



**ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING &
TECHNOLOGY, NAGPUR**

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2023-24

MECHANICAL ENGINEERING

III Semester

Sr No	Course Code	Course Title	Hours per Week			Credits	Maximum Marks		
			L	T	P		Continual Assessment	End Sem Examination	Total
1	AS311T	Applied Mathematics - III	4	-	-	4	30	70	100
2	ME301T	Manufacturing Processes	3	-	-	3	30	70	100
3	ME301P	Manufacturing Processes Lab	-	-	2	1	25	25	50
4	ME302T	Fluid Mechanics & Hydraulic Machines	3	1	-	4	30	70	100
5	ME302P	Fluid Mechanics & Hydraulic Machines Lab	-	-	2	1	25	25	50
6	ME303T	Materials Engineering	4	-	-	4	30	70	100
7	ME303P	Materials Engineering Lab	-	-	2	1	25	25	50
8	ME304T	Engineering Graphics	2	-	-	2	15	35	50
9	ME304P	Engineering Graphics Lab	-	-	2	1	25	25	50
10	H103	Constitution of India	2	-	-	0	Audit		
11	ME305T	Career Development-I *	2	-	-	0	Audit		
Total			20	1	8	21	235	415	650

* Career Development (Computational Skills, Interpersonal Skills, Aptitude and Logical Thinking)

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B.Tech. Scheme of Examination & Syllabus 2023-24

MECHANICAL ENGINEERING

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME301T	Manufacturing Processes	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
<ol style="list-style-type: none">1. This course is designed to provide students with an overview of a wide variety of manufacturing processes for processing of engineering materials.2. Students will learn principles, operations and capabilities of various moulding, metal casting, metal joining processes3. In this course, students shall understand the importance of manufacturing processes and be able to select and apply suitable processes for an engineering product.	<ol style="list-style-type: none">1. Describe principles, operations and capabilities of various moulding, metal casting processes.2. Select appropriate welding or allied process & set correct welding parameters for the given components. Identify welding defect & correct the required parameter.3. Identify various rolling & forging processes as per applications.4. Describe principles, operations and capabilities of various presses and dies.5. Illustrate appropriate process for the manufacture of the given plastic components.

Unit I	[8Hrs]
Pattern Making & Moulding: - Pattern making: Types, materials used, Pattern making allowances, color codes. Core making: - Types, core material & its properties. Moulding: Types of sand moulds, moulding sand composition. moulding sand properties, moulding machines. Shell moulding, CO2 moulding. Gating System & Casting Processes: - Elements of gating systems, pouring equipments, Melting furnaces -Types, Electric furnace, Induction furnace, Cupola construction & operation. Special casting processes such as investment Casting, Centrifugal Casting, Slush Casting and Die Casting.	
Unit II	[8Hrs]
Joining Processes: - Introduction to metal Joining- Types of Welding. Arc Welding & Gas Welding Processes, Defects & Inspection of Welding Joints, Electrodes, weldability of Metals, Welding equipments. Fixtures, TIG Welding, MIG Welding, Spot Welding Soldering and brazing, Thermit welding.	
Unit III	[8Hrs]
Forming Process for metals:- Rolling, Forging, Extrusion, Drawing, Mechanics of forming process, Types of rolling mills, Forging equipments, Extrusion processes and various drawing operations.	
Unit IV	[8Hrs]
Sheet Metal Working: Introduction, Punches and dies, sheet metal working operations: piercing and punching, blanking, notching, beading, flanging, hemming, seaming, perforating, slitting, lancing, mechanism of blanking, drawing, coining, embossing, wire drawing, metal spinning operations, bending, forming and drawing.	
Unit V	[8Hrs]
Processing of Plastic: Introduction, general properties and applications, types of plastic, thermosetting plastic, thermo-plastic plastics. Methods of processing plastics: compression molding, injection molding, extrusion, Calendaring, wire drawing.	

