



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

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

B. Tech. Scheme of Examination & Syllabus 2024-25

MECHANICAL ENGINEERING

SEMESTER III

SrNo	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				No of Hours for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total	
1.	PCC	24ME301T	Machining Process	3	1	-	4	20	20	60	100	3
2.	PCC	24ME301P	Machining Process Lab	-	-	2	1	-	25	25	50	-
3.	PCC	24ME302T	Engineering Thermodynamics	3	1	-	4	20	20	60	100	3
4.	PCC	24ME303T	Materials Engineering	3	-	-	3	20	20	60	100	3
5.	PCC	24ME303P	Materials Engineering Lab	-	-	2	1	-	25	25	50	-
6.	PCC	24ME304P	Machine Drawing Lab	-	-	4	2	-	25	25	50	-
7.	MDM	24ME331M	MDM - I (Refer MDM Basket)	2	-	-	2	10	10	30	50	1.5
8.	VEC	24ES401T	Economics & Management	3	-	-	3	20	20	60	100	3
9.	SEC	24ME341P	Career Development - III	-	-	2	1	-	50	-	50	-
10.	ELC	24ME305P	Micro Project - I*	-	-	2	1	-	50	-	50	-
Total				14	2	12	22	90	265	345	700	

* Field Project or Community engagement project in the major discipline

		July 2024	2.1	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

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

B. Tech. Scheme of Examination & Syllabus 2024-25

MECHANICAL ENGINEERING

PROFESSIONAL ELECTIVE/ OPEN ELECTIVES/ MDM BASKET

Sem	MDM			Professional Elective			Open Elective			
	Course Code	Course Name	Credit	Course Code	Course Name	Credit	Course Code	Course Name	Credit	
III	24ME331M	Orientation course on Entrepreneurship	2	--	--	--	--	--	--	
IV	24ME431M	Project Management	3	--	--	--	--	--	--	
V	24ME531M	Industrial Safety	3	24ME503T(i)	Industrial Robotics	3+1	--	--	--	
				24ME503T(ii)	Machine Fault Diagnosis					
				24ME503T(iii)	Renewable Energy Systems					
				24ME503T(iv)	Advanced I/C Engine					
VI	24ME631M	Vehicle Engineering	3	24ME603T(i)	Logistics and Supply Chain Management	3	24ME661O	Entrepreneurship Development	2	
				24ME603T(ii)	Mechanical Vibrations					
				24ME603T(iii)	Vehicle Engineering					
				24ME603T(iv)	Advances in Project and Quality Management					
				24ME603T(v)	Production and Operation Management	3				
				24ME604T(i)	Fundamentals of HVAC System					
				24ME604T(ii)	Design of Mechanical Power Transmission system					
				24ME604T(iii)	Sustainable Production System					
				24ME604T(iv)	Computer Aided Design					
				24ME604T(v)	Advanced Manufacturing Techniques					
VII	24ME731M	Project Planning and auxiliary systems in vehicle development	3	24ME703T(i)	Refrigeration and Air Conditioning	3+1	24ME761O	Automobile Engineering	3	
				24ME703T(ii)	Finite Element Method					
				24ME703T(iii)	Computer Integrated Manufacturing					
				24ME703T(iv)	Additive Manufacturing					
VIII	--	--	--	24ME802T	Professional Elective-V#	3	24ME861O	Open Elective-III#	3	
Total Credits			14				17			8

Courses to be mapped with NPTEL/SWAYAM/MOOC offered course in that semester

		July 2024	2.1	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR
(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2024-25

MECHANICAL ENGINEERING

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24ME301T	Machining Processes	3	1	-	4	20	20	60	100

Course Objectives	Course Outcomes
<ol style="list-style-type: none"> To provide comprehensive knowledge about various metal cutting processes and develop analytical skills to calculate various machining parameters. To inculcate deep understanding about working and construction of various machine tools 	<ol style="list-style-type: none"> Explain principle of metal cutting, machining parameters, Merchant force circle and estimate principle forces in metal cutting. Illustrate lathe machine constructional details and the various operations performed on lathe machine and to estimate time for turning operation. Explain the Shaper, Slotter and Planer machine tool constructional details and the various operations performed on these machines. Explain the constructional details of Milling machine, Drilling machine, boring machine, their types and the various operations performed on these machine Explain the principle of non-conventional machining and surface finishing processes.

