MECHANICAL ENGINEERING (NEW SYLLABUS) 3rd SEMESTER

Programme Outcome (PO)

After the completion of the three-year diploma programme in Mechanical Engineering Department, the diploma holders will have:

1. The ability to apply knowledge of Applied science and engineering fundamentals to the solution of problems in engineering .
2. An ability to apply discipline - specific knowledge to solve core and / or applied engineering problems.
3. The ability to identify, formulate, and solve mechanical engineering problems through their acquired knowledge.
4. The ability to apply appropriate technologies and tools with an understanding of the limitations.
5. The ability to demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.
6. The capability to understand the impact of the engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
7. To apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices.
8. To function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.
9. An ability to communicate effectively.
10. The ability to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

Programme Specific Outcome(PSO)

After the completion of the three-year diploma programme in Mechanical Engineering, the diploma holders will:

1. Have the capability to identify, analyse, formulate, and solve different problems in Mechanical engineering.
2. Have the ability to apply and interpret the acquired Mechanical Engineering knowledge for advancement in social, economic and environmental fields
3. Develop professional skills, innovative ideas and ethical values for suitable employment, entrepreneur and for higher studies.

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1. Course Title–Computer Application & Programming (All Branches)

1. Course title: Computer Application & Programming

2: Course Code –Co-301

3: Semester- 3rd

4: Aim of the Course :

- To give basic concepts related to organisation of a computer
- To give fundamental terminologies in networking
- To develop simple programs in C.

5: Course Outcome:

On completion of the course students will be able to:

- Explain the basics of a computer hardware and software
- Solve problems related to number systems
- Define basics of Operating System
- Familiarize with networking components
- Write simple C programs

6: Prerequisites for the Course: Have basic idea about a computer and its functions.

7: Teaching Scheme (in hours):

Teaching Scheme			
L	T	P	Total hours per week
3	0	3	6

8: ExaminationScheme :

	Theory (T)	Sessional (TS)	Practical (P)	Practical Sessional (PS)
Full Marks	70	30	25	25
Pass Marks	33		17	

9: Detailed Course Content:

Unit	Topic/Sub-Topics	Intended Learning Outcome	Hours
1	**Computer Architecture:** Brief history, Charles Babbage Machine, Von Neuman Architecture, block diagram, memory &it's different types, I/O devices, Role of O.S., computer languages, translator software, editor. Data, different types of data, information and its characteristics	1. Define a computer and identify its parts. 2. Define computer memory & describe its different types. 3. Define computer languages & translators. 4. Describe the characteristics of information.	**8**
2	**Number System and codes:** Different number system- decimal, binary, octal, hexadecimal number system, their conversion, 1's and 2's Complement, subtraction using complements. Different codes- ASCII, BCD, Ex-3, Gray. Conversion from Gray to binary and vice-versa, BCD addition.	5. Define decimal, binary, octal & hexadecimal number systems. 6. Convert between different number systems. 7. Define 1's & 2's complements. 8. Subtract using 1's & 2's complements. 9. Describe some different codes.	**8**

Unit	Topic/Sub-Topics	Intended Learning Outcome	Hours
3	**Introduction to Operating System:** Definition, single user and multi-user OS, different function performs by OS, various popular OS like DOS, Windows, UNIX/LINUX. DOS and UNIX commands.	10. Define operating system. 11. Operate different commands of DOS, Windows & UNIX/LINUX.	**5**
4	**Computer Network and the Internet:** Definition, necessity of network, different types of network-LAN, MAN, WAN, network topology, transmission media, different network devices like NIC, hub, bridge, switch, gateway. Introduction to the internet, Internet services, browser, search engine.	12. Define network. 13. Describe different types of network. 14. Define network topology. 15. Describe different network devices. 16. Define internet & describe different internet services. 17. Explain use of different browsers & search engines.	**6**
5	**Introduction to C programming:** Fundamentals of programming, Basic structure of C programs, Executing a C program, Constants, Variables, and data types. Operators and expression, Input Output function like printf, scanf, getchar, putchar, gets, puts, Decision making and branching using IF..Else, Switch, looping using for, while, and do-while, array.	18. Define basic terminology of C language. 19. Write small programusing C language. 20. Write diversified solutions using C language. 21. Differentiate between IF..Else and Switch statement.	**15**
	Internal Assessment		**3**

10. Intellectual Skills :

- Logical reasoning
- Relating programming concepts in problem solving

11. Motor Skills :

- Learn to use and handle a computer and its peripherals.

List of Lab Exercises :

I. Basic commands for computer system maintenance.

II. Preparation of Documents

Introduction to Word processing, Opening a document, preparing documents, inserting diagrams and tables, Editing document- (a) Character, word and line editing, (b) Margin Setting, Paragraph alignment, (c) Block Operations, (d) Spell Checker, (e) Saving a document, (f) Mailmerge.

III. Information Presentation through Spread Sheet

Application of Spread Sheet, Structure of spreadsheets, Preparing table for simple data and numeric operations, Using formulae and functions in excel operations, Creation of graphs, Pie charts, bar charts.

