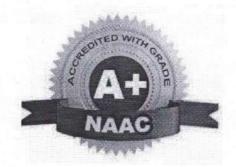


(An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur)



DEPARTMENT OF MECHANICAL ENGINEERING

Structure & Curriculum
From
Academic Year 2021-22

Vision of the Institution

"To emerge as a learning center of Excellence in the National Ethos in domains of Science, Technology and Management"

Mission of the Institution

- > M1 To strive for rearing standard and stature of the students by practicing high Standards of professional ethics, transparency and accountability.
- M2 To provide facilities and services to meet the challenges of Industry and Society.
- > M3 To facilitate socially responsive research, innovation and entrepreneurship.
- To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices.

Vision of the Department

"To emerge as a premier centre in the field of Mechanical Engineering Education that will produce competent Engineers".

Mission of the Department

- > MD1 To impart quality Technical Education through effective teaching-learning process.
- > MD2 To provide a better environment to encourage and support innovation and entrepreneurship.
- > MD3 To strengthen industry institute interaction to meet the challenges of industry and society.
- > MD4 To ensure overall development of students and staff members by inculcating knowledge and professional ethics.

Program Education Objectives (PEO)

- Demonstrate essential technical skill to identify, analyze and solve problem and design issue in mechanical engineering.
- ➤ Analyze the complex problems in the field of mechanical engineering using modern tools.
- > Apply mechanical engineering concept for the betterment of society and environment.
- Develop professionals having administrative and managerial skill for mechanical engineering and allied industries.
- Demonstrate the attributes of mechanical engineering in lifelong learning to contribute towards societal needs.

Program Outcomes (PO)

- 1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and software tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSO)

- PSO 1: apply the knowledge to work professionally and ethically in Thermal, Design, production and Manufacturing areas of Mechanical engineering.
- PSO 2: Analyze and design mechanical components and its processes to meet the societal needs.
- **PSO 3:** Apply Engineering and Management principles to work professionally in the industry or as an entrepreneur.

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur (An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur) SCHEME OF INSTRUCTION & SYLLABUS

Programme: Mechanical Engineering
Scheme of Instructions: Second Year B.TECH. in Mechanical Engineering

Sr. No.	Course	Course Code	Course Title	L	т	P	Contact	Course		196	EXAM SO	HEME	
1101	Category	Code					Hrs/Wk	Credits	CT-1	CT-2	TA/CA	ESE	TOTAL
1	BSC	BME2301	Applied Mathematics - III	3	1		: 4	4	15	15	10	60	
2	ESC	BME2302	Materials Engineering	3		-	3	3	15	15	10	60	100
3	PCC	BME2303	Manufacturing Engineering -I	3	-	-	3	3	15	15			100
4	ESC	BME2304	Engineering Thermodynamics	3	1		4	4	15	15	10	60	100
5	HMSC	BSH2301	Human Values for Professional Society	3			3	3	15	15	10	40	1.000
6	ESC	BME2306	Material Engineering Lab			2	1	1		-	25	60	100
7	PCC	BME2307	Manufacturing Engineering -I Lab			2	1	1			25	2	50
3	PCC	BME2308	Machine Drawing & Solid modeling Lab	-		2	2	1			25	25	50
)	MCC	BAU2303	Environmental Science	2	-		2	Audit	14		-	-	-
			Total	17	2	6	23	20	75	75	125	375	650

L-Lecture CT1-ClassTest1 CT2-ClassTest2

T-Tutorial P-Practical
TA/CA-Teacher Assessment/Continuous Assessment
ESE-End Semester Examination (For Laboratory End S

	HSMC (Hum., Soc.Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Professional Core Courses)	PEC (Professional Elective Courses)	OEC (Open Elective courses from other discipline)	Project / Seminar /Industrial Training	MCC (Mandator Courses)
Credits	3	4	- 8	4				
Comulative Sum	7	33	24					Yes

PROGRESSIVE TOTAL CREDITS: 38+20=58

Tulsian II Saikwad Patil College of

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Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur (An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur)

