



SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

MECHANICAL ENGINEERING

Syllabus Structure for

S.E. (Mechanical Engineering) w.e.f. Academic Year 2017-18

T.E. (Mechanical Engineering) w.e.f. Academic Year 2018-19

B.E. (Mechanical Engineering) w.e.f. Academic Year 2019-20

Choice Based Credit System





SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF ENGINEERING & TECHNOLOGY
Mechanical Engineering

Programme Educational Objectives and Outcomes

A. Program Educational Objectives (PEOs)

1. To make students competent for professional career in Mechanical & allied fields.
2. To build strong fundamental knowledge amongst student to pursue higher education and continue professional development in Mechanical & other fields
3. To imbibe professional ethics, develop team spirit and effective communication skills to be successful leaders and managers with a holistic approach.
4. To nurture students to be sensitive to ethical, societal & environmental issues while conducting their professional work.

B. Program Outcomes (POs)

A Mechanical 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.

C. Program Specific Outcomes (PSOs)

1. **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.
2. **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 consideration
3. **Self Learning:** Graduate with his sound fundamentals is prepared to comprehend applications of the Mechanical engineering through self learning mode.





SOLAPUR UNIVERSITY, SOLAPUR
Faculty of Engineering & Technology
Structure of CBCS Curriculum for Second Year (Mechanical Engineering)wef 2017-18

Semester I : Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME211	Analysis of Mechanical Elements	3	-	-	-	3	30	70	-	100
ME212	Applied Thermodynamics	3	-	-	-	3	30	70	-	100
ME213	Engineering Mathematics -III	3	-	-	-	3	30	70	-	100
ME214	Manufacturing Processes	3	-	-	-	3	30	70	-	100
ME215	Machine Drawing	3	-	-	-	3	30	70	-	100
	Sub Total	16	-	-	-	16	150	350	-	500
MEV21	Environmental Sciences	1	-	-	-	-	-	-	-	-

Semester I: Laboratory / Tutorial Courses

Course code	Name of Laboratory /Tutorial Course	Hrs./week				Credits	ISE	ESE		ICA	Total
		L	T	P	D			POE	OE		
ME211	Analysis of Mechanical Elements	-	1	-	-	1	-	-	-	25	25
ME212	Applied Thermodynamics	-	-	2	-	1	-	-	25	25	50
ME213	Engineering Mathematics -III	-	1	-	-	1	-	-	-	25	25
ME214	Manufacturing Processes	-	-	2	-	1	-	-	-	25	25
ME215	Machine Drawing	-	-	-	4	2	-	-	25	50	75
ME216	Professional Elective-I	1	-	2	-	2	-	25	-	25	50
ME217	Workshop Practices -II	-	-	2	-	1	-	-	-	50	50
	Sub Total	-	-	-	-	8	-	25	50	225	300
	Grand Total	16	02	08	04	24	150	425	225	800	

Abbreviations: L- Lectures, P –Practical, T- Tutorial, ISE- In Semester Examination, ESE - End Semester Examination (University Examination for Theory & / POE & / Oral), ICA- Internal Continuous Assessment.

Professional Elective-I:Computer Programming in C ++, Dot Net, General Proficiency.



SOLAPUR UNIVERSITY, SOLAPUR
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Structure of CBCS Curriculum for Second Year (Mechanical Engineering) wef 2017-18

Semester II : Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME221	Theory of Machine-I	3	-	-	-	3	30	70	-	100
ME222	Machine Tools & Processes	3	-	-	-	3	30	70	-	100
ME223	Fluid Mechanics	3	-	-	-	3	30	70	-	100
ME224	Electrical and Electronic Technology	3	-	-	-	3	30	70	-	100
ME225	Professional Elective-II	3	-	-	-	3	30	70	-	100
	Sub Total	16	-	-	-	16	150	350	-	500
MEV22	Environmental Sciences	1	-	-	-	-	-	-	-	-

Semester II: 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	Theory of Machine-I	-	-	2	-	1	-	-	-	25	25
ME222	Machine Tools & Processes	-	-	2	-	1	-	-	-	25	25
ME223	Fluid Mechanics	-	-	2	-	1	-	-	25	25	50
ME224	Electrical Technology and Electronics	-	-	2	-	1	-	-	-	25	25
ME225	Professional Elective-II	-	-	2	-	1	-	-	-	25	25
ME226	Computer Aided Machine Drawing	1	-	2	-	2	-	50	-	50	100
ME 227	Workshop Practices -III	-	-	2	-	1	-	-	-	50	50
	Sub Total	-	-	14	-	07	-	75	225	300	
	Grand Total	16	-	14	-	23	150	425	225	800	

Abbreviations: L- Lectures, P-Practical, T- Tutorial, ISE- In Semester Examination, ESE - End Semester Examination (University Examination for Theory & / POE & / Oral), ICA- Internal Continuous Assessment.

