Bharati Vidyapeeth Deemed University

College of Engineering, Pune- 411043

The Structure of the Curriculum: 2021

Course Choice Based Credit System (CBCS)

B. TECH. MECHANICAL: SEMESTER- I to VIII

Bharati Vidyapeeth University

College of Engineering, Pune

Department of Mechanical Engineering

Vision of the Bharati Vidyapeeth (Deemed to be University) College of Engineering is:

To be a World Class Institute for Social Transformation through Dynamic Education

Missions of the Bharati Vidyapeeth (Deemed to be University) College of Engineering are:

- *To provide quality technical education with advanced equipment, qualified faculty members, infrastructure to meet needs of profession & society.*
- *To provide an environment conducive to innovation, creativity, research and entrepreneurial leadership.*
- *To practice and promote professional ethics, transparency and accountability for social community, economic & environmental conditions.*

Goals of the Bharati Vidyapeeth (Deemed to be) University College of Engineering are:

- *Recruiting experienced faculty.*
- *Organizing faculty development programs.*
- *Identifying socio-economically relevant areas & emerging technologies.*
- *Constant review &up gradation of curricula.*
- *Up gradation of laboratories, library & communication facilities.*
- *Collaboration with industry and research & development organizations.*
- *Sharing of knowledge, infra-structure and resources.*
- *Training, extension, testing and consultancy services.*
- *Promoting interdisciplinary research.*

Vision of the Mechanical Engineering Department is:

To develop, high quality Mechanical Engineers through dynamic education to meet social and global challenges.

Mission Statements of the Mechanical Engineering Department are:

- *To provide extensive theoretical and practical knowledge to the students with well-equipped laboratories and ICT tools through motivated faculty members.*
- *To inculcate aptitude for research, innovation and entrepreneurial qualities in students.*
- *To acquaint students with ethical, social and professional responsibilities to adapt to the demands of working environment.*

Program Educational Objectives (PEOs) of the B. Tech. Mechanical are:

Graduates will be able,

- *To fulfill need of industry and society with theoretical and practical knowledge.*
- *To engage in research, innovation, lifelong learning and continued professional development.*
- *To fulfill professional ethics and social responsibilities.*

PROGRAM OUTCOMES

Engineering Graduates will be able to:

*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 IT 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. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.*

Statements of Programme Specific Outcomes (PSOs)

PSO1: Apply the knowledge of thermal, design, manufacturing engineering and computational sciences to solve Mechanical Engineering problems.

PSO2: Apply Mechanical Engineering principles for research, innovation and develop entrepreneurial skills.

PSO3: Apply concepts of mechanical engineering to asses' societal, environmental, health and safety issues with professional ethics.

B. TECH. MECHANICAL: COURSE STRUCTURE: CBCS: 2021-2022

B. Tech. Mechanical Sem.-I

Sr. No.	Course Code	Name of Course	Teaching Scheme (Hrs./Week)			Examination Scheme (Marks)						Credits			
			L	P	T	UE	IA	TW	TW & OR	TW & PR	Total	L	P TW/OR/PR	T	Total
1	BMEC101	Linear Algebra, Calculus & Complex Variables	4	-	1	60	40	-	-	-	100	4	-	1	5
2	BMEC102	Waves & Solid State Physics	3	2	-	60	40	25#	-	-	125	3	1	-	4
3	BMEC103	Electrical Engineering Systems	4	2	-	60	40	25#	-	-	125	4	1	-	5
4	BMEC104	Computer Aided Drafting & Visualization*	4	2	-	60	40	-	50	-	150	4	1	-	5
5	BMEC105	Statics and Dynamics	3	-	-	60	40	-	-	-	100	3	-	-	3
6	BMEC106	Metal Joining Processes	-	2	-	-	-	50#	-	-	50	-	1	-	1
7	BMEC107	Soft Computing-I	-	4	-	-	-	-	-	100	100	-	2	-	2
	Total		**18**	**12**	**1**	**300**	**200**	**100**	**50**	**100**	**750**	**18**	**6**	**1**	**25**

*End Sem. Examination of 4 Hrs.; #: Based on TW & internal oral examination

B. Tech. Mechanical Sem.-II

Sr. No.	Course Code	Name of Course	Teaching Scheme (Hrs./Week)			Examination Scheme (Marks)						Credits			
			L	P	T	UE	IA	TW	TW & OR	TW & PR	Total	L	P TW/OR/PR	T	Total
1	BME108	Differential Equations, Probability &Statistics	3	-	1	60	40	-	-	-	100	3	-	1	4
2	BME109	Chemistry of Engineering Materials	3	2	-	60	40	25#	-	-	125	3	1	-	4
3	BME110	Mechanical Engineering Systems	4	2	-	60	40	25#	-	-	125	4	1	-	5
4	BME111	Electronics Engineering Systems	4	2	-	60	40	25#	-	-	125	4	1	-	5
5	BME112	Computer Aided Machine Drawing*	4	2	-	60	40	-	-	50	150	4	1	-	5
6	BME113	Sheet Metal Operations	-	2	-	-	-	50#	-	-	50	-	1	-	1
7	BME114	Soft Computing-II	-	2	-	-	-	-	-	75	75	-	1	-	1
	Total		**18**	**12**	**1**	**300**	**200**	**125**	**-**	**125**	**750**	**18**	**6**	**1**	**25**