SCHEME OF INSTRUCTION & SYLLABI

. Programme: Mechanical Engineering
Scheme of Instructions: Second Year B.TECH. in Mechanical Engineering

Sr. No.	Course	Course					Contact	Course		Her is	EX	AM SC	НЕМЕ
140.	Category	Code	Course Title	L	T	P	Hrs/Wk	Credits	CT-1	CT-2	TA/CA	ESE	TOTAL
1	BSC	BME2401	Applied Mathematics - IV	3	-		3	3	15	15	10	60	100
2	PCC	BME2402	Mechanics of Fluids and Hydraulic Machines	3	-	-	3	3	15	15	10	60	100
3	PCC	BME2403	Kinematics of Machines	3	-	-	3	3	15	15	10	60	100
4	PCC	BME2404	Mechanics of Materials	3	-		3	3	15	15	10	60	100
5	PCC	BME2405	Manufacturing Engineering -II	3	-	-	3	3	15	15	10	60	100
6	PCC	BME2406	Lab-Mechanics of Materials	-	-	2	2	1	0.0		25	25	50
7	PCC	BME2407	Lab-Manufacturing Engineering -II	-	-	2	2	1	R L	-	25	25	50
8	PCC	BME2408	lab-Mechanics of Fluids and Hydraulic Machines	12.	9	2	2	1		-	25	25	50
9	HSMC	BME2409	Industrial Economics and Management	4	-		4	4	15	15	10	60	100
10	PROJ	BME2410	Micro Project	-	-	2	ź	1	18.	-	25	25	50
11	MCC	BAU2404	Group Reading of Classics	2	2	ž.	2	Audit		-	-		
			Total	21	-	8	29	23	90	90	140	460	800

L-Lecture CT1-ClassTest1 T-Tutorial

P-Practical

CT2-ClassTest2

TA/CA-Teacher Assessment/Continuous Assessment

ESE-End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc.Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Professional Core Courses)	PEC (Professional Elective Courses)	OEC (Open Elective courses from other discipline)	Project / Seminar /Industrial Training	MCC (Mandatory Courses)
Credits	4	3	-	15	-	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	01	Yes
Cumulative Sum	11	25	24	20			1	-

PROGRESSIVE TOTAL CREDITS :58+23=81

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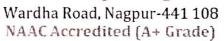
gineering & Technology, NAGPUR.

Dean Academics Tuls Demi Contlamic Patil College Of Engineering and Technology, Nagnus

Principal
Tulsiramji Galpynd Pail College O.
Engineering and Technology, Naub



Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108





An Autonomous Institute affiliated to RTMNU Nagpur

Second Year (Semester-III) B.Tech. Mechanical Engineering

		Second 1 ca	1 (Semester	1-111) D. 1 CCI	ii. Nietii	amear E	ngmeering	
		BSH230	l: Human	Values for P	rofessio	nal Soci	ety	
Teachin	g Schei	ne				Examina	ition Scheme	
Lectu	res	3 Hrs/week				CT-1	15 Marks	
Tutor	ial	0 Hrs/week				CT-2	15 Marks	
Total C	redit	3				TA	10 Marks	
						ESE	60 Marks	
						Total	100 Marks	
						Duration	of ESE: 03 Hrs	00 Min.
Course (
Student								
1		ibe Value Educ				١.		9
3		ate the Harmon						
4		ine the Ethical				l Order.		
5		various theorie						
3	Predic	ct Global Issues		nal Ethics and	Sustainab	ole Develo	pment.	
		oduction to V						Hours
Unit I	Valu Con	ie Education, tent and Proceedings, Self-ex	Definition, Coess of Val	Concept and Nue Education,	, Basic	Guideline	lucation, The es for Value	(9)
Unit II	Hun exist and and	mony in the Fran Being is a sence of the Sethe activities in Resettion, Guidance	more than justlef and the E on the Body, lationships,	ust the Body, Body, Understa Family as a b The Basics fo	Underst anding the pasic unit	anding M ne activiti t of Huma	es in the Self	(9)
Unit III	The Holi	al Ethics Basics for Eth stic Alternative cal Conduct.						(9)
Unit IV	Basi Virtu Ratio	ie theory, Rig	ghts Theory, I Pluralism,	, Casuist The Ethical Egois	eory, Mo sm, Fem	oral Abso	Utilitarianism, dution, Moral sequentialism,	(9)