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Manufacturing technology (Vol. I)	P. N. Rao,		Tata Mc-Graw Hill
2.	Manufacturing Engineering & Technology	Kalpajian		Pearson
3.	Modern Materials and Manufacturing Process,	R. Gregg Bruce, John E. Neely		Pearson Education

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Manufacturing Science,	Ghosh & Malik,		East West Press.
2.	Processes & Materials of Manufacturing,	R. Lindberg, Allyn & Bacon.		

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B.Tech. Scheme of Examination & Syllabus 2023-24

MECHANICAL ENGINEERING

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME301P	Manufacturing Processes Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
<ol style="list-style-type: none">To understand and demonstrate the basic principle of manufacturing processesTo understand and describe casting, joining and forming processesTo demonstrate the skills for pattern making, casting and welding.	<ol style="list-style-type: none">Performing various tests on the moulding sand sample such as compressive strength testing, permeability test, moisture testing etc.To know the properties of the moulding sand.Pattern making from the given component drawing Or component.Making complete mould from various types of patterns like single piece, split, etc.Preparing edges for joining thick plates by M.I.G welding, setting welding parameters such as current, inert gas pressure & job setting.Demonstrate how to melt metal in the furnace & pour the molten metal in the mould.

Minimum 8 experiments to be performed

Expt. No.	Title of the experiment
1	Performance of Moulding Techniques
2	Study of Casting Process
3	Study and Demonstration of Pattern Making
4	Study of Model of Cupola Furnace
5	Study and Demonstration of Joining Processes
6	Study of Forming Processes
7	One Job – Pattern Making
8	One Job – Casting
9	One Job – Welding

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Manufacturing technology (Vol. I)	P. N. Rao,		Tata Mc-Graw Hill
2.	Manufacturing Engineering & Technology	Kalpakjian		Pearson
3	Modern Materials and Manufacturing Process,	R. Gregg Bruce, John E. Neely		Pearson Education

Reference Books

S.N	Title	Authors	Edition	Publisher
	Manufacturing Science, Processes & Materials of Manufacturing,	Ghosh & Malik, R. Lindberg, Allyn & Bacon.	East West Press.	

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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME302T	Fluid Mechanics and Hydraulic Machines	3	1	-	4	30	70	100

Course Objectives	Course Outcomes
<ul style="list-style-type: none">➤ To develop an understanding of the behavior of fluids at rest or in motion and the subsequent effects of the fluids on the boundaries as the mechanical engineers has to deal with fluids in various applications.➤ To understand concepts of fluids and their properties and to apply related analytical tools to solve different types of problems related to fluid flow.➤ To understand practical applications of fluid mechanics based on momentum and angular momentum principles involved in hydraulic machines.➤ To understand design parameters and performance characteristics of various hydraulic machines & devices.	<ul style="list-style-type: none">➤ Define the fundamental properties of fluids and apply the concepts of fluids statics.➤ Apply the principles of fluid kinetics and boundary layer concepts for fluid flow problems.➤ Analyze the fluid flow through pipes.➤ Demonstrate knowledge of working principles of hydraulic pumps➤ Demonstrate knowledge of working principles of hydraulic turbines

Unit I

[8Hrs]

Fluid – definition, Properties of fluids - density, specific weight, specific volume, specific gravity, viscosity, compressibility, vapour pressure, capillarity and surface tension.

Fluid statics: concept of fluid static pressure, absolute and gauge pressures - pressure measurements by manometers and pressure gauges. Buoyancy and Flotation, Stability criterion.

Unit II

[8Hrs]

Fluid Kinematics: Flow visualization, lines of flow, types of flow, continuity equation (one dimensional differential forms). fluid dynamics, equations of motion, Euler's equation along a streamline, Bernoulli's equation, its applications such as venturi meter, orifice meter, pitot tube, boundary layer theory. Introduction to CFD: Navier Stokes Equation, Necessity, limitations, philosophy behind CFD, Applications.

Unit III

[8Hrs]

Flow through pipes: Darcy-Weisbach's equation, friction factor, minor losses, flow through pipes in series and parallel, power transmission, Dimensional analysis.

