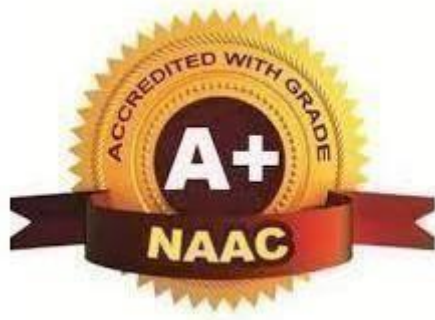




TULSIRAMJI GAIKWAD-PATIL
College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

An Autonomous Institute



DEPARTMENT OF MECHANICAL ENGINEERING

B.Tech.Mechanical Engineering

Teaching Scheme

Semester -Eighth

Considering

**National Education
Policy 2020**

From

Academic Year 2026-27

Vision of Institute

“To emerge as a learning center of Excellence in the National Ethos in Domains of Science, Technology and Management”

Mission of Institute

- 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
- M4: Inculcating knowledge and profession as work practices.

Vision of the Department

“To emerge as a premier centre in the field of Mechanical Engineering Education and produce competent Engineers”.

Mission of the Department

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

Programme Education Objectives (PEO)

PEO-1: Demonstrate essential technical skills to identify analyze and solve problems and design issues in mechanical engineering.

PEO-2: Analyze the complex problems in the field of mechanical engineering by using modern tools.

PEO-3: Apply mechanical engineering concepts for the betterment of society and environment.

PEO-4: Develop professionals having administrative and managerial skills for mechanical engineering and allied industries.

PEO-5: Demonstrate the attributes of mechanical engineering in lifelong learning to contribute towards societal needs.

Programme Outcomes(PO)

- 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. 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 the set 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.

Programme Specific Outcomes(PSO)

PSO1: Apply the knowledge to work professionally and ethically in Thermal, Design, production and Manufacturing areas of Mechanical engineering.

PSO2: Analyze and design mechanical components and its processes to meet the societal needs.

PSO3: 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 & SYLLABI

Program: Mechanical Engineering

Scheme of Instructions: Final Year B.Tech. in Mechanical Engineering Semester-VIII (As Per NEP 2020)

Sr. No.	Course Category	Course Code	Course Title	T/P	Contact Hrs/Wk			Credits	Exam Scheme			ESE Duration	Total Marks
					L	P	Hrs		CT/IA	CA	ESE		
1	PCC	BME34801	Research Methodology	T	4	-	4	4	30	10	60	3Hrs	100
2	CEP	BME34802	Internship/ On Job Training	P	-	24	24	12	-	100	200	2 Hrs	300
3			Total		4	24	28	16	30	110	260	5 Hrs.	400

Course Category	PCC (Program Core Courses)	PEC (Program Elective Courses)	(MDM) Multidiscipli nary Minor	OEC (Open Elective courses from other discipline)	VSEC (Vocational and Skill Enhancement Course)	HSSM (Humanities Social Science and management)(V EC/IKS/AEC)	FP/CP/OJT/RM/ Project (Experimental Learning Courses)
Credits	4	-	-	-	-	-	12
Cumulative Sum	56	14	15	8	8	14	18

PROGRESSIVE TOTAL CREDITS : 150+16 =166

				June,2026	1.00	Applicable for AY2026-27 Onwards
Chairperson HOD	Vice Principal / Director Academics	Director Administration	Principal	Date of Release	Version	

Mechanical Engineering (NBA Accredited)
Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur
Director Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
And Technology, Nagpur

Dr. Premanand Naktode
Principal
TGPCET, Nagpur

Program: Mechanical Engineering




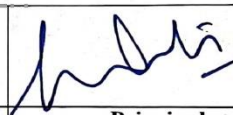
List of **Program Electives** offered By Mechanical Engineering Department (NBA Accredited)

Program Elective- I	Program Elective-II	Program Elective- III	Program Elective- IV
Semester V	Semester VI	Semester VI	Semester VII
BME33504: Industrial Economics and Management	BME33605: Hydraulic and Pneumatic Systems	BME33609: Finite Element Method	BME34704: Material Handling System
BME33505: Computer Aided Design	BME33606: Mechanical Measurement and Metrology	BME33610: Advanced Manufacturing techniques	BME34705: Total Quality Management
BME33506: Automotive System	BME33607: Ginning Processes	BME33611: Operation Research	BME34706: Ginning Management
BME33507: Smart Manufacturing	BME33608: Control System Engineering	BME33612: Industrial Robotics	BME34707: Computer Integrated Manufacturing

Program: Mechanical Engineering

List of **Open Electives** offered Mechanical Engineering Department (NBA Accredited)