Unit V	Global Issues in Professional Ethics: Introduction- Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Deflection, Pollution, Ethics in Manufacturing and Marketing, Media Ethics; War Ethics; Bio Ethics, Intellectual Property Rights.
Text Boo	
T.1	A.N Tripathy, New Age International Publishers, 2003.
T.2	Bajpai. B. L, New Royal Book Co, Lucknow, Reprinted, 2004.
T.3	Bertrand Russell Human Society in Ethics & Politics.
T.4	Professional Ethics: R. Subramanian, Oxford University Press, 2015.
Reference	e Books
R.1	Corliss Lamont, Philosophy of Humanism.
R.2	Gaur. R.R, Sangal. R, Bagaria. G.P, A Foundation Course in Value Education, Excel Books, 2009.
R.3	Gaur. R.R, Sangal. R, Bagaria. G.P, Teachers Manual Excel Books, 2009.
R.4	I.C. Sharma. Ethical Philosophy of India Nagin & co Julundhar.
R.5	Mortimer. J. Adler, – Whatman has made of man.
R.6	Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, Cengage Learning, 2015.



Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108

NAAC Accredited with A+ Grade
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University, Nagpur)



Prograi	n: B.T	ech In Mech	University,Nagpur) anical Engineering		
Semester	r-III BI	ME2302: Materi	als Engineering		habitell
		cheme		Exami: Schem	
Theo		3 Hrs/Week		CT-I	15 Marks
Tutor	2001007	Nill		CT-II	15 Marks
Total Credits Duration of ESE: 3Hrs		3		CA	10 Marks
				ESE	60 Marks
Рге-кеди	isites: (Organic & Inor	ganic Chemistry, Crystallography	Total Marks	100 Marks
			Course Contents		
	HCP defe	Crystal Structure,	ystal systems, Average no. of Atom in SCC,E Properties of Metals, Atomic Packing Factor Millers Indices crystal imperfections—point dect.	for SCC, BC efect, line def	C, FCC & ect, surface
Unit II	Princi Reduc Ingot	et and volume defe ples of metals extraced Iron (DRI), So & Dendritic Sol	Millers Hulles Civsial imperfections point d	efect, line defe e Process (BF eogressive Sol	ect, surface O & Direct idification,
	Princi		ystems, Iron-Iron Carbon Diagram, Limitation & nent Process & Significance, Time-Temperatured its types Normalizing Tament		ci ciice to a

Unit IV	Types of Cast Iron, White cast Iron, Gray Cast Iron, Nodular Cast Iron, Malleable Cast Iron Chilled and alloy Cast Iron. (Production route, Composition, Microstructure and applications) Effects of various parameters on structure and properties of Cast Iron, Alloy cast Iron such as Ni-resist, Ni- hard. Non-Ferrous Alloys – Study of non-ferrous alloys such as brasses (Cu-Zn diagram), Bronzes (Cu-Sn diagram), Aluminum Alloys (e.g. Al-Si & Al-Cu diagram), Bearing
Unit V	Principal of Hardness Measurement, Types of hardness, Types of Harness Testing Hardness, Destructive Test: Brinell, Rockwell, Vickers Test, Non Destructive: Ultrasound Test, Die Penetration Test, Radiography Test, Test: Powder Metallurgy: Powder manufacture and Conditioning, Production of Sintered Structural Components, Self-lubricating bearing, Cemented Carbides, Ceramics, Sintered Carbide cutting tools. Types of corrosion – Dry and Wet corrosion, Electro chemical and oxidation (Chemical) Nano Materials & its application, Metallic glasses, Super conducting material, optic fibers, smart materials.