Unit IV

[8Hrs]

Elements of Hydroelectric power plant, Hydraulic turbines, definition and classifications – Impulse and Reaction turbine - working principles, components, velocity triangles, Work done, specific speed, efficiencies, performance curves for turbines, Draft tube, Cavitation in turbines, Selection of turbines, similarity laws. Hydrodynamic forces on turbine blades.

Unit V

[8Hrs]

Pumps- classifications - Centrifugal pump- classifications, working principles, priming, velocity triangles, specific speed, efficiency and performance curves, multi-staging, operation in series and parallel, NPSH, submersible pumps, axial flow pump, Reciprocating pump- classification, working principles, slip, performance curves and work saved by air vessels, cavitations in pumps, selection of pumps.

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Fluid Mechanics and Hydraulics Machines	R.K Bansal	9th	Laxmi publications (P) Ltd
2.	A Textbook of Hydraulic Machines in SI Units (Fluid Mechanics and Hydraulic Machines Part –II)	R.K, Rajput	Reprint 2012	Laxmi publications (P) Ltd
3.	Fluid Mechanics–Fundamentals and Applications	Y. Cengel and Cimbala		Tata Macgrawhill Publishing

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Introduction to fluid mechanics and fluid machines	Som, S.K., Biswas G.	4th	Tata McGraw-Hill

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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME302T	Fluid Mechanics and Hydraulic Machines	3	1	-	4	30	70	100

LIST OF TUTORIALS

Expt. No.	Title of the experiment
1	Applications based on fluid properties such as block sliding over an inclined plane, capillary phenomenon etc.
2	Study of Manometers
3	Study of stability of floating bodies and submerged bodies
4	Determination of coefficient of discharge of flow meters
5	Case study of pipe network
6	Losses in pipes (Haigen Pois. Equation)
7	Selection design of Turbine
8	Design of centrifugal and reciprocating Pumps
9	Governing of Turbines
10	Study of Hydro-Kinetic System

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**THIRD SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME302P	Fluid Mechanics & Hydraulic Machines Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
<ul style="list-style-type: none">■ To understand the basic concepts regarding the behaviour of fluid.■ To learn various methods for estimation of forces due to fluid / fluid pressure measurement and flow measurements.■ Develops skill to analyze various Hydraulic systems.	<ul style="list-style-type: none">■ Analyze the Stability condition of floating bodies and apply Law of conservation of Energy.■ Apply Frictional losses and Hydraulic co-efficient in the pipe flow.■ Estimate the Performance characteristics of Pelton Turbine■ Estimate the Performance characteristics of Francis Turbine & Kaplan Turbine.■ Estimate the Performance characteristics of Centrifugal Pump & Reciprocating Pump.

■ Minimum eight experiments to be performed from the list

Expt. No.	Title of the experiment
1	Verification of Bernoulli's equation/Theorem
2	Determination of coefficient of discharge of a venturi meter
3	Determination of coefficient of discharge of an orifice meter
4	Determination of metacentric height of a ship model
5	Determination of frictional losses in pipes
6	Determination of Reynolds Number
7	Estimation of performance characteristics of reciprocating pump
8	Estimation of performance characteristics of Centrifugal pump
9	Estimation of performance characteristics of Pelton Wheel Turbine
10	Demonstration of Francis Turbine

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Engineering Fluid Mechanics	K.L. Kumar		S. Chand & Company Ltd
2.	Hydraulic and Fluid Mechanics	P.N. Modi and S.M.Seth		Standard BookHouse
3.	Fluid Mechanics & Hydraulic Machines	R.K. Rajput		S. Chand & Company Ltd, New Delhi

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Fundamentals of CFD	John Anderson		McGraw Hill International
2.	Fluid Mechanics	Victor L Streeter, E Benjamin Wylie		McGraw Hill International
3.	Fluid Mechanics	Yunus A.Cengel & John M. Cimbala		1. Tata McGraw Hill Publishing Company Ltd. New Delhi.

