

**Punyashlok Ahilyadevi Holkar Solapur University, Solapur**



**Name of the Faculty: Science & Technology**

**CHOICE BASED CREDIT SYSTEM**

**Syllabus Structure: B. Tech. (Mechanical Engineering)**

**S.Y. B. Tech (Mechanical Engineering) w.e.f. Academic Year 2019-20**  
**T.Y. B. Tech (Mechanical Engineering) w.e.f. Academic Year 2020-21**  
**Final Year B. Tech (Mechanical Engineering) w.e.f. Academic Year 2021-22**

# Punyashlok Ahilyadevi Holkar Solapur University, Solapur

## FACULTY OF SCIENCE & TECHNOLOGY

### Mechanical Engineering Programme Educational Objectives and Outcomes

#### *A. Program Educational Objectives*

1. Graduate will excel in professional career in Mechanical and allied interdisciplinary areas.
2. Graduate will exhibit strong fundamentals required to pursue higher education and continue professional development in Mechanical and other fields.
3. Graduate will adhere to professional ethics, develop team spirit and effective communication skills to be successful leaders with a holistic approach.
4. Graduate will be sensitive to ethical, societal and environmental issues while serving at their professional work.

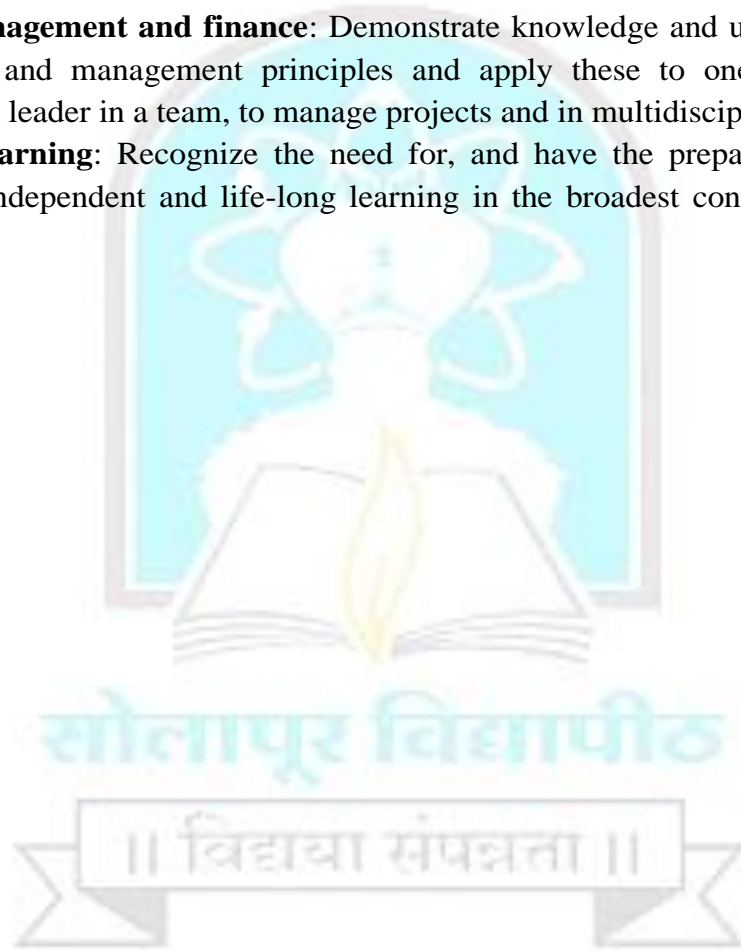
#### *B. Program Outcomes*

Engineering Graduate 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.



**Punyashlok Ahilyadevi Holkar Solapur University, Solapur**  
**Faculty of Science & Technology**

*Credit System structure of S.Y. B. Tech. Mechanical Engineering W.E.F. 2019-20*

**Semester -III**

**Theory Courses**

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME211	Applied Thermodynamics	3	-	-	-	3	30	70	-	100
ME212	Mechanics of Materials	3	-	-	-	3	30	70	-	100
ME213	Manufacturing Processes	3	-	-	-	3	30	70	-	100
ME214	Machine Drawing & CAD	3	-	-	-	3	30	70	-	100
ME215	Professional Elective-I	3	-	-	-	3	30	70	-	100
	<b>Sub Total</b>	<b>15</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>15</b>	<b>150</b>	<b>350</b>	<b>-</b>	<b>500</b>
MEV21	Environmental Sciences	1	-	-	-	-	-	-	-	-