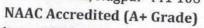
Text	Books
T.1	Material Science & Engineering An Introduction 6.1
T.2	Material Science & Engineering, An Introduction, 6 th Edition, Donald Askeland, 1984. Material Science & Engineering, V. R. Raghavan, 1974.
T.3	Material Science & Engineering, William Callister,1985.
T.4	Material Science & Engineering, R. K. Rajput, 2009
Refer	ence Books
R.1	Modern Physical Metallurgy, R. E. Smallman, Butterworths, 1963
R.2	Phase transformations in metals and alloys- D.A. Potter and K.E. Easterling, CRC Press.
R.3	Introduction to Physical Metallurgy 29st revised edition, 2009 Sidney H.Avner McGraw-Hill, 1964
Useful	Links
1	https://nptel/2rxbxNem1il?list=PLyqSpQzTE6M_ON8uXt-PP8uX6hMWJeYSJ
2	https://nptel/BJrTZ07bHm4?list=PLfIFNJ1DPG4lENg4VUTWyKxxB911aHuJz

Course Code	Course Outcomes		Class
code	District Control of the Control of t	CL	Class Sessions
BME2302.1	Distinguish different type of material, its physical & chemical properties with crystallographicstudies	2	9
BME2302.2	Analyze the process of metals solidification with phase diagram	4	0.40
BME2302.3	Compare the different heat treatment process and plane carbon steel alloys	2	9
1.2020.152.	Categories the different types of cast iron &	2	9
3ME2302.4	anoys with theapplications	2	9
BME2302.5	Perceive the basics of powder Metallurgy with different Hardness testing method and Advance materials.	3	9



Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108





(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur

Semest	am: B. Tech In Mechanical Engineering er-III BME2303- Manufacturing Engineering	-I	
Te	aching Scheme		
Theory			nination Scheme
Tutoria	l Nil	CT-	
Total Credits	03	CT-	
Duratio	n of ESE: 3Hrs		The state of the s
Pre-Req	quisites: Workshop technology	Tota Mark	1 100 Marks
	Pattern Making& Moulding:- Pattern Coallowances, color codes Master Pattern Co	ntonts	
	Moulding: Types of sand moulds, moulding preparation technique for casting,		
	Gatting System & Casting Processes: - Ga	ating design Flaments of	
Unit II	Gating System & Casting Processes: - Gating System & Casting Processes: - Gating equipments, riser design Melting furnaces - Construction operation. Cleaning, inspect Foundry equipments, Special casting processing, Slush Casting and Die Casting. Advantage	tion & casting defects. For	ction furnace, Cupo
Unit II	construction& operation. Cleaning, inspect Foundry equipments, Special casting processing, Slush Casting and Die Casting. Advator Joining Processes: - Introduction to metal . Welding Processes, Thermit Welding, Defeweldability of Metals, TIG Welding, MIG Welding.	ction & casting defects. For cesses such as investment ances in Gating system. Joining- Types of Welding. Lets & Inspection of Welding Resistance Welding	etion furnace, Cupol bundry mechanizing Casting, Centrifuga Arc Welding & Ga
	construction& operation. Cleaning, inspect Foundry equipments, Special casting processing, Slush Casting and Die Casting. Advantage Processes: - Introduction to metal. Welding Processes, Thermit Welding Defe	Joining- Types of Welding. Jo	Arc Welding & Ga g Joints, Electrodes coldering & Brazing plastic compounds and sheet forming astics- Mechanical

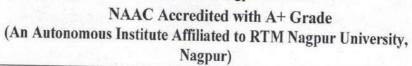
Text Boo	ks
T.1	A Text Of Book Manufacturing Technology by Chand And Co.Publication.
T.2	A Text Of Book Manufacturing Technology II by . Chand And Co. Publication
Referenc	e Books
R.1	Elements Of Workshop Technology: Vol.I 1 REVISE Manufacturing Process by Choudhury Hajra, S.K; Choudhury Hajra, A.K; Roy, Nirj har
R.2	Elements Of Workshop Technology-II by Choudhary S.K.; Choudhary A.K. Nirjhar Roy
R.3	Elements Of Workshop Technology: Vol.I I REVISE Manufacturing Process by Choudhury Hajra,S.K; Choudhury Hajra,A.K;Roy,Nirj har
Useful Li	nks
1	https://www.digimat.in/nptel/courses/video/112105233/L01.html
2	https://nptel.ac.in/courses/112/103/112103250/
3	https://nptel.ac.in/courses/112/105/112105212/