IV. Preparation of presentation

Creation of electronic slides on any topic, Practice of animation effect, presentation of slides.

V. Programming in C

Editing a C program, defining variables and assigning values to variables Arithmetic and relational operators, arithmetic expressions and their evaluation Practice on in iput/output function like getchar, putchar, gets, puts, scanf, printf etc. Programming exercise on simple if statement, If..else statement, switch statement Programming exercise on looping with do-while, while, for loop and array.

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2. Course Title– Engineering Economics and Accountancy (All Branches)

1. Course Title : **ENGINEERING ECONOMICS AND ACCOUNTANCY**
2. Course Code: **Hu – 302**
3. Semester: 3rd

4. Aim of the Course:

   1. To introduce the students to some important economic and accounting terms.

   2. To acquaint the students with some economic laws and with the functions of money, bank etc.

   3. To make the students capable of recording business transaction under double entry system.

   4. To introduce the students about financial statements.

5. Course Outcomes:

On completion of the course on EEA, students will be able to

- CO_1 = Define some important economic and accounting terms.
- CO_2 = explain some basic economic laws.
- CO_3 = Describe overall economic environment.
- CO_4 = explain double entry system of book keeping.
- CO_5 = record business transactions under double entry system of book keeping
- CO_6 = define financial statements.

1. **Teaching Scheme (in hours)**

Lecture	**Tutorial**	**Practical**	**Total**
42 hrs	**3 hrs**	**--**	**45 hrs**

2. **Examination Scheme:**

Theory				Practical				Total Marks
Examination Full Marks	Sessional Full Marks	Total Marks	Pass Marks	Examination		Sessional		
70	30	100	33	--	--	--	--	100

3. Detailed Course Content:

Chapter No.	Chapter Title	Content	Intended Learning Outcomes	Duration (in hours)
Part – A : Engineering Economics				**21 hrs**
1.0	**Introduction to Economics :**	i) Definition of Economics, its utility and scope of study ii) Definition of Engineering Economics ii) Meaning and concepts of Utility, Consumption, Value, Price, Goods and National Income, inflation iii) Wants – Definition and characteristics iv) Wealth & Welfare– Definition, meaning and types	i) explain core economic terms concepts and theories	5
2.0	**Demand and Supply :**	i) Meaning and types of Demand ii) The Law of Demand, its limitations iii) Preparation of Demand Schedule iv) Meaning of Supply ii) The Law of Supply, its limitations iii) Preparation of Supply Schedule	Define the Laws of Demand and Supply	4
3.0	**Production :**	i) Meaning and factors of production ii)Factors determining efficiency of labour iii) Savings, investment and capital formation iv)Meaning of production function	i) Define factors of production ii) Explain formation of capital	5
4.0	**Money:**	i) Meaning of money ii) Types of money iii) Functions of money	i) Understand meaning and functions of money	2

Chapter No.	**Chapter Title**	Content	Intended Learning Outcomes	Duration (in hours)
5.0	**Banking Organisation :**	i) Central Bank – its functions ii) Commercial banks – its functions	i) Distinguish the functions of different banks	3
6.0	Pricing	i) Objectives of pricing policy ii) price determinants iii) Price discrimination	i) explain pricing policy	2
Part – B : Accountancy				**21 hrs**
7.0 (A)	**Introduction to Book-Keeping and Accounting:**	i) Definition & objectives of Book-keeping ii) Need and advantages of Book-keeping iii) Definition of Accounting iv) Difference between Book-keeping and Accounting v) Double Entry System – main features vi) Advantages and disadvantages of Double Entry System	i) Define Double Entry System of Book Keeping ii) State its objectives, features merits and demerits	3
(B)	**Introduction to Computerised Accounting System:**	i) Components of Computerised Accounting Software ii) Need for Computerised Accounting iii) Difference between Manual Accounting and Computerised Accounting	i) Identify components of computerized accounting software	2
8.0	**Transaction:**	i) Definition ii) Meaning of Account iii) Classification of Accounts: - Traditional Approach - Modern Approach iv) Meaning of Debit and Credit v) Rules of Debit and Credit	i) State the meaning and rules of Debit and Credit	2

Chapter No.	**Chapter Title**	Content	Intended Learning Outcomes	Duration (in hours)
9.0	**Journal and Ledger**	i) Meaning Journal ii) Recording of Transactions in Journal iii) Meaning of Ledger iv) Objectives and utility of Ledger v) Posting and balancing of Ledger vi) Distinction between Journal and Ledger vii) Names of different Books of Accounts	i) Record business transactions under double entry system in books of accounts	4
10.0	**Cash Book:**	i) Meaning and importance of Cash Book ii) Characteristics and advantages of Cash Book iii) Discount – Trade Discount and Cash Discount iv) Different types of Cash Book: - Single Column Cash Book - Double Column Cash Book - Triple Column Cash Book v) Bank Reconciliation Statement – Basic idea	i) Differentiate different types of Cash Book ii) Record transactions in Cash Book	4
11.0	**Trial Balance & Errors in Accounting:**	i) Meaning and objects of Trial Balance ii) Main features and advantages of Trial Balance iii) Preparation of Trial Balance iv) Types of errors in Accounting	i) Explain meaning and features of Trial balance	3