**Semester 3: Laboratory / Tutorial Courses**

Course code	Name of Laboratory / Tutorial Course	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
								POE	OE		
ME211	Applied Thermodynamics	-	-	-	-	-	-	-	-	-	
ME212	Mechanics of Materials	-	1	-	-	1	-	-	-	25	
ME213	Manufacturing Processes	-	-	2	-	1	-	-	25	50	
ME214	Machine Drawing & CAD	-	-	-	4	2	-	50	-	50	
ME215	Professional Elective-I	-	-	2	-	1	-	-	-	25	
	<b>Sub Total</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>5</b>	<b>-</b>	<b>50</b>	<b>25</b>	<b>125</b>	
	<b>Grand Total</b>	<b>15</b>	<b>01</b>	<b>04</b>	<b>04</b>	<b>20</b>	<b>150</b>	<b>425</b>	<b>125</b>	<b>700</b>	

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**Professional Elective-I:** A. Microprocessors in Automations B. Internal Combustion Engines C. Composite Materials

# Punyashlok Ahilyadevi Holkar Solapur University, Solapur

## Faculty of Science & Technology

Semester -IV

*Credit System Structure of S.Y. B. Tech. Mechanical Engineering W.E.F. 2019-20*

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME221	Engineering Mathematics –III	3	-	-	-	3	30	70	-	100
ME222	Manufacturing Technology	3	-	-	-	3	30	70	-	100
ME223	Fluid Mechanics & Fluid Machines	3	-	-	-	3	30	70	-	100
ME224	Kinematics & Theory of Machines	3	-	-	-	3	30	70	-	100
ME225	Professional Elective-II	3	-	-	-	3	30	70	-	100
<b>Sub Total</b>		<b>15</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>15</b>	<b>150</b>	<b>350</b>	<b>-</b>	<b>500</b>
MEV22	Environmental Sciences	1	-	-	-	-	-	-	-	-

### Semester 4: Laboratory / Tutorial Courses

Course code	Name of Laboratory / Tutorial Course	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
								POE	OE		
ME221	Engineering Mathematics –III	-	1	-	-	1	-	-	-	25	25
ME222	Manufacturing Technology	-	-	2	-	1	-	-	-	25	25
ME223	Fluid Mechanics & Fluid Machines	-	-	2	-	1	-	-	-	25	25
ME224	Kinematics & Theory of Machines	-	-	2	-	1	-	-	25	25	50
ME225	Professional Elective-II	-	-	2	-	1	-	-	-	25	25
ME 226	Mechanical Workshop-I	-	-	2	-	1	-	-	-	50	50
ME 227	Electrical Technology	-	-	2	-	1	-	-	25	25	50
<b>Sub Total</b>		<b>-</b>	<b>01</b>	<b>12</b>	<b>-</b>	<b>07</b>	<b>-</b>	<b>50</b>	<b>200</b>	<b>250</b>	
<b>Grand Total</b>		<b>15</b>	<b>01</b>	<b>12</b>	<b>-</b>	<b>22</b>	<b>150</b>	<b>400</b>	<b>200</b>	<b>750</b>	

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**Professional Elective-II:** A. Mechatronic Systems B. Power Plant Engineering C. Solid Mechanics

- **Note :**

1. Batch size for the practical /tutorial shall be of 20 students. On forming the batches, if the strength of remaining student exceeds 9, then a new batch shall be formed.
2. Student is required to study and pass Environmental Science subject in Second Year to become eligible for award of degree.
3. Industrial Training (evaluated at B. Tech Sem.-7) of minimum 30 days shall be completed in any vacation after B. Tech. Sem.-3, but before B. Tech. Sem.-7 & the report shall be submitted and get evaluated in B. Tech. Sem.-7
4. Term work assessment shall be a continuous process based on student's performance in – class tests, assignments, homework, subject seminars, quizzes, and laboratory books and their interaction and attendance for theory and laboratory sessions as applicable.



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## Faculty of Science & Technology

*Credit System structure of T.Y. B. Tech. Mechanical Engineering W.E.F. 2020-21*

<b>Semester -V</b>
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### Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME311	Machine Design –I	3	-	-	-	3	30	70	-	100
ME312	Heat Transfer	3	-	-	-	3	30	70		100
ME313	Material Science & Metallurgy	3	-	-	-	3	30	70	-	100
ME314	Open Elective-I	3	-	-	-	3	30	70	-	100
ME315	Professional Elective –III	3	-	-	-	3	30	70	-	100
SLH31	Self-Learning – HSS	-	-	-	-	2#	-	50	-	50
	<b>Sub Total</b>	<b>15</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>15</b>	<b>150</b>	<b>400</b>		<b>550</b>