Course Code	Course Outcomes	CL	Class Sessions	
BME2303.1	Apply the sand moldings technique for the castings.		9	
BME2303.2 Preparing the gating and riser system needed for casting and requirements to achieve defect free casting.		3	9	
BME2303.3	ME2303.3 Examine appropriate welding process based on the type of industrial application.		9	
BME2303.4	Summarize appropriate type of plastics and plastics processing method.	2	9	
BME2303.5	Analyze effect of parameters influencing metal forming and compare hot working and cold working with applications.	4	9	



Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441108





Program:]	3.Tech in Mechanical Engi	neering				
	BME2304:Engineering T					
	ng Scheme		minationSch			
Theory	3 Hrs/week	CT-I	15Marks			
Tutorial	1	СТ-ІІ	15Marks			
Total Credits	4	CA	10Marks			
Duration of ES		ESE	60Marks			
Pre-Requisit Applied Che	es: Mathematics-I, Mathemat mistry	tics-II, Applied Physics, Engineering Total Marks	100Marks			
124		Course Contents				
UnitI	macroscopic and microscopic approaches, properties and state of a system, point and path functions, thermodynamic equilibrium, processes and cycles, quasi-static process, properties such as specific volume, pressure, temperature, The Ideal Gas equation of state. The concepts of heat and work interactions. Evaluation of different modes of work. Zeroth law of thermodynamics, temperature scales. First law of thermodynamics: Energy of systems, classification of energy, law of					
UnitII	energy: a function of tem constant pressure, change i processes. First law applied balance and energy balance application to nozzles and of	st law applied to closed system undergoing a cycle aperature, enthalpy, specific heat at constant von internal energy and heat transfer during various d to flow processes: steady state steady flow process in steady flow process, steady flow energy equation of energy equations and compressor diffusers, throttling valve, turbines and compressor done and heat transfer during steady flow processes	e, internal lume and non-flow ess, mass on and its			
UnitIII	Second law of thermodynand heat pumps, Kelvin-pland irreversible processes, propositions regarding the escale, reversed Carnot cycle processes – constant volume	namics: Limitations of first law, heat engines, refrank and Clausius statements, their equivalence, refractors that render processes irreversible, Carnot coefficiency of Carnot cycles, the thermodynamic tende, COP of heat pump and refrigeration. Thermode, isothermal, adiabatic, polytropic processes, throtes diagrams-work done, heat exchanged, change in	rigerators reversible ycle, two nperature odynamic			
UnitIV	increase entropy. Properties of Pure Subsubstances in solid, liquid a substances, phase rule, the charts. Calculations of work	pusius, entropy: a property of system, entropy charge of a system during irreversible process, printerstances (Steam): Thermodynamic properties and vapor phases; P-v-T behavior of simple comparts thermodynamic property tables (Steam Tables and heat interactions in non-flow and stead fryness fraction using various calorimeters.	of pure			

UnitV

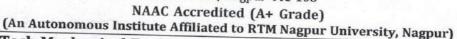
Cycle					
ks					
Cengel Y.A., Boles M.A., A Text Book of Thermodynamics, McGraw-Hill, 6th Edition					
Basic and Applied Thermodynamics, 2nd Edition, Nag P. K., Tata McGraw-Hill.					
Engineering Thermodynamics, 2nd Edition, D.P.Mishra, Cengage Learning					
e Books					
Fundamentals of Thermodynamics, 5th Edition, Richard E. Songtag, Claus Borgnakke and Gordon Van Wylen, John Wiley and Sons, Inc.					
Thermodynamics, 5th Edition, K. Wark, McGraw-Hill					
Engineering Thermodynamics, Gordon Rogers, Pearson Publications					
inks					
https://nptel.ac.in/courses/112/108/112108148/					
https://nptel.ac.in/courses/112/105/112105123/					
https://nptel.ac.in/courses/101/104/101104063/					