Unit I [9Hrs]
Introduction to Machining Parameters: Introduction to machining, nomenclature and tool geometry of single point cutting tool, Theory of Metal Cutting: Introduction. Orthogonal and Oblique cutting. Mechanics of Metal Cutting, shear plane, Stress, Strain and cutting forces. Merchant's circle, Chip formation, cutting force calculations, Determination of Torque and power required for turning, Drilling and Milling. Influence of tool angle, cutting fluids, cutting speed, feed and depth of cut on power requirement, Estimation of tool life.

Unit II [9Hrs]
Lathe: Introduction. type, construction of simple lathe mechanism and attachments for various operations, machine specifications, basis for selection of cutting speed. feed and depth of cut, time estimation for turning operation. Introduction to Capstan & Turret Lathe.

Unit III [9Hrs]
Shaper: Introduction, type, specification, description of machines, hydraulic drives in shapers, cutting parameters. Mechanism of shaper: Quick return mechanism, Crank & slotted link mechanism, Table feed mechanism, shaper operations, time estimation for shaping operations. Slotter: Introduction, specifications, description, type of drives for slotter, types of slotting machines - production slotter, puncher slotter, tool room slotter. Planer: Introduction, specifications, description. type of planner, open side planner, pit planner

Unit IV [9Hrs]
Milling: Introduction. Specification, types, column & knee type milling machine, fixed bed type milling machines, production milling machines, special purpose milling machines such as thread milling Machines, profile milling machine, Tool geometry & their specifications. Indexing- simple, compound and differential. Drilling: Introduction, classification of drilling machines. Boring, reaming, Broaching: Introduction, type of broaches, nomenclature of broaches. types of broaching machines.

Unit V [9Hrs]
Finishing Processes: Grinding wheel, grinding machines, fine finishing operations such as lapping, honing, polishing buffing, metal spraying, galvanizing and electroplating. Non-conventional Machining Processes Introduction, classification, water jet machining, chemical machining, electro-chemical machining, electrical discharge machining, non-conventional forming processes.

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Workshop Practice	H. S. Bawa	2nd	Tata Mc-Graw Hill
2.	Manufacturing Engineering & Technology	Kalpakistan	3rd	Pearson

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Processes & Materials of Manufacturing	R. Lindberg	4th	Allyn & Bacon
3.	Modern Materials and Manufacturing Process	R. G. Bruce, J.E. Neely	4th	Pearson Education

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR
(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2024-25
MECHANICAL ENGINEERING

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24ME301P	Machining Processes Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
<ol style="list-style-type: none">To provide experiential learning on tool geometry and prefer to perform analysis of cutting forces.To give hands on experience on various machine tools.To give hands on experience for performing metal cutting operations on various machine tools.	<ol style="list-style-type: none">Analyse various cutting forces on single point cutting tool.Explain construction and working of machine toolsPerform metal cutting operations using machine tools.

Minimum 8 practical to be performed

Expt. No.	Title of the experiment
1	Calculations of Various forces on single point cutting tools.
2	Demonstration of multiple point cutting tools (milling, drilling).
3	Demonstration of construction and working of Lathe Machine.
4	Demonstration of construction and working of Shaper machine.
5	Demonstration of construction and working Milling machine.
6	To perform Job on Lathe Machine (Thread cutting, Taper turning).
7	To perform Job on Milling machine (Spur gear cutting).
8	To perform Job on Drilling, Boring (Lathe Machine).