Open Elective-I	Open Elective-II	Open Elective-III
III-Semester	IV-Semester	V-Semester
BME32306: Basics of Manufacturing Technology and Processes	BME32407: Automobile Engineering	BSS32XX: Additive Manufacturing





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



Course Category	BSC (Basic Science Course)	ESC (Engineering Science Course.)	PCC (Program Core courses)	PEC (Program Elective courses)	Multidisciplinary courses	OEC (Open Elective courses from other discipline)	VSEC (Skill Course)	Humanities Social Science & Management	Experiential Learning Courses	CC (Liberal Learning Courses)	Semester Wise Credits
Semester -I	8	5	2	--	--	--	2	2	--	2	21
Semester -II	8	8	--	--	--	--	2	2	--	2	22
Semester -III	--	--	8	--	3	4	--	4	2	--	21
Semester -IV	--	--	11	--	2	2	2	4	--	--	21
Semester -V	--	--	12	4	3	2	-	-	--	--	21
Semester -VI	--	--	8	6	2	-	2	2	--	--	20
Semester -VII	--	--	6	4	4	--	--	--	8	--	24
Semester -VIII	--	--	4	4	-	--	--	--	12	--	16
Cumulative Sum	16	13	51	18	14	8	8	14	22	4	166

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Course Category	Theory		Practical		Semester Wise Credits
	Contact Hours	Credit	Contact Hours	Credit	
Semester-I	12	12	18	9	21
Semester-II	13	13	18	9	22
Semester-III	17	17	8	4	21
Semester-IV	15	15	12	6	21
Semester-V	18	18	6	3	21
Semester-VI	14	14	12	6	20
Semester-VII	18	18	12	6	24
Semester-VIII	4	4	24	12	16
Cumulative Sum	117	117	102	51	166

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	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441108 NAAC Accredited with A+ Grade (An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)			
Fourth Year (Semester-VIII) B.Tech. Mechanical Engineering				
BME34801: Research Methodology				
Teaching Scheme		Examination Scheme		
Lectures	4 Hr / Week		CT	30
Tutorials	-		CA	10
Total Credits	4		ESE	60
			Total	100 Marks
			Duration of ESE: 03 Hrs	
Course Objectives:				
1	Understand the research process, types, and ethical practices.			
2	Develop the ability to design research studies and collect relevant data.			
3	Apply statistical methods for analyzing and interpreting data.			
Course Contents				
Unit I	Introduction to Research Definition and objectives of research, Types of research: Fundamental vs applied, Qualitative vs quantitative, Research process and steps, Identification of research problems, Literature survey and review techniques, Sources of information: Journals, conferences, patents, Ethics in research and plagiarism			
Unit II	Research Design and Data Collection Research design: Exploratory, descriptive, analytical, Formulation of hypothesis, Variables and measurement scales, Data collection methods: Primary (survey, questionnaire, interview), Secondary data, Sampling techniques: Probability and non-probability sampling			
Unit III	Data Analysis and Interpretation Data processing and classification, Descriptive statistics: Mean, median, mode, Standard deviation, variance, Correlation and regression analysis (basic), Hypothesis testing: t-test, chi-square test (concept), Interpretation of results			
Unit IV	Research Tools and Technical Writing Use of software tools: MATLAB / Excel / SPSS (intro), Graphical representation of data, technical paper writing: Structure of research paper, Abstract, introduction, methodology, results, Referencing styles (APA, IEEE), Citation tools (Mendeley, Zotero)			
Unit V	Advanced Research Practices Intellectual Property Rights (IPR), Patents: Filing process, Patent search, Research proposal writing, Project report writing, Presentation skills, Case studies in engineering research			

Text Books

T.1	Research Methodology: Methods and Techniques – C.R. Kothari
T.2	Research Design: Qualitative, Quantitative and Mixed Methods – John W. Creswell
T.3	Research Methods for Engineers – David V. Thiel

Reference Books

R.1	Research Methodology: A Step-by-Step Guide – Ranjit Kumar
R.2	Engineering Research Methodology – Dipankar Deb
R.3	Research Methodology for Engineers – R. Ganesan

Useful Links

1	https://nptel.ac.in/courses/101/106/101106033/
2	https://nptel.ac.in/courses/101/101/101101002/
3	https://nptel.ac.in/courses/101/106/101106082/

Course Code	Course Outcomes	CL	Class Sessions
BME34801.1	Describe research types and processes.	2	9
BME34801.2	Formulate research problems and design experiments.	3	9
BME34801.3	Apply statistical tools for data analysis.	3	9
BME34801.4	Develop technical reports and research papers.	4	9
BME34801.5	Explain IPR concepts and research dissemination methods.	4	9

AM
HOD

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