CourseCode	CourseOutcomes	CL	Class Sessions	
BME2304.1	Apply basic laws of thermodynamics in analysis and design of thermodynamic cycles	3	9	
BME2304.2	Apply the First of thermodynamics for the analysis ofthermodynamic systems to evaluate energy interaction in various Processes.	3	9	
вме2304.3	Evaluate the performance of cyclic devices, change in the entropy and Availability in various processes applying the laws of thermodynamics.	5	9	
BME2304.4	Evaluate various thermodynamic parameters in various processes with Phase change using phase change diagrams		9	
BME2304.5	Analyze the performance of various Thermodynamic cycles applying Law of thermodynamics for evaluation of energy interaction.	4	9	



Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108





Teaching	School	al Engineering	Date		Charles III of		
Practical	Sche				ion Scheme	è	
The Part of the Pa	2 ms/ week		CA	25 Marks			
Total Credit 2		2		ESE	25 Mar	Marks	
				Total	50 Mar	ks	
0 0				Duration of	ESE: 02 Hrs		
Course Ou							
Students wi		NOT THE PARTY OF T					
1 Distin	guish s	different type o	f material, its physical 8	& chemical properties	s with crystall	ographic	
2 Analyz	ze the p	process of metal:	solidification with phas	e diagram			
o compa	are the	different heat to	eatment process and pla	no carbon steel -ll			
Latego	nies u	ie different type	s of cast iron & nonferro	us allows with the ann	1! • !		
5 Identif	ly the	basics of powde	r Metallurgy with differ	ent Hardness testing	method and	Advance	
Sr. No.	TD.	10 1 1100	List of Experin	nent		CO	
2	To verify the different crystal structure & crystalline nature of metals				CO		
3	To analyze the Iron-Iron carbide equilibrium diagram				CO		
4	To Perform the Jominy end Quench Test for the study of hardenability.				CO		
5	To Prepare case study on Metal Extraction process Industry			CO			
6	To distinguish the microstructure of different Plane Carbon Steel & their alloys.				COS		
7	To evaluate of different heat treatment processes and analyze it. To analyze the microstructure of cast iron and various nonferrous metals.			COS			
8	To ana	alvze the Powde	Motally mar for a serial	various nonferrous m	etals.	CO4	
9	To Pre	pare the ferrous	Metallurgy for powder is and nonferrous specime	metallurgical compon	ents.	COS	
10	To Per	form the Rockw	ell hardness test on meta	en for micro structure	study	COS	
ext Books	S		on har arress test on meta	ai specimen		COS	
1	Mater	rial Science & En	gineering, An Introduction	on 6 th Edition D			
2	Mater	rial Science & En	gineering, V. R. Raghavar	1974	d Askeland, 19	84.	
3	Matei	ial Science & En	gineering, William Callist	er 1985		k	
4	Mater	ial Science & En	gineering, R. K. Rajput, 20	009			
eference I	Books						
1	Mode	rn Physical Meta	llurgy, R. E. Smallman, B	utterworths 1963			
2	2. Trai	transformations isformations in	in metals and alloys- D./ Metals, P.G. Shewmon, M.	A. Potter and K.E. East			
3	2. Transformations in Metals, P.G. Shewmon, Mc-Graw Hill, 1969. Introduction to Physical Metallurgy 29st revised edition, 2009 Sidney H.Avner McGraw-Hill, 1964				raw-		
4	Moder	n Physical Meta	llurgy, R. E. Smallman, Bu	itterworths 1963			
eful Links							
1	https:/	//nptel/2rxbxNe	em1il?list=PLyqSpQzTE6	M ON8uXt-PP8uX6h	IZVAIWN		
2	https:/	/nptel/BJrTZ07	bHm4?list=PLfIFNJ1DPC	AIFNo4VIITWvKvvDC	11aUnia		



Tulsiramji Gaikwad-Patil College of Engineeringand Technology

Wardha Road, Nagpur-441 108

University, Nagpur)

