

Sant Gadge Baba Amravati University, Amravati

*Scheme of Implementation for
Four Year Undergraduate Degree Programme in
Engineering and Technology*

B.E. in MECHANICAL ENGINEERING

*in the faculty of
Science and Technology*

ACADEMIC EVALUATION SCHEME/CREDIT SYSTEM

Year: 2024-25

(Scheme of Teaching, Learning, Examination & Evaluation w.e.f. 2024-2025 and onwards)

Scheme for First Year Four Year Undergraduate Engineering Degree Programme Semester - I [Common for all branches]													
Sr No.	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation		Practical Evaluation		Total	ESE Time Hrs.)
			L	P	T	Hrs.		IE	ESE	INT	EXT		
Core Courses													
1	Applied Mathematics -I (BSC)	1SH100BS	3	0	0	3	3	40	60			100	3.00 Hrs.
2	Engineering Physics (BSC)	1SH101BS	3	0	0	3	3	40	60			100	3.00 Hrs.
3	Computer Programming (ESC)	1CS102ES	3	0	0	3	3	40	60			100	3.00 Hrs.
4	Engineering Mechanics (ESC)	1CE103ES	3	0	0	3	3	40	60			100	3.00 Hrs.
Laboratory Courses													
5	Engineering Physics Lab (BSC)	1SH104BL	0	2	0	2	1			25	25	50	
6	Computer Programming Lab (ESC)	1CS105EL	0	2	0	2	1			25	25	50	
7	Engineering Mechanics Lab (ESC)	1CE106EL	0	2	0	2	1			25	25	50	
8	Workshop (ESC)	1ME107EL	0	2	0	2	1			25	25	50	
Vocational and Skill Enhancement Courses (VSEC)													
9	Design Thinking and Idea Lab.	1ME108VS	1	2	0	3	2			50	-	50	
Ability Enhancement Courses (AEC)													
10	Professional Communication	1SH109AE	1	2	0	3	2			25	25	50	
Co-curricular Course (CC)													
11	Co-curricular Course (CC)	1SH110CC	0	4	0	4	2			50	-	50	
	TOTAL		14	16	0	30	22					750	

L: Lecture **P:** Practical **T:** Tutorial **MSE:** Mid Semester Exam **ESE:** End Semester Exam **IE:** Internal Evaluation **INT:** Internal **EXT:** External

Note: Suitable number of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Scheme for First Year Four Year Undergraduate Engineering Degree Programme Semester -II – [Common for all branches]													
Sr No.	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation		Practical Evaluation		Total	ESE Time Hrs.)
			L	P	T	Hrs.		IE	ESE	INT	EXT		
Core Courses													
1	Applied Mathematics -II (BSC)	2SH111BS	3	0	0	3	3	40	60			100	3.00 Hrs.
2	Engineering Chemistry (BSC)	2SH112BS	3	0	0	3	3	40	60			100	3.00 Hrs.
3	Basic Electrical Engineering (ESC)	2EE113ES	3	0	0	3	3	40	60			100	3.00 Hrs.
4	Engineering Graphics (ESC)	2ME114ES	2	0	0	2	2	40	60			100	3.00 Hrs.
Laboratory Courses													
5	Engineering Chemistry Lab (BSC)	2SH115BL	0	2	0	2	1			25	25	50	
6	Basic Electrical Engineering Lab (ESC)	2EE116EL	0	2	0	2	1			25	25	50	
7	Engineering Graphics Lab (ESC)	2ME117EL	0	2	0	2	1			25	25	50	
Vocational and Skill Enhancement Courses (VSEC)													
8	Computer Aided Design and Drafting	2ME118VS	1	2	0	3	2			50	-	50	
Programme Core Course (PCC)													
9	Elements of Mechanical Engineering	2ME119PC	2	0	0	2	2	20	30			50	2.00 Hrs.
Indian Knowledge System (IKS)													
10	Indian Traditional Knowledge	2SH120IK	2	0	0	2	2	20	30			50	2.00 Hrs.
Co-curricular Course (CC)													
11	Co-curricular Course (CC)	2SH121CC	0	4	0	4	2			50	-	50	
	TOTAL		16	12	0	28	22					750	