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**THIRD SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME303T	Materials Engineering	4	-	-	4	30	70	100
Course Objectives		Course Outcomes						
Students will be able to understand the fundamentals and do structure property co-relation of various engineering materials. This course is aimed to understand, develop a fundamentals in selecting appropriate materials for industrial and engineering applications. Also, this course is aimed to built knowledge for development of properties using suitable heat treatment processes. This course also aims to compute the mechanical properties of engineering materials using various testing methods.		<ul style="list-style-type: none">■ Describe the fundamentals of various engineering materials, properties, their crystal structure and imperfection.■ Compute the mechanical properties of engineering materials using various testing methods.■ Interpret and explain the phase diagram and make use of this knowledge to illustrate the Iron-Iron carbide equilibrium diagram.■ Realize the significance and general procedure of heat treatment processes.■ Differentiate the composition, microstructure, properties and application of alloy steels, cast-iron and non metal alloys.						

Unit I**[9Hrs]**

Introduction to engineering materials and their classification, mechanical properties of engineering materials, Non metals, Ceramics, Plastics, Nanomaterials, Refractory materials, Crystal structure – space lattice and unit cell, Miller indices, atomic packing factor, polymorphism, Imperfection in crystals: Point, line, interfacial and volume defects, Microscopic and macroscopic examinations of metals, Dislocations, strengthening mechanisms and slip systems, critically resolved shear stress.

Unit II**[9Hrs]**

Mechanical Property measurement: Tensile, compression, Young's modulus, relations between true and engineering stress-strain curves, generalized Hooke's law, yield strength, ductility, resilience, toughness and elastic recovery. Hardness test : Rockwell, Brinell and Vickers tests and their relation to strength. Introduction to nondestructive testing (NDT)

Unit III**[9Hrs]**

Alloys, solid solutions, Hume-Rothery's rules of solid solubility, Gibb's phase rule. Solidification of pure metal, Phase diagrams: Interpretation of binary phase diagrams and microstructure development; Iron Iron-carbide phase diagram and microstructural aspects of austenite, ferrite and cementite, pearlite and ledeburite. Critical temperatures, invariant reactions.

Unit IV**[9Hrs]**

Heat treatment of Steel, Isothermal transformation (TTT) diagrams for Fe-C alloys and microstructure development. Continuous cooling curves (CCT) and interpretation of final microstructures and properties. Annealing, tempering, normalizing and hardening. Austempering, martempering, case hardening, carburizing, nitriding, cyaniding, carbo-nitriding, flame and induction hardening,

Unit V**[9Hrs]**

Classification of steel, Alloying of steel, properties of stainless steel and tool steels, maraging steels. Cast irons; grey, white, malleable and spheroidal cast irons. Copper and copper alloys; brass, bronze and Bearing Materials. Introduction to Powder metallurgy. International standards and codes for some commonly used steels for engineering applications (e.g. EN, IS, AISI, ASTM etc.).

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Material Science and Metallurgy for Engineers	V. D. Kodgire & S. V. Kodgire		Everest Publishing House.
2.	Introduction to Physical Metallurgy	Sindney H Avner		Mc-Graw Hill Education (India) Pvt. Ltd.
3.	Engineering Materials and Metallurgy	U. C. Jindal		Pearson

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Materials Science and Engineering-An Introduction	W. D. Callister	6th	Wiley India
2.	Engineering Materials	Kenneth G. Budinski and Michael K. Budinski	4th	Prentice Hall

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**THIRD SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME303P	Materials Engineering Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
<ul style="list-style-type: none">■ Students will be able to learn and practice preparation, identification of micro structure.■ Students will be able to compute the mechanical properties of engineering materials using various testing methods.■ Students will be able to understand heat treatment process.	<ul style="list-style-type: none">■ Ability to identify phases and composition of various metals by metallographic examination using metallurgical microscope.■ Ability to get experience on various heat treatment processes.■ Ability to measure hardness of engineering materials.■ Ability to understand working, principle and utilization of UTM to derive various material properties.

