	2	1						2	2	
CO5	3	2	1						2	2	

UNIT-I:

DC & AC Circuits:

DC circuits: Ohm's and Kirchhoff's laws, analysis of series, parallel and series-parallel circuits excited by independent voltage sources for R, L, C parameters, current division, voltage division

AC circuits: Generation of sinusoidal voltage, frequency of generated voltage, average value, RMS value, form, and peak factors. Real power, reactive power, apparent power, and Power factor.

Practice:

1. Verification of Ohm's Law.
2. Verification of KCL and KVL.
3. Verification of KCL, KVL and ohm's law using simulation.

UNIT-II:

Machines and Measuring Instruments:

Principles and operation of DC machines, Transformers – Synchronous Machines - three Phase and single phase induction motors - Moving coil and moving iron instruments, Wheatstone bridge and Megger.

Practice:

1. To study Magnetisation Characteristics of DC shunt generator
2. Measurement of Power and Power factor using Single-phase wattmeter

3. Measurement of Resistance using Wheat stone bridge
4. Measurement of Earth Resistance using Megger.

UNIT-III:

Energy Resources, Electricity Bill &Safety Measures

Conventional and non-conventional energy resources; Layout and operation of various Power Generation systems: Hydel, Thermal, Solar & Wind power generation. Calculation of electricity bill for domestic appliances. Working principle of Fuse and Miniature circuit breaker (MCB). Electric Shock, Earthing and its types, Safety Precautions to avoid shock.

Practice:

1. Calculation of Electrical Energy for Domestic Premises

UNIT-IV:

Semiconductor Devices

Intrinsic semiconductors – Extrinsic semiconductors - P type and N type - P-N junction characteristics of P N Junction Diode — Zener Effect — Zener Diode and its Characteristics. working of simple zener voltage regulator and amplifier- Bipolar Junction Transistor — CB, CE, CC Configurations and Characteristics.

Practice:

1. Sketch the V-I characteristics of PN Junction diode A) Forward bias B) Reverse bias.
2. Sketch the V-I characteristics of Zener Diode and its application as voltage Regulator
3. Plot Input & Output characteristics of BJT in CE and CB configurations.
4. Obtain Frequency response of CE amplifier.

UNIT-V:

Basic Electronic Circuits

Block diagram description of a dc power supply, working of a half and full wave, bridge rectifier, filters.

Digital Electronics

Overview of Number Systems, Logic gates including Universal Gates, BCD codes, Excess-3 code, Gray code, Hamming code. Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR. Simple combinational circuits–Half and Full Adders

Practice:

1. Implementation of half wave and full wave rectifiers.
2. Design Half Adder and Full Adder circuits.
3. Verification of truth table for Logic gates using ICs.

Text Books:

1. Basic Electrical and Electronics Engineering, Salivahanan S, Tata McGraw Hill Education (India) Private Limited, New Delhi, ISBN: 9789389691801.
2. Principles of Electrical Engineering, V. K. Mehta, R. Mehta, S. Chand & Company Ltd., New Delhi, ISBN-13: 9788121930888
3. Digital Fundamentals, Thomas Floyd, Prentice Hall, 10th Edition, ISBN: 9780132737968).

Reference Books:

1. Electronic Devices & Circuit Theory, Robert L. Boylestad and Louis Nashelsky, Pearson, 11/e, ISBN: 9780135026496.
2. Power System Engineering, P.V. Gupta, M.L. Soni, U.S. Bhatnagar and A. Chakrabarti, Dhanpat Rai & Co., ISBN: 9788177000207.

Web Links:

1. https://nptel.ac.in/courses/108/101/108101091/ (NPTEL Video by Dr.Mahesh B. Patil from IIT Bombay)
2. https://nptel.ac.in/courses/117/106/117106108/ (NPTEL Video by Prof. Nagendra Krishnapura from IIT Madras)

Engineering Economics & Management
(Common to CE, EEE, ME, CSE, IT, AIML & CSE (DS))

	L	T	P	C
Course Code: 2501MB01	**2**	**0**	**0**	**2**

Course Outcomes:
At the end of the course, student will be able to:

- **CO1:** Explain the Business Economic concepts, law of demand and forecasting methods.
- **CO2:** Identify the production, cost behavior for managerial decision making with Break-Even Point (BEP).
- **CO3:** Make use of financial accounting and capital budgeting techniques for decision making.
- **CO4:** Summarize management and motivational theories to renovate the practice of Management.
- **CO5:** Illustrate the functional management and project management using PERT and CPM.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1									2	2	
CO2	1										2
CO3											3
CO4	1								1	1	2
CO5											3

UNIT – I

Introduction to Managerial Economics and demand Analysis:
Definition of Managerial Economics –Scope of Managerial Economics- Concept of Demand, Types of Demand, Determinants of Demand- Law of Demand and its limitations- Elasticity of Demand, Types- Demand forecasting and its Methods.

UNIT – II

Production and Cost Analyses:
Concept of Production function Law of Variable Proportions-Isoquants and Isocosts - Producer Equillibrium-, cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs – Cost –Volume-Profit Analysis-Determination of Breakeven point (simple problems).

UNIT – III

Introduction to Markets and Financial Accounting: Market Structures-Classification of markets,.Introduction to Financial Accounting , Concepts and conventions, Accounting

cycle, Journal entries and Ledger (Simple Problems), Methods of capital budgeting (Simple Problems).

UNIT – IV

Operations Management :
Concept nature and importance of Management, Generic Functions of Management, Theories of Motivation, Plant location and layout, Principles of organization,SWOT analysis.
Material Management: Need for Inventory control, EOQ, ABC analysis

UNIT – V

Functional Management And Project Management
Concept of HRM , HRD and PMIR, Functions of HR Manager , Job Evaluation and Merit Rating , Marketing Management, Functions of Marketing , Channels of distributions - Development of Network , Difference between PERT and CPM, Finding Critical Path (Simple Problems)

Text Books:

1. Managerial Economics and Financial Analysis, A. R. Aryasri , McGraw Hill Education, ISBN: 978-0070078031
2. Managerial Economics and Financial Analysis', N. Appa Rao, P. Vijay Kumar, Cengage Publications, New Delhi, ISBN: 978-8131515952
3. Management Science by Aryasri; Publisher: Tata McGraw Hill, 2009, ISBN: 978-0070090279
4. Management by James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Ed; Publisher: Pearson Education/Prentice Hall, ISBN: 978-0131087477

Reference Books:

1. Principles of Marketing: A South Asian Perspective by Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshanul Haque, 13th Edition, Publisher: Pearson Education/ Prentice Hall of India, ISBN: 9788131731017
2. A Handbook of Human Resource Management Practice by Michael Armstrong, 2010; Publisher: Kogan Page Publishers, ISBN: 978-1789661033

Web Links:

1. www.managementstudyguide.com
2. www.citehr.com
3. www.nptel.ac.in/courses/122106032
4. www.btechguru.com/courses--nptel--basic-course