L: Lecture **P:** Practical **T:** Tutorial **MSE:** Mid Semester Exam **ESE:** End Semester Exam **IE:** Internal Evaluation **INT:** Internal **EXT:** External

Note: Suitable number of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Scheme for Multiple Entry and Exit

Exit option -1 (Level 4.5): Award of UG Certificate in Major with 44 credits and an additional 8 credits				
Exit Courses				
SN	Course Code	Name of the Course	Mode	Credits
1	3ME241EC	Geometric Dimensioning and Tolerancing (GD&T)	Online Certification Course	4
2	3ME242EC	Welding Technology/ Joining Processes	Online Certification Course	4
	OR			
3	3ME404EL	Internship at Industry	Two Months (288 – 320 Hours)	8

Scheme for Second Year Four Year Undergraduate Engineering Degree Programme B.E. in MECHANICAL ENGINEERING (Semester -III)													
Sr No.	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation		Practical Evaluation		Total	ESE Time Hrs.)
			L	P	T	Hrs.		IE	ESE	INT	EXT		
Core Courses													
1	Engineering Thermodynamics (PCC-I)	3ME200PC	3	0	0	3	3	40	60			100	3.00 Hrs.
2	Manufacturing Technology (PCC-II)	3ME201PC	3	0	0	3	3	40	60			100	3.00 Hrs.
3	Mechanics of Materials (PCC-III)	3ME202PC	3	0	0	3	3	40	60			100	3.00 Hrs.
Laboratory Courses													
4	Comm. Engg. Project/ Field Project	3ME400EL	0	4	0	4	2			25	25	50	
5	Manufacturing Technology (PCC-II)	3ME203PC	0	2	0	2	1			25	25	50	
6	Mechanics of Materials (PCC-III)	3ME204PC	0	2	0	2	1			25	25	50	
Multidisciplinary Minor													
7	Multidisciplinary Minor –I*	3ME205MD	2	0	0	2	2	20	30	-	-	50	2.00 Hrs.
Open Elective other than a particular Program													
8	Open Elective -I	3ME206OE 1/2/3	3	0	0	3	3	40	60	-	-	100	3.00 Hrs.
HSSMC (Entrepreneurship/ Economics/ Management Course)													
9	Entrepreneurship Development	3ME207EM	2	0	0	2	2	20	30	-	-	50	2.00 Hrs.
Value Education Course (VEC)													
10	Environmental Science	3SH208VE	2	0	0	2	2	20	30			50	2.00 Hrs.
	TOTAL		17	10	0	27	22					700	

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Note: Suitable number of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Open Elective-I: 3ME206OE1- Power Plant Engineering 3ME206OE2- Engineering Materials 3ME206OE3- Manufacturing Processes

*Please refer to the list of Multidisciplinary Minor courses attached separately.

Scheme for Second Year Four Year Undergraduate Engineering Degree Programme B.E. in MECHANICAL ENGINEERING (Semester -IV)													
Sr No.	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation		Practical Evaluation		Total	ESE Time Hrs.)
			L	P	T	Hrs.		IE	ESE	INT	EXT		
Core Courses													
1	Material Science (PCC-I)	4ME209PC	3	0	0	3	3	40	60			100	3.00 Hrs.
2	Fluid Mechanics (PCC-II)	4ME210PC	3	0	0	3	3	40	60			100	3.00 Hrs.
3	Energy Conversion – I (PCC-III)	4ME211PC	2	0	0	2	2	40	60			100	3.00 Hrs.
Laboratory Courses													
4	Material Science (PCC-I)	4ME212PC	0	2	0	2	1			25	25	50	
5	Fluid Mechanics (PCC-II)	4ME213PC	0	2	0	2	1			25	25	50	
Multidisciplinary Minor													
6	Multidisciplinary Minor –II*	4ME214MD	2	0	0	2	2	20	30	-	-	50	2.00 Hrs.
Vocational and Skill Enhancement Courses													
7	Computational Methods and Programming	4ME215VS	1	2	0	3	2			50	-	50	
Open Elective other than a particular Program													
8	Open Elective- II	4ME216OE	2	0	0	2	2	20	30			50	2.00 Hrs.
HSSMC (Entrepreneurship/ Economics/ Management Course)													
9	Principles of Economics and Management	4ME217EM	2	0	0	2	2	20	30			50	2.00 Hrs.
(Ability Enhancement Course (AEC))													
10	Modern Indian Language	4SH218AE	2	0	0	2	2			25	25	50	.
Value Education Course (VEC)													
11	Universal Human Values & Ethics	4SH219VE	2	0	0	2	2	20	30			50	2.00 Hrs.
TOTAL			19	06	0	25	22					700	