Chapter No.	**Chapter Title**	Content	Intended Learning Outcomes	Duration (in hours)
12.0	**Components of Final Accounts:**	i) Meaning and objectives of Trading Account ii) Contents of Trading Account iii) Meaning and objectives of Profit and Loss Account iv) Contents of Profit and Loss Account v) Meaning of depreciation, revenue expenditure and capital expenditure vi) Contents of Balance Sheet	i) Identify different components of Financial Statements	3
	Class Test			3 hrs
	Total			**45 hrs**

9 . TABLE OF SPECIFICATIONS for Engineering Economics & Accountancy

Sl. No	**Topic** (a)	**Time allotted in hours (b)**	**Percentage Weightage (c)**	Knowledge	Comprehension	**Application**	**HA**
1	Introduction to Economics	5	12	5	3	0	0
2	Demand & Supply	4	9	2	4	0	0
3	Production	5	12	6	2	0	0
4	Money	2	5	4	0	0	0
5	Banking Organisation	3	7	3	2	0	0
6	Pricing	2	5	2	2	0	0

Sl. No	Topic (a)	Time allotted in hours (b)	Percentage Weightage (c)	Knowledge	Compre-hension	Application	HA
7	(A) Introduction to Book-Keeping	3	7	5	0	0	0
	(B) Introduction to Computerised Accounting System	2	5	3	0	0	0
8	Transaction	2	5	2	1	0	0
9	Journal & Ledger	4	9.5	2	2	3	0
10	Cash Book	4	9.5	0	5	2	0
11	Trial Balance & Errors in Accy	3	7	5	0	0	0
12	Components of Final Accounts	3	7	2	3	0	0
Total		**42 hrs**	**100**	**41**	**24**	**5**	**0**

K = Knowledge C = Comprehension A = Application

A = Higher than Application (Analysis, Synthesis, Evaluation)

C= $\frac{b}{\Sigma b} \times 100$

10 Distribution of Marks:

DETAILED TABLE OF SPECIFICATIONS FOR EEA

Sl. No	Topic	OBJECTIVE TYPE				SHORT ANSWER TYPE					ESSAY TYPE					Grand
		K	C	A	T	K	C	A	HA	T	K	C	A	HA	T	Total
1	Introduc	3	1	0	4	2	2	0	0	4	0	0	0	0	0	8
2	Demand & Suppl	0	0	0	0	0	0	0	0	0	2	4	0	0	6	6
3	Production	1	0	0	1	2	0	0	0	2	3	2	0	0	5	8
4	Money	2	0	0	2	2	0	0	0	2	0	0	0	0	0	4
5	Banking Organis	1	0	0	1	0	0	0	0	0	2	2	0	0	4	5
6	Pricing	2	2	0	4	0	0	0	0	0	0	0	0	0	0	4
7	Introdu to B K	2	0	0	2	3	0	0	0	3	0	0	0	0	0	5
	Introduc to Comput	3	0	0	3	0	0	0	0	0	0	0	0	0	0	3
8	Transact	2	0	0	2	0	1	0	0	1	0	0	0	0	0	3
9	Journal & Ledge	1	0	0	1	0	0	0	0	0	1	2	3	0	6	7
10	Cash Book	0	2	0	2	0	0	0	0	0	0	3	2	0	5	7
11	Trial Balance	3	0	0	3	2	0	0	0	2	0	0	0	0	0	5
12	Componts F/Ac	0	0	0	0	0	0	0	0	0	2	3	0	0	5	5
	Total	20	5	0	25	11	3	0	0	14	10	16	5	0	31	70

K = Knowledge C = Comprehension A = Application

HA = Higher Than Application **Higher than Application (Analysis, Synthesis, Evaluation)**

T = Total

11 Suggested implementation Strategies: Modified syllabus may be implemented with effect from July, 2018 (Starting with the present batch (2018) of 2nd Semester students)

12 **Suggested learning Resource**:

a. Book list

Sl. No.	Title of Book	Name of Author(s)	Publisher
1	Introductory Micro Economics	Sandeep Garg	Dhanpat Rai Publication Pvt. Ltd. New Delhi
2	Introductory Macro Economics	Sandeep Garg	Dhanpat Rai Publication Pvt. Ltd. New Delhi
3	Theory and Practice of Accountancy	B. B. Dam R. A. Sarda R. Barman B. Kalita	Capital Publishing Company, Guwahati – 5
4	Book-Keeping & Accountancy	Juneja, Chawla & Saksena	Kalyani Publisher, New Delhi - 110002
5	Tally. ERP 9 For Beginners	Tally Solutions Pvt. Ltd.	Sahaj Enterprises, Bangalore
6			
7			
8			

b. List of Journals

c. Manuals

d. Others

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3 Course Title– Environmental Education

ENVIRONMENTAL EDUCATION

Subject Title	**:ENVIRONMENTAL EDUCATION**		
Subject Code	**:Me/Ch-301**		
Hours Per Week	**:**	**03**	
Hours Per Semester	**:**	**45**	
Class Test hrs	**:**	**03**	
Total hrs	**:**	**48**	
Full marks(Theory)	**:**	**70**	
Sessional Marks	**:**	**30**	
Class hours	**L**	**T**	**P**
	3	**0**	**0**

Pre requisite : None

Aim of the subject : The aim of the subject is to let the students know about the environment its importance of study, different types of pollution , its effect on environment.