Minimum 8 practicals to be performed from following list

Expt. No.	Title of the experiment
1	To study the Metallurgical Microscopes
2	Preparation of specimen for metallographic examination.
3	Micro-structural examination of different types of Steels.
4	Micro-structural study of Meehanite alloy.
5	Micro-structural study of White Cast Iron and Grey Cast Iron.
6	Micro-structural study of Malleable Cast Iron and Nodular Cast Iron.
7	Measurement of hardness with the help of Rockwell Hardness Tester.
8	Measurement of hardness with the help of Brinell Hardness Tester.
9	Determination of tensile properties of ductile material.
10	Hardenability Test

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Introduction to Engineering Metallurgy	Rollason E.C		Edward Arnold publications
2.	Engineering Materials	Kenneth G. Budinski and Michael K. Budinski	4th	Prentice Hall of India

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Material Science and Engineering	V. Raghavan		Prentice Hall of India
2.	Materials Science and Engineering-An Introduction	W. D. Callister	6th	Wiley India

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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME304P	Engineering Graphics Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
<ul style="list-style-type: none">To practice the basics of Engineering Drawing by using freehand sketching and drafting with the help of hand-held drafting tools and computer-aided drafting software.Students would be able to interpret data and transform it into graphic drawings for effective communication and lifelong learning.	<ul style="list-style-type: none">Recognize and construct multi-view orthographic projection of lines and planes.Recognize and construct multi-view orthographic projection of solids.Apply knowledge of orthographic projections to convert isometric/ pictorial view into orthographic views and use CAD software for drafting.Apply knowledge of isometric projection to convert orthographic projections of three-dimensional objects into isometric drawing and use CAD software for drafting.

Five A2 (594X420mm) (Half imperial) size drawing sheets and CAD work as detailed below:

Expt. No.	Title of the experiment
1	Sheet No. 1: Projection of Lines (Minimum four problems)
2	Sheet No. 2: Projection of Planes (Minimum four problems)
3	Sheet No. 3: Projections of solids and DLS (Development of Lateral Surfaces) (Minimum 2 problems each)
4	Sheet No.4: Orthographic Views, to draw orthographic views from a given pictorial view (Minimum four problems)
5	Sheet No. 5: Isometric Views/Projection (Two problems each on Isometric views & Isometric projections)
6	Sheet No. 6: Drawing Orthographic/ Isometric views using a CAD package. (Minimum 2 Problems)

Note: During the external practical examination of 25 marks, students are expected to solve problems on the drawing sheet. (15 marks and duration: 1 Hr 30 Min). An oral viva of 10 marks will be conducted during the external practical examination.

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Elementary Engineering Drawing	N.D. Bhatt		Charotar Publishing house
2.	Engineering Drawing	D. N. Johle		Tata Mcgraw-hill Publishing
	Engineering Drawing	M.B. Shah: B. C. Rana		Pearson

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Engineering Graphics	. P.S. Gill		
2.	Fundamentals of Engineering Drawing	Luzadder Warren J, Duff John		PHI Publications

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THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME304T	Engineering Graphics	2	-	-	2	15	35	50

Course Objectives	Course Outcomes
<p>To make students conversant with-</p> <ul style="list-style-type: none">Standard conventions and principles to be applied while making engineering drawing.Methods and techniques for drawing orthographic projection (lines, planes and solids) and Isometric projection.Computer Aided Drafting software.	<ul style="list-style-type: none">Create Orthographic projection of points, lines, and planesConstruct Orthographic projection of solids and Development of their lateral surfaces.Apply the concepts of orthographic projection to convert pictorial view into multi-view projection and use CAD software for drafting.Apply the concepts of isometric projection to convert orthographic projection into a pictorial view of the objects and use CAD software for drafting.

Unit I

[7Hrs]

Introduction to Engineering Drawing & Basics of Orthographic Projections: Projections of Line and Plane

Introduction: Use various drawing instruments, lettering, Layout of drawing sheets, different types of lines used in drawing practice, and Dimensioning. Introduction to scales and scale factor (R.F.). Orthographic projection:- Reference planes of projection, reference line and conventions employed, Projections of point in all four quadrants, Projection of straight lines (located in first quadrant/ first angle only)- True and apparent lengths, true & apparent inclinations to the reference plane. Problems on Lines inclined to both reference planes; Projection of Plane: Projection of planes with condition perpendicular to one & inclined to the other reference plane and when it is inclined to both reference planes (Plane in First Quadrant Only). Introduction to Auxiliary Plane method.