L: Lecture **P:** Practical **T:** Tutorial **MSE:** Mid Semester Exam **ESE:** End Semester Exam **IE:** Internal Evaluation **INT:** Internal **EXT:** External

Note: Suitable number of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

Open Elective-II: 1) Automotive Technology 2) Sustainable Energy 3) Business Planning and Project Management

***Please refer list of Multidisciplinary Minor courses attached separately.**

Scheme for Multiple Entry and Exit

Exit option -2 (Level 5.0): Award of UG Diploma in Major with 88 credits and an additional 8 credits				
Exit Courses				
SN	Course Code	Name of the Course	Mode	Credits
1	5ME243EC	Industrial Safety Engineering	Online Certification Course	4
2	5ME244EC	Quality Control and Inspection	Online Certification Course	4
	OR			
3	5ME405EL	Internship at Industry OR Minor Project	Two Months (288 – 320 Hours)	8

Scheme for Second Year Four Year Undergraduate Engineering Degree Programme B.E. in MECHANICAL ENGINEERING (Semester -V)													
Sr No.	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation		Practical Evaluation		Total	ESE Time Hrs.)
			L	P	T	Hrs.		IE	ESE	INT	EXT		
Core Courses													
1	Heat Transfer (PCC-I)	5ME220PC	3	0	0	3	3	40	60			100	3.00 Hrs.
2	Theory of Machines (PCC-II)	5ME221PC	3	0	0	3	3	40	60			100	3.00 Hrs.
3	Measurement Systems (PCC-III)	5ME222PC	3	0	0	3	3	40	60			100	3.00 Hrs.
4	Programme Elective Course -I	5ME223PE	3	0	0	3	3	40	60			100	3.00 Hrs.
Laboratory Courses													
5	Heat Transfer (PCC-I)	5ME224PC	0	2	0	2	1			25	25	50	
6	Theory of Machines (PCC-II)	5ME225PC	0	2	0	2	1			25	25	50	
7	Measurement Systems (PCC-III)	5ME226PC	0	2	0	2	1			25	25	50	
Multidisciplinary Minor													
8	Multidisciplinary Minor –III*	5ME227MD	2	0	0	2	2	20	30			50	2.00 Hrs.
9	Multidisciplinary Minor –IV*	5ME228MD	2	0	0	2	2	20	30			50	2.00 Hrs.
10	Multidisciplinary Minor Lab. –I*	5ME229ML	0	2	0	2	1			25	25	50	
Open Elective other than a particular Program													
11	Open Elective- III	5ME230OE	2	0	0	2	2	20	30			50	2.00 Hrs.
	TOTAL		19	08	0	26	22					750	

L: Lecture P: Practical T: Tutorial MSE: Mid Semester Exam ESE: End Semester Exam IE: Internal Evaluation INT: Internal EXT: External

Note: Suitable number of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

PEC	Thermal Engineering Stream (A)	Manufacturing Engineering Stream (B)	Design Engineering Stream (C)
PEC -I	Non-conventional Energy Sources	Productivity Techniques	Computer Aided Design & Simulation

Open Elective –III: 1) Optimization Techniques 2) Industrial Robotics & Automation 3) Introduction to 3D Printing

*Please refer list of Multidisciplinary Minor courses attached separately.