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Manufacturing Science	Ghosh & Mallik	2016	East West Press
2.	Manufacturing technology (Metal cutting & Machine tools) Vol. II	P. N. Rao	2015	Tata Mc-Graw Hill

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Introduction to Manufacturing Processes	J. A. Schey		Tata Mc-Graw Hill
2.	Workshop Technology (Volume II)	Hajra Chaudhary		Media Promoters & Publishers

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR
(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2024-25
MECHANICAL ENGINEERING

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24ME302T	Engineering Thermodynamics	3	1	-	4	20	20	60	100

Course Objectives	Course Outcomes
<ol style="list-style-type: none"> To describe the basic principles of classical thermodynamics and prepare them to apply them during heat and work interaction. To enable the students to understand laws of thermodynamics, gas laws and apply it to various systems, note the significance of the results and to know about entropy. To explain the properties of pure substance, their behaviors during various thermodynamic processes and working principles of calorimeters. To explain working principle and significance of vapour power and various air standard cycles. 	<ol style="list-style-type: none"> Define the basic concepts of thermodynamics, represent different thermodynamic processes on P-V and T-s plots and analyze them using gas laws and compute associated heat and work interactions. Explain First Law of thermodynamics and apply it to non-flow and flow processes. Explain Second Law of thermodynamics and entropy, analyze the performance of heat pump, heat engine and refrigerator. Describe the formation of steam, its characteristics and determine properties of steam using steam tables and Mollier chart. Represent various air standard cycles and vapour power cycles such as Carnot, Otto, Diesel, and Rankine cycles on P-v and T-s plots, explain the different processes of these cycles and perform their thermodynamic analysis.

Unit I	[9Hrs]
Introduction to Thermodynamics, Fundamental Concepts and Definitions, Modes of energy transfer, heat and work, thermodynamic definition of work, internal energy, enthalpy, temperature, zeroth law of thermodynamics and its application.	
Ideal Gas, Equation of state, Thermodynamic Processes, representation of these processes on P-v, T-s planes, First Law of Thermodynamics: First law applied to a system undergoing a process and a cycle.	
Unit II	[9Hrs]
Application of first law of thermodynamics to non-flow processes, determination of work, heat, internal energy and enthalpy changes during the various thermodynamic processes.	
First law applied to flow processes, general energy equation, steady flow energy equation on unit mass and time basis, application of SFEE for devices such as boiler, turbine, heat exchangers, pumps, nozzles, etc.	
Unit III	[9Hrs]
Second Law of Thermodynamics: Limitations of the first law, Thermal Energy Reservoirs, definition of a heat engine, heat pump, refrigerator, thermal efficiency and the co-efficient of performance. Kelvin-Planck and Clausius statements of the second law, their equivalence, reversible heat engine, Carnot theorems and corollaries. Carnot cycle, thermodynamic temperature scale. Thermodynamic analysis of heat engine, heat pump and refrigerator. Entropy: Entropy as a property, Clausius inequality, Principle of increase of entropy.	
Unit IV	[9Hrs]
Pure Substance: Behavior of pure substance (steam) with reference to P-V, T-s and h-s diagrams, properties of steam, Sensible Heat, Latent Heat, Critical State, Triple Point, Wet Steam, Dry Steam, Superheated Steam, Dryness Fraction, saturation state, Quality of steam, its determination using various calorimeters. Steam tables and Mollier chart, Determination of properties of steam using steam tables and Mollier chart..	
Unit V	[9Hrs]
Vapour power cycle, Introduction, vapour Carnot cycle, simple Rankine cycle, methods to improve the efficiency of simple Rankine cycle, Analysis of simple Rankine cycle. Air standard cycles, introduction to air standard cycles, Otto cycle, Diesel cycle, air standard efficiency, mean effective pressure, Analysis of air standard cycles.	

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Engineering Thermodynamics	P.K. Nag	6th	Tata McGraw-Hill Publishing Company Ltd., New Delhi
2.	Engineering Thermodynamics	R.K. Rajput	5th	Laxmi publications (P) Ltd, New Delhi

Reference Books



S.N	Title	Authors	Edition	Publisher
1.	An Introduction to Thermodynamics	Y.V.C.Rao	revised	Universities Press (India) Ltd
2.	Thermodynamics - An engineering approach	Yunus A. Cengel, Michael A. Boles	9th	Tata McGraw-Hill

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR
(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2024-25
MECHANICAL ENGINEERING