*End Sem. Examination of 4 Hrs.; #: Based on TW & internal oral examination

B. Tech. Mechanical Sem.-III

Sr. No.	Course Code	Name of Course	Teaching Scheme (Hrs./Week)			Examination Scheme (Marks)						Credits			
			L	P	T	UE	IA	TW	TW & OR	TW & PR	Total	L	P TW/OR/PR	T	Total
1	BME201	Thermodynamics-Principles	4	2	-	60	40	-	50	-	150	4	1	-	5
2	BME202	Mechanisms of Machines*	4	2	-	60	40	-	50	-	150	4	1	-	5
3	BME203	Mechanics of Fluids	4	2	-	60	40	-	-	50	150	4	1	-	5
4	BME204	ITC-I: Manufacturing Technology[@]	3	-	-	60	40	-	-	-	100	3	-	-	3
5	BME205	Strength of Machine Components	3	2	1	60	40	25#	-	-	125	3	1	1	5
6	BME206	Manufacturing Technology Laboratory	-	2	-	-	-	25#	-	-	25	-	1	-	1
7	BME207	Python Programming-I	-	4	-	-	-	-	-	50	50	-	2	-	2
8	BME208	Vocational Course-I [$] (Automobile Servicing-I)	-	-	-	-	-	-	50	-	50	-	2	-	2
9	BME209	MOOC-I	-	-	-	-	-	-	-	-	-	-	-	-	2
10	BME210	Environmental Studies (Mandatory Audit Course)[+]	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total		**18**	**14**	**1**	**300**	**200**	**50**	**150**	**100**	**800**	**18**	**9**	**1**	**30**

*End Sem. Examination of 4 Hrs; [@]Industry Taught Course-I; [$]To be conducted in service centre after office hours: 4 hrs./week; [+]End sem. Exam. of 50 marks

B. Tech. Mechanical Sem.-IV

Sr. No.	Course Code	Name of Course	Teaching Scheme (Hrs./Week)			Examination Scheme (Marks)						Credits			
			L	P	T	UE	IA	TW	TW & OR	TW & PR	Total	L	P TW/OR/PR	T	Total
1	BME211	Thermodynamics-Applications	4	2	-	60	40	-	50	-	150	4	1	-	5
2	BME212	Machine Design & Analysis-I*	4	2	-	60	40	-	50	-	150	4	1	-	5
3	BME213	Science of Engineering Materials	4	-	-	60	40	-	-	-	100	4	-	-	4
4	BME214	ITC-II: Entrepreneurship Development Skills[@]	3	-	-	60	40	-	-	-	100	3	-	-	3
5	BME215	Theory of Machines	3	2	1	60	40	-	50	-	150	3	1	1	5
6	BME216	Solid Modelling	-	4	-	-	-	-	-	50	50	-	2	-	2
7	BME217	Python Programming-II	-	4	-	-	-	-	-	50	50	-	2	-	2
8	BME218	Vocational Course-II[$] (Automobile Servicing-II)	-	-	-			-	50	-	50	-	2		2
9	BME219	Social Activities-I	-	-	-			-	-	-	-	-	-		2
10	BME220	Disaster Management (Mandatory Audit Course)[+]	-	-	-			-	-	-	-	-	-		-
	Total		**18**	**14**	**1**	**300**	**200**	**-**	**200**	**100**	**800**	**18**	**9**	**1**	**30**

*End Sem. Examination of 4 Hrs; [@]Industry Taught Course-II; [$]To be conducted in service centre after office hours: 4 hrs./week; [+]End sem. Exam. of 50 marks

B. Tech. Mechanical Sem.-V

Sr. No.	Course Code	Name of Course	Teaching Scheme (Hrs./Week)			Examination Scheme (Marks)						Credits			
			L	P	T	UE	IA	TW	TW & OR	TW & PR	Total	L	P TW/OR/PR	T	Total
1	BME301	Heat Transfer-Principles & Applications	4	2	-	60	40	25	-	--	125	4	1	-	5
2	BME302	Machine Design & Analysis -II*	3	2	-	60	40	25	-	-	125	3	1	-	4
3	BME303	Turbo Machinery	3	2	-	60	40	-	50	-	150	3	1	-	4
4	BME304	ITC-III: Hybrid & Electric Vehicles[@]	3	-	-	60	40	-	-	-	100	3	-	-	3
5	BME305	Computer Integrated Manufacturing	3	2	-	60	40	-	50	-	150	3	1	-	4
6	BME306	Vocational Course-III[$] (Logistics & Stores Management)	-	-	-	-	-	-	50	-	50	-	2	-	2
7	BME307	Computer Oriented Numerical Methods	-	4	-	-	-	-	-	50	50	-	2	-	2
8	BME308	Project-I Stage-I	-	2	-	-	-	-	100		100	-	4		4
9	BME309	MOOC-II	-	-	-	-	-	-	-	-	-	-	-		2
	Total		**16**	**14**	**-**	**300**	**200**	**50**	**250**	**50**	**850**	16	**12**	**-**	**30**