Scheme for Second Year Four Year Undergraduate Engineering Degree Programme B.E. in MECHANICAL ENGINEERING (Semester -VI)													
Sr No.	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation		Practical Evaluation		Total	ESE Time Hrs.)
			L	P	T	Hrs.		IE	ESE	INT	EXT		
Core Courses													
1	Design of Machine Elements (PCC-I)	6ME231PC	3	0	0	3	3	40	60			100	3.00 Hrs.
2	Metrology & Quality Control (PCC-II)	6ME232PC	3	0	0	3	3	40	60			100	3.00 Hrs.
3	Hydraulic Machines (PCC-III)	6ME233PC	3	0	0	3	3	40	60			100	3.00 Hrs.
4	Program Elective Course -II	6ME234PE	3	0	0	3	3	40	60			100	3.00 Hrs.
5	Program Elective Course -III	6ME235PE	3	0	0	3	3	40	60			100	3.00 Hrs.
Laboratory Courses													
6	Design of Machine Elements (PCC-I)	6ME236PC	0	2	0	2	1			25	25	50	
7	Metrology & Quality Control (PCC-II)	6ME237PC	0	2	0	2	1			25	25	50	
8	Hydraulic Machines (PCC-III)	6ME238PC	0	2	0	2	1			25	25	50	
Multidisciplinary Minor													
9	Multidisciplinary Minor –V*	6ME239MD	2	0	0	2	2	20	30			50	2.00 Hrs.
Vocational and Skill Enhancement Courses													
10	Design Analysis and Simulation Lab	6ME240VS	1	2	0	3	2			50	-	50	
	TOTAL		18	08	0	26	22					750	

L: Lecture P: Practical T: Tutorial ESE: End Semester Exam IE: Internal Evaluation INT: Internal EXT: External

Note: Suitable number of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

***Please refer list of Multidisciplinary Minor courses attached separately: 6ME239MD**

PEC	Course Code	Thermal Engineering Stream (A)	Course Code	Manufacturing Engineering Stream (B)	Course Code	Design Engineering Stream (C)
PEC -II	6ME239MD-A1	Internal Combustion Engines	6ME239MD-B1	Computer Aided Manufacturing	6ME239MD-C1	Tool Design
PEC -III	6ME239MD-A2	Computational Fluid Dynamics	6ME239MD-B2	Project Management	6ME239MD-C2	Product Design and Development

Scheme for Multiple Entry and Exit

Exit option -3 (Level 5.5): Award of UG Degree in Major with 132 credits and an additional 8 credits				
Exit Courses				
SN	Course Code	Name of the Course	Mode	Credits
1	7ME310EC	A. CNC Programming Techniques & Practice OR B. Ventilation & Air Conditioning System Design (HVAC) OR C. Industrial Piping Engineering	Online Certification Course	4
2	7ME311EC	Certified Mechanical Software Course on CFD or FEA Software or SolidWorks or CREO or CATIA or NXCAD or INVENTOR Design Course	Online Certification Course	4
	OR			
3	7ME406EL	Internship at Industry OR Minor Project	Two Months (288 -320 Hours)	8

Scheme for Second Year Four Year Undergraduate Engineering Degree Programme B.E. in MECHANICAL ENGINEERING (Semester -VII)													
Sr No.	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation		Practical Evaluation		Total	ESE Time Hrs)
			L	P	T	Hrs.		IE	ESE	INT	EXT		
Core Courses													
1	Energy Conversion-II (PCC-I)	7ME300PC	3	0	0	3	3	40	60			100	3.00 Hrs.
2	Automation Engineering (PCC-II)	7ME301PC	3	0	0	3	3	40	60			100	3.00 Hrs.
3	Program Elective Course -IV	7ME302PE	3	0	0	3	3	40	60			100	3.00 Hrs.
4	Program Elective Course -V	7ME303PE	3	0	0	3	3	40	60			100	3.00 Hrs.
5	Program Elective Course -VI	7ME304PE	3	0	0	3	3	40	60			100	3.00 Hrs.
Laboratory Courses													
6	Energy Conversion-II (PCC-I)	7ME305PC	0	2	0	2	1			25	25	50	
7	Automation Engineering (PCC-II)	7ME306PC	0	2	0	2	1			25	25	50	
Multidisciplinary Minor													
8	Multidisciplinary Minor –VI*	7ME307MD	2	0	0	2	2	30	30			50	2.00 Hrs.
9	Multidisciplinary Minor Lab. –II*	7ME308ML	0	2	0	2	1			25	25	50	.
Project													
10	Project	7ME401PR	0	4	0	4	2			50	50	100	
	TOTAL		17	10	0	27	22					800	