### Semester 5 Laboratory / Tutorial Courses

Course code	Name of Laboratory /Tutorial Course	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
								POE	OE		
ME311	Machine Design –I	-	-	2	-	1	-	-	-	25	25
ME312	Heat Transfer	-	-	2	-	1		25	-	25	50
ME313	Material Science & Metallurgy	-	-	2	-	1	-	-	25	25	50
ME314	Open Elective-I	-	1	-	-	1	-	-	-	25	25
ME315	Professional Elective –III	-	1	-	-	1	-	-	-	25	25
ME316	Mechanical Workshop –II	-	-	2	-	1	-	-	-	25	25
	<b>Sub Total</b>	<b>-</b>	<b>02</b>	<b>08</b>	<b>-</b>	<b>06</b>	<b>-</b>	<b>50</b>		<b>150</b>	<b>200</b>
	<b>Grand Total</b>	<b>15</b>	<b>02</b>	<b>08</b>	<b>-</b>	<b>21</b>	<b>150</b>	<b>450</b>	<b>150</b>	<b>750</b>	

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# Indicates credits which are over and above.

**Professional Elective –III:** A. Metrology and Quality Control B. Industrial Hydraulics and Pneumatics C. Mechanical Vibrations

**Open Elective –I:** A. Industrial Management B. Mechatronics C. Systems Engineering **D. Plastic Engineering**



# Punyashlok Ahilyadevi Holkar Solapur University, Solapur

## Faculty of Science & Technology

*Credit System structure of T.Y. B. Tech. Mechanical Engineering W.E.F. 2020-21*

<b>Semester -VI</b>
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### Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME321	Machine Design –II	3	-	-	-	3	30	70	-	100
ME322	Instrumentation & Control	3	-	-	-	3	30	70	-	100
ME323	CAD-CAM & CAE	3	-	-	-	3	30	70	-	100
ME324	Professional Elective –IV	3	-	-	-	3	30	70	-	100
SLH32	Self-Learning (Technical)	-	-	-	-	2#	-	50	-	50
	<b>Sub Total</b>	<b>12</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>12</b>	<b>120</b>	<b>330</b>	<b>-</b>	<b>450</b>

### Semester 6 Laboratory / Tutorial Courses

Course code	Name of Laboratory / Tutorial Course	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
								POE	OE		
ME321	Machine Design –II	-	-	2	-	1	-	-	25	25	50
ME322	Instrumentation & Control	-	-	2	-	1	-	-	-	25	25
ME323	CAD-CAM & CAE	-	-	4	-	2	-	-	25	50	75
ME324	Professional Elective –IV	-	-	2	-	1	-	-	-	25	25
ME325	Mechanical Workshop –III	-	-	2	-	1	-	-	-	25	25
	<b>Sub Total</b>	<b>-</b>	<b>-</b>	<b>12</b>	<b>-</b>	<b>06</b>	<b>-</b>	<b>50</b>	<b>150</b>	<b>200</b>	
	<b>Grand Total</b>	<b>12</b>	<b>-</b>	<b>12</b>	<b>-</b>	<b>18</b>	<b>120</b>	<b>380</b>	<b>150</b>	<b>650</b>	

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# Indicates credits which are over and above.

**-Professional Elective –IV: A. Tool Engineering B. Finite Element Methods, C. Gas turbines and jet propulsion**



• **Note –**

1. Batch size for the practical /tutorial shall be of 20 students. On forming the batches, if the strength of remaining student exceeds 9, then a new batch shall be formed.
2. Industrial Training (evaluated at B. Tech Sem.-7) of minimum 15 days shall be completed in any vacation after B.Tech Sem.-3, but before B. Tech. Sem.-7 & the report shall be submitted and evaluated in B.Tech. Sem.-7
3. Students shall select one Self Learning Module at B.Tech. Sem. 5 and B.Tech. Sem. 6 each from Humanities and Social Sciences and Technical Groups Respectively.
4. Curriculum for Humanities and Social Sciences Self Learning Modules is common for all under graduate programmes of faculty of Engineering and Technology.

**6. for B. Tech. Sem.6 -**

**A. Student can select a Self Learning Course from Solapur University, Solapur HSS Course List and appear for its examination as and when conducted by Solapur University, Solapur**

**OR**

**B. Student can enroll for National Programme on Technology Enhanced Learning (NPTEL) course, complete its assignments and Appear for certificate examination as and when conducted by NPTEL.**

*For more details about Self Learning Course (HSS) please refer to separate rule document available from Solapur University, Solapur*

*More details about NPTEL are available at <http://nptel.ac.in>*

7. ICA assessment shall be a continuous process based on student's performance in class tests, assignments, homework, subject Seminars, quizzes, laboratory books and their interaction and



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**Faculty of Science & Technology**

*Credit System structure of Final Year B. Tech. Mechanical Engineering W.E.F. 2021-22*