*End Sem. Examination of 4 Hrs.; [@]Industry Taught Course-III; [$]To be conducted in industry after office hours: 4 hrs./week

B. Tech. Mechanical Sem.-VI

Sr. No.	Course Code	Name of Course	Teaching Scheme (Hrs./Week)			Examination Scheme (Marks)						Credits			
			L	P	T	UE	IA	TW	TW & OR	TW & PR	Total	L	P TW/OR/PR	T	Total
1	BME310	Introduction to CFD & FEA	4	2	-	60	40	-	-	50	150	4	1	-	5
2	BME311	Mechanical System Design*	4	2	-	60	40	25#	-	-	125	4	1	-	5
3	BME312	Refrigeration & Air Conditioning	3	2	-	60	40	25#	-	-	125	3	1	-	4
4	BME313	Quantitative Techniques, Communication & Values	2	2	-	60	40	-	-	-	100	3	-	-	3
5	BME314	ITC-IV: Industrial Engineering &Management[@]	3	-	-	60	40	-	-	-	100	3	-	-	3
6	BME315	Vocational Course-IV (Refrigeration & Air Conditioning Systems Maintenance)	-	-	-	-	-	-	-	50	50	-	2	-	2
7	BME316	Introduction to Data Science	-	2	-	-	-	-	-	50	50	-	1	-	1
8	BME317	Project-I Stage-II	-	2	-	-	-	-	100	-	100	-	4	-	4
9	BME318	Internship	-	-	-	-	-	-	50	-	50	-	3	-	3
	Total		**16**	**14**	**-**	**300**	**200**	**75**	**150**	**125**	**850**	**17**	**13**	**-**	**30**

*End Sem. Examination of 4 Hrs.; [@]Industry Taught Course-IV; [$]To be conducted in industry after office hours: 4 hrs./week

B. Tech. Mechanical Sem.-VII

Sr. No.	Course Code	Name of Course	Teaching Scheme (Hrs./Week)			Examination Scheme (Marks)						Credits			
			L	P	T	UE	IA	TW	TW & OR	TW & PR	Total	L	P TW/OR/PR	T	Total
1	BME401	Industrial Automation	4	2	-	60	40	-	50	--	150	4	1	-	5
2	BME402	Elective-I	4	2	-	60	40	-	50	--	150	4	1	-	5
3	BME403	ITC-V: Production Planning & Control[@]	4	-	-	60	40	-	-	-	100	4	-	-	4
4	BME404	Power Plant Technology	4	2	-	60	40	-	50	-	150	4	1	-	5
5	BME405	Measurement & Metrology Techniques	-	2	1	-	-	-	50	-	50	-	1	1	2
6	BME406	Machine Learning	-	2	-	-	-	-	50	-	50	-	1	-	1
7	BME407	Project-II-Stage-I	-	4	-	-	-	-	200	-	200	-	4	-	4
8	BME408	Research Paper Publication*	-	-	-	-	-	-	-	-	-	-	-	-	2
9	BME409	MOOC-III	-	-	-	-	-	-	-	-	-	-	-	-	2
	Total		**16**	**14**	**1**	**240**	**160**	**-**	**450**	**-**	**850**	**16**	**9**	**1**	**30**

[@]Industry Taught Course-V; *Based on Project-I Stage I & II

B. Tech. Mechanical Sem.-VIII

Sr. No.	Course Code	Name of Course	Teaching Scheme (Hrs./Week)			Examination Scheme (Marks)						Credits			
			L	P	T	UE	IA	TW	TW & OR	TW & PR	Total	L	P TW/OR/PR	T	Total
1	BME410	Renewable Energy Technologies	4	2	-	60	40	-	50	-	150	4	1	-	5
2	BME411	Elective-II	4	2	-	60	40	-	50	-	150	4	1	-	5
3	BME412	ITC-VI: Energy Audit & Management[@]	4	-	-	60	40	-	-	-	100	4	-	-	4
4	BME413	Reliability & Machine ConditionMonitoring	4	2	-	60	40	-	50	-	150	4	1	-	5
5	BME414	Project-II-Stage-II	-	4	-	-	-	-	200	-	200	-	6	-	6
6	BME415	Operations Research Practices		2	-	-	-	50#	-	-	50	-	1	-	1
7	BME416	Robot Movement Systems		2	1	-	-	50#	-	-	50	-	1	1	2
8	BME417	Social Activities-II		-	-	-	-	-	-	-	-	-	-	-	2
	Total		**16**	**14**	**1**	**240**	**160**	**100**	**350**	**-**	**850**	**16**	**11**	**1**	**30**

[@]Industry Taught Course-VI; #: Based on TW & internal oral examination

Elective-I Six Sigma, Lean & Agile Manufacturing , Waste to Energy Conversion, Jig, Fixture & Die Design, Artificial Intelligence, Principles of Air Craft & Submarine Design

Elective -II Industrial Product Design, Engineering Economics, Project Management & Ethics, Virtual Reality, Additive Manufacturing & Rapid Prototyping