CO------Course Outcome of the subject.(Outcome based Objective)

After studying the course the students will be able to

1) Know the need of the environmental study
2) Know the importance of ecology
3) Identify the different type of pollution and its impact on the environment
4) Know about the environmental sanitation process
5) Appreciate the resource conservation like conservation of land forest and timber, wild life, minerals
6) Know about the pollution control strategies

COURSE CONTENTS

1.0 General concept

1.1 Nature and scope of environmental problems, definition.

1.2 Interaction of system.

1.3 Environmental disturbances.

1.4 Public awareness and action.

1.6 Population and economic growth.

1.7 Impact of industrialization and urbanization on environment.

2.0 Elements of ecology

2.1 Concept of ecosystem

2.2 Concept of biosphere and its components.

2.3 Energy flow in ecosystem.

2.4 Food chain in ecosystem.

3.0 Environmental Pollution

3.1 Water pollution types, source and their effects, natural recovery of water bodies, BOD, COD, DO sag curve

3.2 Air pollution definition, types, sources and it's effects. Air quality standards. Acid rain, Ozone hole depletion, Green house gases and their effects, Global warming. Vehicular pollution and prevention.

3.3 Land pollution, it's types, sources and their effects.

3.4 Noise pollution, sources, measurements and it's effects.

3.5 Radioactive pollution, types, sources and their effects.

4.0 Environmental Sanitation

4.1 Epidemiology- infectious diseases, factors and transmission of diseases.

4.2 Sanitary protection.

4.3 Occupational health hazards

4.4 Solid waste, sources, disposal methods.

5.0 Resource Conservation

5.1 Conservation of land, forest and timber, wildlife, minerals

5.2 Environmental Management.

5.3 Pollution control strategies.

5.4 Environmental ethics.

REFERENCES

1. Environmental Education by Alan Reid
2. An Introduction to Environmental Education by Ezaza & Otienda Atman

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4. Course Title: Fluid Mechanics & Fluid Machines

Fluid Mechanics & Fluid Machines

Subject Title	**:FLUID MECHANICS & FLUID MACHINES**			
Subject Code	**:**	**Me-302**		
Hours Per Week	**:**	**03**		
Hours Per Semester	**:**	**45**		
Class Test hrs	**:**	**03**		
Total hrs		**:**	**48**	
Full marks(Theory)		**:**	**70**	
Sessional Marks	**:**	**30**		
Class hours		**L**	**T**	**P**
		3	**1**	**3**

Pre requisite : Applied Physics, Applied Chemistry, Mathematics, Engineering Mechanics

Aim of the subject : The aim of the subject is to let the students know

1) about the different properties of the fluid ,
2) how the fluid particles behaves during statical pressure,
3) how the fluid particles behaves during flow,
4) how the different types of pump behaves with the fluid

CO--------Course Outcome of the subject.(Outcome based Objective)

After studying the course the students will be able to

1. Know the different properties of fluids
2. Calculate fluid pressureusing manometer
3. Appreciate the Archimedes' Principle of a floating object
4. Apply Bernoulli's theorem for solving problems on discharge
5. Calculate the Coefficient of discharge of a Venturimeter and a notch
6. Solve problems on head loss for both pipe flow and open channel flow
7. Identify the components of pumps and hydraulic turbines
8. Solve small problems on hydraulic turbines and pump.

1 **INTRODUCTION**

1.1 Introduction of fluid mechanics

1.2 Definition _solid, liquid & gas

1.3 Classification of Fluid: Ideal & real fluids

1.4 Units & dimensions

2 **PHYSICAL PROPERTIES OF FLUIDS**

2.1 Specific weight, mass density, specific gravity, compressibility

2.2 Viscosity, Newton's law of viscosity, kinematic viscosity, dimensional formula and units of viscosity

2.3 Surface tension, cohesion & adhesion

2.4 Newtonian& Non Newtonian fluid

2.5 Problems related to 2.1 & 2.2

3 **FLUID STATICS**

3.1 Pressure(atmospheric, absolute & gauge)

3.2 Transmission of pressure (Pascal's law & its application)

3.3 Hydrostatic law (Pressure, specific weight & height relationship)

3.4 Force & centre of pressure on a horizontal , vertical & inclined submerged surface with deduction

3.5 Archimedes' principle, stability of immersed & floating bodies, metacentre & determination of metacentric height (Simple problems related to 3.2,3.4 to 3.5)

4 **FLUID KINEMATICS**

4.1 Classifications of fluid flow (laminar & turbulent), steady & unsteady, uniform & non uniform, compressible & non compressible, rotational &irrotational