**Semester - VII**

**Theory Courses**

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME411	Refrigeration and Air Conditioning	3	-	-	-	3	30	70	-	100
ME412	Industrial Engineering	3	-	-	-	3	30	70	-	100
ME413	Professional Elective-V	3	-	-	-	3	30	70	-	100
ME414	Open Elective-II	3	-	-	-	3	30	70	-	100
ME415	Project Work & Seminar –I	-	-	-	-	-	-	-	-	-
ME416	Industrial Training	-	-	-	-	-	-	-	-	-
	<b>Sub Total</b>	<b>12</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>12</b>	<b>120</b>	<b>280</b>	<b>-</b>	<b>400</b>

**Semester 7: Laboratory / Tutorial Courses**

Course code	Name of Laboratory / Tutorial Course	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
								POE	OE		
ME411	Refrigeration and Air Conditioning	-	-	2	-	1	-	25	-	25	50
ME412	Industrial Engineering	-	-	2	-	1	-	-	-	25	25
ME413	Professional Elective-V	-	-	2	-	1	-	-	25	25	50
ME414	Open Elective-II	-	-	2	-	1	-	-	-	25	25
ME415	Project Work & Seminar –I	-	-	4	-	2	-	-	-	125	125
ME416	Industrial Training	-	1	-	-	1	-	-	25	50	75
	<b>Sub Total</b>	<b>-</b>	<b>01</b>	<b>12</b>	<b>-</b>	<b>07</b>	<b>-</b>	<b>75</b>	<b>-</b>	<b>350</b>	
	<b>Grand Total</b>	<b>12</b>	<b>01</b>	<b>12</b>	<b>-</b>	<b>19</b>	<b>120</b>	<b>355</b>	<b>275</b>	<b>750</b>	

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**Professional Elective-V A.** Product Design **B** Energy Engineering **C.** Production and Operational Management

**Open Elective-II:** **A.** Industrial Robotics, **B** Entrepreneurship Development, **C.** Railway Transportation Systems-**I** **D.** Marketing Management

# Punyashlok Ahilyadevi Holkar Solapur University, Solapur

## Faculty of Science & Technology

*Credit System structure of Final Year B. Tech. Mechanical Engineering W.E.F. 2021-22*

<b>Semester -VIII</b>
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### Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME421	Automobile Engineering	3	-	-	-	3	30	70	-	100
ME422	Operations Research	3	-	-	-	3	30	70	-	100
ME423	Professional Elective- VI	3	-	-	-	3	30	70	-	100
ME424	Open Elective – III	3	-	-	-	3	30	70	-	100
ME425	Project Work & Seminar - II	-	-	-	-	-	-	-	-	-
	<b>Sub Total</b>	12	-	-	-	12	120	280	-	400

### Semester 8: Laboratory / Tutorial Courses

Course code	Name of Laboratory / Tutorial Course	Hrs./week				Credits	ISE	Examination Scheme		ICA	Total
		L	T	P	D			ESE			
								POE	OE		
ME421	Automobile Engineering	-	-	2	-	1	-	-	-	25	25
ME422	Operations Research	-	-	2	-	1	-	-	-	25	25
ME423	Professional Elective – VI	-	-	2	-	1	-	-	25	25	50
ME424	Open Elective- III	-	-	2	-	1	-	-	-	25	25
ME425	Project Work & Seminar-II	-	-	8	-	4	-	-	75	100	175
	<b>Sub Total</b>	-	-	16	-	8	-	100		200	300
	<b>Grand Total</b>	<b>12</b>	<b>-</b>	<b>16</b>	<b>-</b>	<b>20</b>	<b>120</b>	<b>380</b>	<b>200</b>	<b>700</b>	

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**Professional Elective VI: A. Computational Fluid dynamics, B. Process Engineering, C. Design for Manufacture and Assembly**

**Open Elective III: A Software Engineering & Cyber Security, B. Total Quality Management, C. Economics for Engineers, D. Project Management, E. Railway Transportation Systems-II**

• **Note:**

1. Batch size for the practical /tutorial shall be of 20 students. On forming the batches, if the strength of remaining student exceeds 9, then a new batch shall be formed.
2. Industrial Training (evaluated at B. Tech Sem.-7) of minimum 30 days shall be completed in any vacation after B. Tech. Sem.-3, but before B. Tech. Sem.-7 & the report shall be submitted and evaluated in B. Tech. Sem.-7
3. Project group for B. Tech. (Mechanical) Sem. 7 and Sem. 8 shall not be of more than 4 students.
4. ICA assessment shall be a continuous process based on student's performance in – class tests, assignments, homework, subject seminars, quizzes, and laboratory books and their interaction and attendance for theory and lab sessions as applicable.