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	



THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24ME303T	Materials Engineering	3	-	-	3	20	20	60	100
Course Objectives		Course Outcomes							
1. To provide comprehensive understanding about the basics of engineering materials, their classification, properties and testing methods. 2. To prepare students to understand and interpret structure property co-relation of various engineering materials in selecting appropriate materials for industrial and engineering applications. 3. To built knowledge for heat treatment processes, its importance and effects on mechanical properties. 4. To compute the mechanical properties of engineering materials using various testing methods.		1. Describe the fundamentals of various engineering materials, properties, their crystal structure and imperfection. 2. Compute the mechanical properties of engineering materials using various testing methods. 3. Interpret and explain the phase diagram and make use of this knowledge to illustrate the Iron-Iron carbide equilibrium diagram. 4. Realize the significance and general procedure of heat treatment processes. 5. 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	2nd	Everest Publishing House.
2.	Introduction to Physical Metallurgy	Sindney H Avner	2nd	Mc-Graw Hill Education (India) Pvt. Ltd.
3.	Engineering Materials and Metallurgy	U. C. Jindal	1st	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

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR
(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2024-25
MECHANICAL ENGINEERING

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24ME303P	Materials Engineering Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
<ol style="list-style-type: none">To provide hands on experience on metallurgical microscope.To provide hands on experience on specimen preparation and equip to perform microstructural examinations of engineering materials.To explain and demonstrate the procedure for performing hardness test.To explain and demonstrate the procedure for performing tensile test.	<ol style="list-style-type: none">Perform microstructural examination and study of various metals using metallurgical microscope.Prepare specimen for metallographic examinations.Perform hardness test and determine mechanical properties of engineering materials.Perform tensile test and determine various mechanical properties of engineering materials.

Minimum 8 practical to be performed from following list

Expt. No.	Title of the experiment
1	Metallurgical Microscope and observation of specimens.
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	Measurement of hardenability with the help of Jominy end quench test.

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Introduction to Engineering Metallurgy	Rollason E.C	2nd	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	2nd	Prentice Hall of India
2.	Materials Science and Engineering-An Introduction	W. D. Callister	6th	Wiley India

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

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

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

B. Tech. Scheme of Examination & Syllabus 2024-25**MECHANICAL ENGINEERING****THIRD SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24ME304P	Machine Drawing Lab	-	-	4	2	25	25	50

Course Objectives	Course Outcomes
<ol style="list-style-type: none">To make students aware of standard practices followed in machine drawing for creating 2-d detailing, assembly drawings and production drawings.To provide awareness about importance of machine drawing as engineers' language for communication and career perspective.To inculcate application of standard drafting practices, symbols, Geometric Dimensioning & Tolerances in machine drawing.	<ol style="list-style-type: none">Identify, Describe and interpret symbols and notations related to machining processes, geometrical dimensioning and tolerances.Interpret Isometric drawings and construct Orthographic projections and sectional views of mechanical components.Construct the Assembly drawings and Part drawing of machines and machine components.Demonstrate team work to perform reverse engineering drawings task.Create digital drawing using CAD software tools as per industrial practices.

LIST OF PRACTICALS

Minimum 8 practical to be performed

Experiment No.	Title of the Experiments
1	Conventional representation of Materials, standard machine components, forms of threads, joints, machining, surface roughness and welded joints symbols.
2	Orthographic projection and Sectional Views of Component (Manual drawing on sheet)
3	Orthographic projection and Sectional Views of Component (Using CAD software)
4	Assembly drawings. (Manual drawing on sheet)
5	Assembly drawing. (Using CAD software).
6	Assembly detailing /part drawings. (Manual drawing on sheet)
7	Assembly detailing /part drawings. (Using CAD software)
8	Production drawing with Geometric Dimensioning & Tolerances. (Manual drawing on sheet)
9	Reverse Engineering (Student will be provided with actual physical part or assembly and will be asked to measure all relevant dimensions and then prepare 2-D detailing of part/ parts or assembly views if applicable)

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Machine Drawing	K. Narayana, P. Kannaiah, K. Reddy	2012	New Age International
2.	Machine Drawing	N. D. Bhatt & V. M. Panchal	2015	Charotar Publishing House

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Machine Drawing	N. Sidheshwar, Shastry, Kanhaiah	2015	Tata Mcgraw Hill
2.	Fund. of Machine Drawing	Sadhu Singh, P. L. Shah	2017	PHI Learning Pvt. Ltd
3.	Engg Graphics with AutoCAD	D. M. Kulkarni, A.P. Rastogi, A.K. Sarkar	2016	PHI Learning Pvt. Ltd.