4.2 Flow rate & Continuity equation

4.3 Bernoulli's equation including its modification

4.4 Total Energy & Hydraulic gradient (simple problems related to 4.2 & 4.3)

5 **FLUID MEASUREMENTS**

5.1 Piezometer

5.2 Description & working principle of simple Tube manometer, differential manometer

5.3 Definition & relation of co efficient of contraction, coefficient of velocity & co efficient of discharge & vena contracta

5.4 Working principle & use – Venturimeter, Orificemeter& Pitot tube

5.5 (Simple problems on 5.2, 5.3,5.4)

6 **PIPE & OPEN CHANNEL FLOW**

6.1 Flow losses in pipes (at entrance,exit, contraction, expansion & bending) only empirical formula

6.2 Laws of fluid friction

6.3 Darcy's equation for head loss due to pipe friction (Simple problems on 6.2 & 6.3)

6.4 Chezy's&Manning's formula (No deductions & problems only) .

7 FLUID MACHINES : IMPACT OF JET

7.1 Direct impact of a jet on a stationary flat plate

7.2 Direct impact of a jet on an inclined fixed plate

7.3 Impact of a jet on a moving plate

7.4 Impact of a jet on a series of flat vanes mounted on the periphery of a large wheel

7.5 All related problems.

8 HYDRAULIC TURBINES

8.1 Classification – Impulse & Reaction

8.2 Pelton wheel – components , working principle, velocity diagrams, work done, power,efficiency.

8.3 Francis turbine – components, working principle, velocity diagrams, work done, power, efficiency. (PROBLEMS)

8.4 Kaplan turbine- components

8.5 Governing of an impulse turbine (Pelton wheel)

8.6 Difference between impulse & reaction turbine

9 PUMPS

9.1 Classification of pumps

9.2 Reciprocating pump – Types

9.3 Working principle (single acting & double acting), discharge, slip, pump work, power required, indicator diagram (Simple related problems)

9.4 Use of air vessels

9.5 Advantages & disadvantages of reciprocating pump over centrifugal pump

9.6 Centrifugal pump – types

9.7 Working of the pump, methods of converting the K.E of water leaving the impeller into pr. Energy, guide blades, priming

9.8 Work done by the impeller, the manometric head, the manometric efficiency., impeller power, the mechanical efficiency., the overall efficiency.,

9.9 Multistage centrifugal pumps ,specific speed of centrifugal pumps

9.10 Problems on

9.11Books and References:

1. Hydraulics by R H Khurmi
2. Fluid Mechanics by Jain

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4. Course Title: Fluid Mechanics & Fluid Machines Laboratory

Fluid Mechanics &Fluid Machine Laboratory

Weekly hrs	03
Total hrs	45
Sessional Marks	25
Viva Marks	25
Total	50

Outcome based Objectives:

After performing the experiments the students will be able to

1. Appreciate the use of Archimedes' Principle
2. Verify Bernoulli's Theorem
3. Calculate Discharge using Venturimeter
4. Calculate Discharge using Notch
5. DeterminePipe friction using Darcy's formula
6. Determine the Forces of jet on fixed and moving plate
7. Know the function of Centrifugal pump
8. Determine the type of flow in a pipe, laminar or turbulent using Reynold's Apparatus

Course content

1. Measurement of meta centric height of a floating ship model
2. Experiment on Bernoulli's theorem

i) Using Bernoulli's Apparatus

3. Determination of coefficient of discharge by using
   i) Orifice meter
   ii) Venturimeter
   iii) Notch
4. Pipe Friction
   i) Determination of friction factor 'f' in pipe flow
   ii) Determination of minor losses in pipe flow
5. Force of jet
   i) Determination of force of jet on a fixed and moving plate
6. Centrifugal pump
   i) Determination of pressure head
7. Determination of Laminar flow or Turbulent flow
   i) Reynolds' Apparatus

5. Course Title– Fundamental of Electrical & Electronic Engineering

1. Course Code :- El/Et-304
2. Semester :- 3rd
3. Duration of Exam= 3 hrs
4. COURSE OUT COME (CO)

On completion of the course, the student will be able to:

- Define current, voltage, insulator, conductor etc.
- Solve numerical problems using Kirchhoff's law.
- Operate motor and generator.
- Explain briefly the alternating current and transformer
- Explain the use of semiconductor and transistor.
- Guide house wiring
- Explain the fundamental concept of digital electronics correlated to microprocessor with its applications.