L: Lecture P: Practical T: Tutorial ESE: End Semester Exam IE: Internal Evaluation INT: Internal EXT: External

Note: Suitable number of hours per week are allotted for continuous evaluation process for the above subjects. (Total contact hours per week = 42 Hours)

***Please refer list of Multidisciplinary Minor courses attached separately: 7ME307MD**

PEC	Course Code	Thermal Engineering Stream (A)	Course Code	Manufacturing Engineering Stream (B)	Course Code	Design Engineering Stream (C)
PEC -IV	7ME307MD-A1	Automobile Engineering	7ME307MD-B1	Supply Chain Management	7ME307MD-C1	Finite Element Analysis
PEC -V	7ME307MD-A2	Energy Conservation and Management	7ME307MD-B2	Operation Research and Techniques	7ME307MD-C2	Mechatronics
PEC -VI	7ME307MD-A3	Refrigeration and Air-conditioning	7ME307MD-B3	Additive Manufacturing	7ME307MD-C3	Robotics and Industrial Applications

Scheme for Second Year Four Year Undergraduate Engineering Degree Programme B.E. in MECHANICAL ENGINEERING (Semester -VIII)													
Sr No.	Course Name	Code	Course Plan per Week (Hrs.)				Credits	Theory Evaluation		Practical Evaluation		Total	ESE Time Hrs)
			L	P	T	Hrs.		IE	ESE	INT	EXT		
Core Courses													
1	Research Methodology	8ME309RM	4*			4	4	40	60			100	3.00 Hrs.
2	Industry Internship	8ME402EL	0	24	0	24	12			100	200	300	--
3	Project	8ME403PR	0	4	0	4	2			50	50	100	--.
	TOTAL		4	28	0	32	18					500	

L: Lecture

P: Practical

T: Tutorial

ESE: End Semester Exam

IE: Internal Evaluation

INT: Internal

EXT: External

Note: Suitable number of *The course on Research Methodology may be completed by the student in Online mode (Swayam, MOOC's, any other platform approved by AICTE OR on the LMS platform offered by the Institute).

B. E. Mechanical Engineering

Multi -Disciplinary Minor Courses (14 Credits)

SEM	Course Code	Course Type	Course Title	Credit		Options		
				T	P	A	B	C
Sem III	3ME205MD	MDM –I	Basics of Mechanical Engineering	2	0	Industrial Piping Engineering	Advanced Excel	Industrial Accounting
Sem IV	4ME214MD	MDM -II	Fluid Mechanics and Machines	2	0	Ergonomics	Enterprise Resource Planning	Industrial Safety Engineering
Sem V	5ME227MD	MDM -III	Engineering Thermodynamics	2	0	Basics of Electrical Drives	Industrial IoT	Material Management
	5ME228MD	MDM -IV	Manufacturing Technology	2	0	Green Energy Systems	Industry 4.0	Product Lifecycle Management
	5ME229ML	MDM Lab. -I	Computer Aided Design and Drafting Lab	0	1	Essential of Data Science	Problem solving using Python	MATLAB for Engineers
Sem VI	6ME239MD	MDM -V	*Sem. VI: PEC-II/PEC-III	2	0	Hybrid EV Design & Analysis	AI for Mechanical Engineers	Human Resource Management
Sem VII	7ME307MD	MDM -VI	**Sem. VII: PEC-IV/PEC-V/PEC-VI	2	0	Introduction to Nano Technology	Introduction to 3D Printing	Digital Marketing and E-commerce
	7ME308ML	MDM Lab. -II	Thermal Engineering Lab.	0	1	Animation & Motion Graphics	Digital Content Creation	Interactive Presentations
			Total	12	02			