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

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

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

B. Tech. Scheme of Examination & Syllabus 2024-25**MECHANICAL ENGINEERING****THIRD SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24ME331M	MDM-I Orientation Course on Entrepreneurship	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
<ol style="list-style-type: none">To strengthen business acumen and an entrepreneurial attitude in order to improve employment opportunities and cultivate entrepreneurial abilities.To introduce the necessary skills to develop ventures beyond the idea/prototype stage.	<ol style="list-style-type: none">Develop an entrepreneurial mindset by applying the five effectuation principles [Bird in hand Affordable Loss, Lemonade, Patchwork Quilt or Crazy Quilt, and Pilot-in-the-Plane].Apply Design Thinking to identify user needs and define real-world problems from a human-centered perspective.Create your own business model using the Lean Canvas template.

Unit I **[10 Hrs]**

Self-Discovery: Find your flow (passion), Principles of Effectuation, Selecting Venture Team. Opportunity Discovery: Identifying problem worth solving, Problem clarification - Understanding of the problem – Problem analysis - Reformulation of the problem - Observation Phase - Empathetic design - Tips for observing - Methods for Empathetic Design

Unit II **[10 Hrs]**

Design Thinking, Look for Solutions. Customer & Solution: Customers & Markets, Identify Market Segment and Niche Market, Identify Jobs, Pains & Gains and Early Adopters, Craft your Value Proposition Canvas, Problem Solution fit.

Unit III **[10 Hrs]**

Basics of Business Model and Lean Approach, Craft your Business Model (Lean Canvas), Risks & Assumptions, Pitching your Business Model. Validation: Blue Ocean Strategy, Building Solution Demo & Conducting Solution interviews, Building an MVP (Minimum Viable Product).

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Innovation and entrepreneurship : practice and principles	Peter Drucker	1986	Allied Publishers
2.	Knowledge-Driven Entrepreneurship, The Key to Social and Economic Transformation	Andersson, Thomas, Formica, Piero, Curley, Martin G	2009	Springer book series

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Entrepreneurial Development	Khanka S.S.	2020	S. Chand Publications
2.	Effectual Entrepreneurship	Stuart Read, Saras Sarasvathy, Nick Dew, Robert Wiltbank, and Anne-Valérie Ohlsson	2016	Routledge

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

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

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

B. Tech. Scheme of Examination & Syllabus 2024-25**MECHANICAL ENGINEERING****THIRD SEMESTER**

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24ES401T	Economics & Management	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
1. To provide awareness about Industrial economics, management, banking practices and their impact on business.	1. Apply managerial economics concept in business analysis and business decision making. 2. Explain relationships between production and costs and understand different forms of market structures. 3. Assess impact of macroeconomics and government policies on business and economy. 4. Recognize the functions of management and marketing management for business decisions. 5. Explore role of financial management in business and decision making.

Unit I	[9Hrs]
Economics, Classification of economics, Industrial economics, Consumer demand, Law of Demand, Determinants of demand, Demand forecasting, Law of supply, Utility, Law of diminishing marginal Utility, Types of Elasticity of demand	
Unit II	[9Hrs]
Concept of Production, Factors of Production, Laws of return, Cost concepts and types of cost, cost curves, Market Structures- Perfect competition, Monopoly, Oligopoly, and Monopolistic competition.	
Unit III	[9Hrs]
The functions of central bank, Inflation, Deflation, Recession. Measures to control Inflation, National income, GDP, GNP, Liberalization, Privatization and Globalization	
Unit IV	[9Hrs]
Definition of management, functions of management – planning, organizing, directing, Controlling, human resources Management, Marketing Management, Concepts of Marketing, Marketing mix, Methods of pricing, channels of distribution, advertising and sales promotion.	
Unit V	[9Hrs]
Financial Management, nature and scope of financial management, Sources of finance, Types of capital, Brief outline of profit and loss account, balance sheet, Budgets and types of budgets, Ratio analysis	