Unit II

[7Hrs]

Projections of Solids:- Introduction, Definitions, Orthographic Projections of Prisms, Pyramids, Cube, Tetrahedron, Cylinder, and Cone (With condition of axis inclined to one & parallel to the other reference plane); Introduction to Section planes and Development of Lateral Surfaces of the Cube, right regular prisms, right regular pyramids, right circular cylinder, right circular cone, tetrahedron.

Unit III

[5Hrs]

Orthographic Projections and Introduction to CAD:- Conversion of given Pictorial/ Isometric view into Orthographic views. Advantages of using Computer Aided Drafting (CAD) packages, applications of CAD, the basic operation of drafting packages, and use of various commands for drawing, dimensioning, editing, modifying, saving, and printing/plotting the drawings. Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Command Icon Bars).

Unit IV

[5Hrs]

Isometric Projections

Definition of Isometric view/projection, Isometric scale to draw Isometric projection, Conversion of given orthographic views (solids and simple castings/ components) into Isometric view/ projection; Construction of Isometric view of combined two simple solids (axes vertical & coinciding) such as Cube, Pyramid, Prism, Cone, Cylinder & Sphere.

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Elementary Engineering Drawing	N.D. Bhatt		Charotor Publishing house
2.	Engineering Drawing	D. N. Johle		Tata Mcgraw-hill Publishing
3.	Engineering Drawing	M.B. Shah: B. C. Rana		Pearson

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Engineering Graphics	P.S. Gill		
2.	Fundamentals of Engineering Drawing	Luzadder Warren J, Duff John		PHI Publications

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**THIRD SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
ME305T	Career Development-I	2	-	-	-	-	-	-

Course Objectives	Course Outcomes
1. To provides hands-on use of Microsoft Office applications like Word, Excel and PowerPoint. 2. To impart MS Office applications knowledge and skills. 3. To create foundation to prepare students for life-long learning of computer concepts and skills.	<ul style="list-style-type: none">■ Enter, import and edit data in Excel■ Apply formulas and choose suitable functions as per the need.■ Create and edit different types of charts■ Manage and analyze data using sorting techniques and PivotTables■ Generate What-If Analysis using Goal Seeking and Solver■ Create and edit Word documents and PowerPoint presentations

Unit I	[4Hrs]
Introduction and key elements of Excel: Introduction to Excel, Basic Worksheet Operations, Entering, Editing and Formatting Worksheet Data, Formula basics and Operators Used in Formulas, Creating Your First Excel Workbook.	
Unit II	[5Hrs]
Data entry, Sorting, Functions and Conditional formatting: Using Forms for data entry, Working with Tables, Data sorting, Functions in Excel, Relative, Absolute, and Mixed referencing, Conditional formatting and analysis, Pasting in special ways.	
Unit III	[6Hrs]
Data analysis and visualization in Excel: Importing data and data validation, Creating different types of charts in Excel, Formatting different elements of charts, Making a Pivot table and filtering data, Creating Visualizations for the Dashboard, Adding Charts to Dashboard, Slicer.	
Unit IV	[5Hrs]
What-if analysis in Excel: What-if analysis, Scenarios, Goal-Seek, Solver and constraints, Using Solver for Maximization, Using Solver for Minimization, Introduction to Macros and VBA.	
Unit V	[4Hrs]
MS Word - Introduction to MS Word, Formatting Text, Lists, Paragraphs, Find and Replace, Spelling and Grammar, Printing. Power Point - Introduction to MS PowerPoint, Creating a Presentation, Views, Animations, Running a Slide Show, Printing.	

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Excel® 2019 Bible.	Michael Alexander, Dick Kusleika.	2019	John Wiley & Sons, Inc., Indianapolis, Indiana

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Office 2016 For Beginners- The perfect guide on Microsoft office Including Microsoft Excel Microsoft PowerPoint Microsoft Word Microsoft Access and more!	Steven Weikler	2016	Alpha Lifestyle Productions

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