CO s and ILOs

CO s	*ILO s*
CO -1. define current, voltage, insulator, conductor etc	1. Define conductor, insulator, and semiconductor with examples. 2. Define current, voltage, resistance, capacitance 3. Describe the Ohm's law 4. Solve problems related to Ohm's law
CO-2 Solve numerical problems using Kirchhoff's law	1. Explain DC network. 2. Define and explain the Kirchhoff's current and voltage law 3. Solve of critical problems by using Kirchhoff's current and voltage law 4. Use of Wheatstone bridge 5. Determine of unknown resistance by Wheastone bridge

CO s	*ILO s*
CO-3 operate motor and generator	1. Define DC generator and motor 2. Explain the construction of DC generator and motor 3. Explain the working principle of DC generator and motor 4. Compare the DC motor and generator 5. Enumerate different types of DC motor and generator 6. Explain use of DC generator and motor
CO -4 Explain briefly the alternating current and transformer	1. Define amplitude, time period, frequency, equation of alternating voltage and current, RMS, average value, instantaneous value, peak factor. 2. Explain RLC circuit 3. Explain inductance of AC circuit 4. Solve numerical problems 5. Explain construction of transformer 6. State operating principle of transformer 7. State type and uses of transformer 8. State step up and step down transformer
CO5- Explain the use of semiconductor and transistor	1. Define semi conductor, energy band, intrinsic and extrinsic semi conductor 2. Doping of semi conductor 3. Explain P-type, N-type semiconductor, 4. Define PN junction diode, forward and reverse biased diode, 5. Explain diode characteristics, application of PN junction diode like Half-wave, Full-Wave rectifier. 6. Explain Transistor: Physical construction of bipolarPNP and NPN transistor. 7. biasing circuit configuration 8. Explain different mode of transistor (CE, CB, CC). 9. State the application of transistor as an amplifier. 10. State elementary ideas of display - LED, LCD, Seven segment display.

CO s	*ILO s*
CO-6 guide house wiring	1. Define house wiring 2. Explain different methods of house wiring 3. State the safety and precautionary measure to be taken for electrical shock.
CO-7 Microprocessor	1. Explain the various symbolic representation of logic gates, combinational logic, basic operation of flip-flops, counters and registers. 2. State the fundamental concept of microprocessor and its application in instrumentation, 8085 microprocessor and its operation.

5. Teaching Scheme (in hours/week)

Lecture	Tutorial	Practical	Total
3		3	6

6. Examination Scheme :-

Theory			Pass marks (ESE+SS)	Practical		Pass marks (PT+PA)	Total marks (Th+ Pr)	Credit
ESE	Sessional (SS)			PT	PA			
	TA	HA						
70	10	20	33/100	25	25	17/50	150	4

7. Detailed Course Content

Chapter No	Chapter Title	Content	Duration (in hours)
1	**Introduction**	Basics of Electricity: Revision of insulators and conductors and their examples ,Definition and units of voltage, current, resistance, inductance, capacitance, different voltage sources, Ohm's law, series & parallel combination of resistance .	4

Chapter No	Chapter Title	Content	Duration (in hours)
2	DC network	DC network: Kirchhoff's Law, solving network problem to find current and voltage, Wheatstone bridge and Its problem.	5
3	Generator & motor	Faradays laws of electromagnetic induction, Flemings right hand and left hand rule D.C. generator and motor: Construction, operating principle, types, uses.	4
4	AC fundamental	A. C. Fundamentals: Basic terms-cycle, amplitude, time period, frequency, equation of alternating voltage and current, RMS, average value, instantaneous value, peak factor, form factor, simple problem	5
5	AC circuit	R-L-C series circuit: AC through resistance, capacitance, inductance and their combinations, expression for impedance, reactance, current, power factor, simple problem.	4
6	Transformer	Transformer Construction, operating principle, types and uses.	4
7	Semiconductor	Semiconductor: Definition of semiconductor, energy band diagram, intrinsic and extrinsic semiconductor, doping, P-type, N-type semiconductor, PN junction diode, forward and reverse biased diode, diode characteristics, application of PN junction diode like Half-wave, Full-Wave rectifier.	5
8	Transistor	Transistor: Physical construction of bipolar PNP and NPN transistor, biasing circuit configuration (CE, CB, CC). Application of transistor as an amplifier. Elementary ideas of display - LED, LCD, Seven segment display.	5
9	House wiring	9.1 Introduction to house wiring 9.2 Methods of house wiring 9.3 Safety and precautions measures against electrical hazard.	2

Chapter No	Chapter Title	Content	Duration (in hours)
10	Microprocessor	1. Symbolic representation of logic gates, combinational logic, basic operation of flip-flops, counters and registers. 2. Fundamental concept of microprocessor and its application in instrumentation, 8085 microprocessor and its operation.	5
11	Class test	Two class test	2

8. Distribution of Marks/ Table of specifications

Sr. No	**Topic** (a)	**Time allotted in hours** **(b)**	**Percentage Weightage** **(c)**	**K**	**C**	**A**	**HA**
1	Introduction	4	9	3	0	0	
2	DC net work	5	11	3	0	4	
3	Generator & motor	4	9	3	0	5	
4	AC fundamental	5	11	4	3	4	
5	AC circuit	4	9	3	1	4	
6	Transformer	4	9	3	3	1	
7	Semiconductor	5	11	3	1	3	
8	Transistor	5	11	3	2	1	
9	House wiring	**2**	4	2	0	4	
10	**Microprocessor**	5	11	4	0	3	

Sr. No	Topic (a)	Time allotted in hours (b)	Percentage Weightage (c)	K	C	A	HA
11	Class test	2	4				
	Total	Σ b=45	100	31	10	29	

K = Knowledge C = Comprehension A = Application

HA = Higher Than Application (Analysis,Synthesis, Evaluation)