***6ME239MD: Multi-disciplinary Minor –V**

(Note: Select any one course from the below list of Program Electives: PEC-II or PEC-III)

PEC	Thermal Engineering Stream (A)	Manufacturing Engineering Stream (B)	Design Engineering Stream (C)
PEC -II	Internal Combustion Engines	Computer Aided Manufacturing	Tool Design
PEC -III	Computational Fluid Dynamics	Project Management	Product Design and Development

****7ME307MD: Multi-disciplinary Minor –VI**

(Note: Select any one course from the below list of Program Electives: PEC-IV/PEC-V/PEC-VI)

PEC	Thermal Engineering Stream (A)	Manufacturing Engineering Stream (B)	Design Engineering Stream (C)
PEC –IV	Automobile Engineering	Supply Chain Management	Finite Element Analysis
PEC -V	Energy Conservation and Management	Operation Research and Techniques	Mechatronics
PEC -VI	Refrigeration and Air-conditioning	Additive Manufacturing	Robotics and Industrial Applications

Honors / Double Minors / Honors with Research Degree Programme – 18 Credits

- **Eligibility:** Those students, who have cleared (Pass) first two semesters' university examinations (Semester I & II) with CGPA 7.5 & higher marks
- **Courses:** The five courses will be required to be qualify from Semester III to Semester -VII
- **Subjects:** The candidates need to complete four (4) theory subjects during semester -III to Semester -VI and one (1) Capstan project during Semester -VII
- **Execution:** The examination will be conducted by the University for all the Theory subjects / If candidates are permitted to complete the project in online mode on any MOOC's platform, then examination will be conducted by respective course conduction body or organization.
- **Verticals:** It is decided to have maximum two (2) tracks under each BoS (Board of Studies)

Suggestive List of Verticals in Mechanical Engineering (which will be finalized by the BoS)

- Advance Thermal Engineering
- Robotics & Automation
- Additive Manufacturing
- Electric Vehicle
- Business Development Marketing & Finance
- Logistic Management

Subject code for Honors / Double Minors Programme

Vertical -I

SN	Semester	Subject Code
1.	Semester -3	3ME245DH1
2.	Semester -4	4ME246DH1
3.	Semester -5	5ME247DH1
4.	Semester -6	6ME248DH1
5.	Semester -7	7ME407DH1

Vertical -II

SN	Semester	Subject Code
1.	Semester -3	3ME245DH2
2.	Semester -4	4ME246DH2
3.	Semester -5	5ME247DH2
4.	Semester -6	6ME248DH2
5.	Semester -7	7ME407DH2

Subject code for Honors with Research Programme

7 ME 408 HR and 8ME409HR

Nomenclature: Name of Department offering the courses

Acronym	Discipline of engineering/Department offering the course
SH	Science and Humanities
ME	Mechanical Engineering
EE	Electrical Engineering
CS	Computer Science and Engineering
CE	Civil Engineering
IT	Information Technology
ET	Electronics & Telecommunication Engg.
TX	Textile Engineering
EP	Electrical (Electronics & Power) Engg.
AD	Artificial Engineering and Data Science
CH	Chemical Engineering
DS	CSE (Data Science)

Courses	
Acronym	Course/Subject Vertical
BS	Basic Science Course
BL	Basic Science Laboratory
ES	Engineering Science Course
EL	Engineering Science Laboratory
PC	Program Course
PL	Program Laboratory
PE	Program Elective Course
M	Multidisciplinary Minor Course
ML	Multidisciplinary Minor Laboratory
OE	Open Elective

Acronym	Course/Subject Vertical
VS	Vocational Skill Enhancement Course
AE	Ability Enhancement Course
EM	Entrepreneurship/Economics/Management Course
IK	Indian Knowledge System
VE	Value Education Course
RM	Research Methodology
FP	Field Project
II	Industry Internship
PR	Project
CC	Co-curricular Course