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Program: B.Tech in Mechanical Engineering BME2307: Manufacturing Engineering-I Lab **Teaching Scheme Examination Scheme** Practical 2 Hrs/week CA 25 Marks **Total Credit** ESE 25 Marks Total 50 Marks Duration of ESE: 02 Hrs Course Outcomes (CO) Students will be able to Create the sand moldings technique for the castings. Preparing the gating and riser system needed for casting and requirements to achieve defect free Examine appropriate welding process based on the type of industrial application. Summarize appropriate type of plastics and plastics processing method. Analyze effect of parameters influencing metal forming and compare hot working and cold working with Sr. No. List of COS Experiment To analyze Pattern Making process 1 CO₁ To perform job of Pattern Making 2 CO₁ 3 To perform job of Sand Mould CO1 To analyze Casting Techniques Process 4 CO₂ To perform job of Casting Techniques 5 CO₂ To analyze the design of Gating System in sand mould techniques 6 CO₂ To analyze Joining Techniques Processes 7 CO3 8 To perform Job of Welding CO₃ To Examine Plastic Molding Techniques 9 CO₄ To Examine Metal forming process 10 CO₅ Text Books

1	A Text Of Book Manufacturing Technology & Classic Actions of the Classic Action of the Company o					
2	A Text Of Book Manufacturing Technology by Chand And Co.Publication. A Text Of Book Manufacturing Technology II by . Chand And Co.Publication					
Referen	ce Books					
R.1	Elements Of Workshop Technology: Vol.I 1 REVISE Manufacturing Process by Choudhury Hajra, S.K; Choudhury Hajra, A.K; Roy, Nirj har					
R.2	Elements Of Workshop Technology-II by Choudhary S.K.; Choudhary A.K. Nirjhar Roy					
R.3	Elements Of Workshop Technology: Vol.I 1 REVISE Manufacturing Process by Choudhury Hajra, S.K.; Choudhury Hajra, A.K.; Choudhury Hajra, A.K.; Roy, Nirj har					
Useful L	inks					
1	https://www.digimat.in/nptel/courses/video/112105233/L01.html					
2	https://nptel.ac.in/courses/112/103/112103250/					
3	https://nptel.ac.in/courses/112/105/112105212/					



Tulsiramji Gaikwad-Patil College of Engineeringand Technology

Wardha Road, Nagpur-441 108

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Teach	ning Sche	ma	Solid Modeling Lab.			
Practi				Examinat	ion Scheme	
Total Credit 1				CA	25 Marks	
		1	1	ESE	25 Mark	
			7	Total	50 Mark	
Cours	e Outcor	nes (CO)	I	Duration of I	ESE: 02 Hrs	3
Student	s will be al	ole to				
1 Inte	rpret and	describe basis	lamant a			-
tole	rances, syn	abols etc.	lements of standard machine draw	ing like line	s, dimensions.	
2 Cres	ate 2-D de	tailing sections				
3		aring, sections	views of machine elements from	given isome	tric view.	
Sr. No	ly concept	s of GD &T for	creating part and assembly drawin	ď		-
1			ist of T	t		
2	10 D	raw Sheets of N	ame Blocks and Types of Lines			COS
4	To analyze and Draw different Standard dimensioning methods and Applying Tolerances.				CO	
3	To analyze and Draw different Co.				CO	
4	To analyze and Draw different Standard Components and their representations To analyze and Draw different Standard Features and their representations				COI	
5					COI	
	Finish Symbols Finish Symbols Finish Symbols				C01	
_6	To Create 2-D Isometric projection of machine elements using Soft					
7	To Cre	ate 2-D orthog	aphic projection of machine eleme	danig Solly	vare	CO2
8	To Cre	ate Sectional vi	ews of machine elements using So	nts using Sc	oftware	CO2
9	To Cre	ate Dimensioni	or and details	ftware		CO2
	To Cro	ete Linit Fit	ng and detailing of machine elemen	nts using So	ftware	CO3
10	10000	ale Limit Fife	nd Tolone		tolerances	CO3
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Tulsiramji Gaikwad Patil College T. Tulsiramji Gaikwad-Patil Engineering and Technology, Naupi