C= $\frac{b}{\sum b} \times 100$

10. Details Table of Specification for Theory

Sl. no	Topic	OBJECTIVE TYPE				SHORT/ DESCRIPTIVE ANSWER TYPE				
		K	C	A	***T***	K	C	A	HA	***T***
1	Introduction	1			***1***	2				***2***
2	DC net work	1		1	***2***	2		3		***5***
3	Generator & motor	1		2	***3***	2		3		***5***
4	AC fundamental	2	1	1	***4***	2	2	3		***7***
5	AC circuit	1	1	1	***3***	2		3		***5***
6	Transformer	1		1	***2***	2	3			***5***
7	Semiconductor	1	1	1	***3***	2		2		***4***
8	Transistor	1	1	1	***3***	2	1			***3***
9	House wiring	1		1	***2***	1		3		***4***
10	Microprocessor	1		1	***2***	3		2		***5***
	Total				***25***					***45***

K = Knowledge C = Comprehension A = Application HA = Higher Than Application

T = Total

N.B.:- 1. The question pattern will be as per the instruction of SCTE or as per existing rules.

2. The objective type questions may be in the form of multiple choice, fill up the blanks, true or false or very short answer type.

3. Optional question (if any) may be from the same topic in the form of either or type like below

Q No. Explain the properties of conductor

Or

Explain the properties of insulator

11. Suggested Implementation Strategies:- Teacher will use Black board, OHP, LCD Projector, Smart board, Video etc for effective teaching learning process .
12. Ref Books:

I. A text book of Electrical Technology Vol – I, B. L. Theraja& A. K. Theraja, S. Chand.
II. Principle of Electronics, V. K. Mehta, S. Chand.
III. Electronic Principle, A.P. Malvino, Tata McGraw-Hill
IV. Electronic Devices & Circuits, Millman&Halkias, Tata McGraw-Hill

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5. Course Title :- Fundamental of Electrical & Electronic Engineering (Practical)

1.Course Title :- **FUNDAMENTAL OF ELECTRICAL & ELECTRONIC ENGINEERING** (PRACTICAL)

2.Course Code :- El/Et-304

3.Semester :- 3rd

INTELLECTUAL SKILLS

a. Identify the properties of generator, ammeter, voltmeter, transformer
b. Interpret the working principle of equipment
c. Interpret the test results
d. Follow the IS procedure of testing

MOTOR SKILLS

a. Measure the quantities accurately
b. Identify the instruments properly
c. Handle the equipment carefully.

LIST OF PRACTICAL

(Students are to perform minimum six experiments)

1. Verification of KCL and KVL
2. Study of DC shunt generator.
3. Milli ammeter as a Voltmeter.
4. Milli voltmeter as an ammeter.
5. Study of RLC series circuit.
6. Study of single phase transformer.
7. Determination of semi-conductor diode characteristic.
8. Study of transistor configuration (CE,CB.CC) (Project base)
9. Study of transistor as an amplifier. (Project base)
10. Hands on activity on house wiring (Mini project work on simple house wiring involving one light point, one fan point, one power socket, one MCB on a wooden or ply board

6. Course Title: Manufacturing Technology - I

MANUFACTURING TECHNOLOGY – I

Subject Title	**:**	**Manufacturing Technology - I**		
Subject Code	**:**	**Me-303**		
Hours Per Week	**:**	**03**		
Hours Per Semester	**:**	**45**		
Class Test		**:**	**03**	
Total hrs		**:**	**48**	
Full marks(Theory)		**:**	**70**	
Sessional Marks	**:**	**30**		
Class hours		**L**	**T**	**P**
		3	**0**	**3**

Pre requisite : None

Aim of the subject : The aim of the subject is to let the students know about the different tools used in finishing the machining processes and how the machines are used for production from raw metal to the final product. It will also help to know different mechanicalmanufacturing process of metals.

CO COURSE OUTCOME

After studying the course the students will be able to

1. Identify the tool angles of a single point cutting tool used in lathe machine
2. Identify the different chips in machining process
3. Know about the metal casting process, pattern making and moulding
4. Know the use of resistance and arc welding
5. Know the press operation like bending, cutting, drawing, punching
6. Appreciate the use of cutting fluids and coolants

CONTENTS:

1.0 Basic of Machine Tools

1.1 Introduction to machine tools.

1.2 Differences between machine and machine tools

1.3 Types of cutting tools

1.4 Cutting tool materials-properties and types.

1.5 Single point cutting tool nomenclatures.

1.6 Cutting tool life and factors effecting tool life and tool wear.

1.7 Orthogonal and Oblique cutting.

1.8 Cutting forces in orthogonal and oblique cutting

1.9 Chip formation process, temperature zone and forces.

1.10 Types of chips and factors for producing each chip.

1.11 Chip breaker and its types.

2.0 Metal Casting Process

2.1 Introduction to metal casting

2.2 Casting: steps involved in casting

2.3 Pattern for casting

2.4 Pattern making materials

2.6 Moulding- Moulding sand-Moulding process

2.7 Special casting processes - Die casting, Centrifugal casting & Investment casting.

2.8 Defects in casting and their remedies

3.0 Advanced Welding Processes

3.1 Introduction.

3.2 Classification of welding process

3.3 Resistance welding - Spot, Seam and Projection welding

3.4 Advanced Arc welding types-Shielded metal arc welding, TIG & MIG welding,Submerged arc welding, Plasma arc welding & Laser beam welding.