Text Books

S. N	Title	Authors	Edition	Publisher
1.	Managerial Economics	D.N. Dwivedi	8th	Vikas Publishing
2.	Modern Economic Theory	K.K. Dewett	2005	S. Chand Publisher

Reference Books

S. N	Title	Authors	Edition	Publisher
1.	Industrial Organization and Industrial economics	T.R. Banga, S.C. Sharma	2006	Khanna Publishers
2.	Industrial Management	Dr.I.K. Chopde, Dr.A.M. Sheikh	Revised edition	S. Chand Publisher

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	



ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR
(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2024-25
MECHANICAL ENGINEERING

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24ME341P	Career Development-III	-	-	2	1	50	-	50

Course Objectives	Course Outcomes
1. To ignite the importance of aptitude skill development for better career prospects. 2. To develop analytical and aptitude skills for preparation of competitive exams and placement drives.	1. Solve analytical questions on numbers, ratio and proportion, simple and compound interest by application of mathematical concepts. 2. Disgusting and select correct alternative for verbal and non-verbal questions on series and analogy. 3. Analyze the given data and frame equations for percentage, profit & loss and partnership problems.

Topics to be covered

Topic No.	Topic
1	Numbers (Part-1: Divisibility Test, LCM / HCF Problems)
2	Numbers (Part-2: Factorization, Remainder Theorem)
3	Numbers (Part-3: Power Cycle, Successive Division)
4	Analogy (Number / Letter / Word / Nonverbal analogy)
5	Number and Letter Series
6	Simple Equations
7	Ratio, Proportion & Variation
8	Percentage, Profit & Loss
9	Partnership Problems
10	Simple & Compound Interest

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Quantitative Aptitude for Competitive Examinations.	R.S.Agrawal	2025	S.Chand & Company
2.	Quantitative Aptitude	Shripad Deo	2014	Allied Publishers

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	A modern approach to verbal and non verbal reasoning.	R.S.Agrawal	2025	S.Chand & Company
2.	Verbal & Non-verbal reasoning	Neeraj Kumar	2022	NRBC Publishers

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	



THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24ME305P	Micro Project-I	-	-	2	1	50	-	50

Course Objectives	Course Outcomes
<ol style="list-style-type: none">To enable students to develop Problem-solving and analytical thinking.To guide student to explore Field Project or Community engagement project in the major disciplineTo inculcate effective oral communication and technical documentation writing.To instill collaboration and team work spirit in project conduction.To provide opportunities to use modern engineering tools.	<ol style="list-style-type: none">Explore opportunities to select field and community based projectsDemonstrate collaborative team work and communicate effectivelyDevelop problem solving and critical thinking skills

<p>Module 1 : Introduction to Project its Planning and management</p> <ul style="list-style-type: none">Introduction to [understanding of community-based projects.Overview of project management principles.Project scope, objectives and constraints.Work break down structure <p>Module 2 : Literature review</p> <ul style="list-style-type: none">Introduction to types of literature and their sourcesLiterature managementMethodology to Conduct a thorough literature review related to the chosen project areaIdentify existing solutions and research gapsCompiling findings of literature review <p>Module 3: Result Discussions, and Conclusion</p> <ul style="list-style-type: none">Performing analysis and documentation of results.Discussions on the significance of findings.Conclusion based on analysis and potential future work or applications. <p>Module 4: Project Presentation and Viva</p> <ul style="list-style-type: none">Final project presentation to a panel of faculty members.Demonstration of the project work.Answering viva questions regarding methodology, results, and implementation.Submission of final reports and any prototypes (if applicable).
--

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Research Methodology	Kothari C..R.	Fifth	New Age International Pvt Ltd Publishers
2	Research Methodology: Step by Step Guide for Beginners	Ranjit Kumar	Fourth	Sage Publications

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Design and Analysis of Experiments	Douglas C. Montgomery	9th Edition , 2017	John Wiley & Sons
2.	Statistics for Experimenters: Design, Innovation, and Discovery	Paul D. Berger	2nd Edition ,2016	CRC Press

		July 2025	1.0	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	