3.5 Defects in welding and their remedies

3.6 Differences between Brazing and Soldering.

4.0 Press Work

6.1 Introduction.

6.2 Presses-Types-Power press

6.3 Press operations: Cutting, bending, drawing, punching, blanking & notching,

5.0 Powder Metallurgy

7.1 Basic concepts of powder metallurgy.

7.2 Methods of powder metallurgy.

7.5 Applications, merits and limitations of powder metallurgy.

6.0 Cutting Fluids and Coolants

8.1 Introduction.

8.2 Purpose and Properties.

8.3 Coolants and lubricants for different operations

REFERENCE BOOKS:

1) Workshop Technology by Hazara Chaudhary VOL - I & VOL – II.
2) Production Technology by Dr.P.C.Sharma., S Chand & Co
3) Workshop technology by B.S. Raghuvanshi
4) Introduction to Manufacturing Processes, P N Rao , Vol 1 & Vol II, Tata Mc Grew Hill Publications
5) Manufacturing Process- I & II & III- By Dr. Radhakrishna K
6) Production Technology by R.K.Jain.
7) Manufacturing Technology I &II , Dr P C Sharma , S Chand & Co
8) Manufacturing Technology - P P Date , Jaico Publishing House
9) Foundry Technology –Dr. Radhakrishna.

6. Course Title: Manufacturing Technology Laboratory

Manufacturing Technology - I- Lab

Hours Per Week	:	03
Hours Per Semester	:	45
Total hrs	:	48
Sessional Marks	:	25
Viva Marks	:	25

Outcome Based Objectives

After performing the practical the students will be able to

1. Know the various types of cutting tools
2. Know the nomenclature of a single point cutting tool
3. Prepare a mould sand mix
4. Handle the electrode holder for laying welding beads

Course Content

1. Machining
   - 1.1 Draw the single point cutting tool and label various parts
   - 1.2 Ground the various angles according to single point cutting tool nomenclature on a rectangular work piece

2. Foundry, Moulding and casting of
   - 2.1 solid bearing
   - 2.2 flange coupling
   - 2.3 split bearing
   - 2.4 connecting rod
   - 2.5 V pulley
   - 2.6 Gear pulley
   - 2.7 Core making
3. Welding
   - 3.1 Lay out of beads

3.2 Butt joints

3.3 Lap joints

3.4 T- joint

3.5 H – joints

3.6 Angular joints

3.7 Two joints

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7 Course Title: Professional Practice-I

PROFESSIONAL PRACTICE I

Subject code-Me -310

Class hours	**L**	**T**	**P**
	1	**0**	**2**

Rationale :

To develop general confidence, ability to communicate and attitude in addition to basic technological concepts through Industrial visits , expert lectures, seminars on technical topics and group discussion.

CO s

After studying the subject the student will be able to :

- Acquire information from different sources.
- Prepare notes for a given topic.
- Present a given topic in a seminar.
- Interact with peers to share thoughts.
- Prepare a report on industrial visit, expert lecture.

Activities

1. **INDUSTRIAL VISITS:** **10**
2. Structured industrial visits be arranged and report of the same should be submitted by the individual student to form part of the term work.

Visits to **any two** of the following :

- Nearby Petrol Pump (fuel ,oil , Density, product specifications)
- Automobile Service Station (Observation of Components/aggregates)
- Engineering Workshop (Layout, Machines)
- Dairy Plant / Water Treatment Plant

3. **GUEST LECTURE(S):** **6**

Lectures by Professional/ Industrial Expert / Student Seminars based on information search to be organized from any THREE of the following areas :

- Pollution Control
- Non destructive testing(NDT)
- Acoustics

- Illumination / Lighting System.
- Fire Fighting / Safety Precautions and First aids
- Computer Networking and Security.
- Topics related to Social Awareness such as – Traffic Control System, Career opportunities, Communication in Industry , Yoga Meditation , Aids awareness and health awareness etc.

4. **: GROUP DISCUSSION 6**

The students should discuss in a group of six to eight students and write a brief report on the same as a part of term work. Two topics for group discussion maybe selected by the faculty members. Some of the suggested topics are:

i. Sports events
ii. Current news items
iii. Current topics related to mechanical engineering field.
iv. Innovative news

5. **STUDENT ACTIVITIES: 8**

The students in a group of 3 to 4 will perform any one of the following activities (other similar activities may be considered Activity)

I. Collect and study IS code for Engineering Drawing.
II. Collecting information from Market : Nomenclatures and specifications of engineering materials.
III. Specifications of Lubricants. SAE no
IV. Draw orthographic projections of a given simple machine element using CAD software.
V. Collect information on issuing of pollution certificate from the DTO's office

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