Professional Elective-II: Computational Techniques & Numerical Methods, Simulation Techniques

- **Note:**

1. Batch size for the practical /tutorial shall be of 20 students. On forming the batches, if the strength of remaining student exceeds 09, then a new batch shall be formed.
2. Industrial Training (evaluated at B.E. Sem.-I) of minimum 30days shall be completed in any vacation after S.E. Sem.-II, may be Maximum in two slots but before B.E. Sem.-I & the report shall be submitted and evaluated in B.E. Sem.-I
3. Appropriate subjects under Elective I & II may be added as per the requirement.
4. Term work 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 attendance for theory and laboratory sessions as applicable





SOLAPUR UNIVERSITY, SOLAPUR
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Structure of CBCS Curriculum for Third Year (Mechanical Engineering) wef 2018-19

Semester I : Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME311	Theory of Machine -II	3	-	-	-	3	30	70	-	100
ME312	Metrology and Mechanical Measurement	3	-	-	-	3	30	70	-	100
ME313	Metallurgy	3	-	-	-	3	30	70	-	100
ME314	Machine Design -I	3	-	-	-	3	30	70	-	100
ME315	Professional Elective -III	3	-	-	-	3	30	70	-	100
ME316	Advanced Computer Programming -I	1	-	-	-	1	-	-	-	-
	Workshop Practices -IV	-	-	-	-	-	-	-	-	-
SLH31	Self Learning(HSS)	-	-	-	-	2	-	50		50
	Sub Total	16	-	-	-	18	150	400		550

Semester I : 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	Theory of Machine -II	-	-	2	-	1	-	-	25	25	50
ME312	Metrology and Mechanical Measurement	-	-	2	-	1	-	-	-	25	25
ME313	Metallurgy	-	-	2	-	1	-	-	25	25	50
ME314	Machine Design -I	-	1	-	-	1	-	-	-	25	25
ME315	Professional Elective -III	-	-	2	-	1	-	-	-	25	25
ME316	Advanced Computer Programming -I	-	-	2	-	1	-	-	-	25	25
ME317	Workshop Practices -IV	-	-	2	-	1	-	-	-	50	50
	Sub Total	-	01	12	-	7	-	-	50	200	250
	Grand Total	16	01	12	-	25	150	450	200	800	

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Professional Elective –III: Machine Tool Design, Material Handling System, Fluid Machinery & Fluid Power



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Semester II : Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME321	Heat and Mass Transfer	3	-	-	-	3	30	70	-	100
ME322	Internal Combustion Engine	3	-	-	-	3	30	70	-	100
ME323	CAD-CAM & CAE	3	-	-	-	3	30	70	-	100
ME324	Machine Design -II	3	-	-	-	3	30	70	-	100
ME325	Professional Elective -IV	3	-	-	-	3	30	70	-	100
ME326	Advanced Computing Techniques ² -II	1	-	-	-	1	-	-	-	-
	Sub Total	16	-	-	-	16	150	350	-	500

Semester II : Laboratory / Tutorial Courses

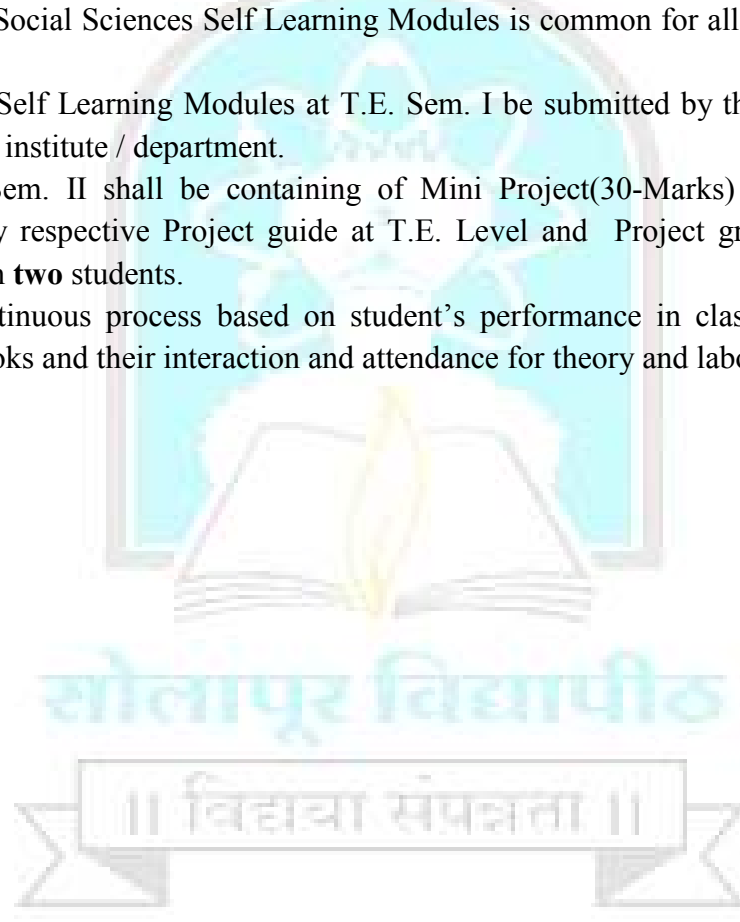
Course code	Name of Laboratory / Tutorial Course	Hrs./week				Credits	Examination Scheme				
		L	T	P	D		ISE	ESE		ICA	Total
								POE	OE		
ME321	Heat and Mass Transfer	-	-	2	-	1	-	25	-	25	50
ME322	Internal Combustion Engine	-	-	2	-	1	-	-	-	25	25
ME323	CAD-CAM & CAE	-	-	2	-	1	-	-	-	25	50
ME324	Machine Design -II	-	01	2	-	1	-	-	25	25	50
ME325	Professional Elective - IV	-	-	2	-	1	-	-	-	25	25
ME326	Advanced Computing Techniques ² -II	-	-	2	-	1	-	-	-	25	25
ME327	Workshop Practice –V	-	-	2	-	1	-	25#	-	25	75
SLH32	Self Learning (Technical)	-	-	-	-	-	-	-	-	50	-
	Sub Total	-	01	14	-	7	-	75	225	300	
	Grand Total	16	01	14	-	23	150	425	225	800	

Abbreviations: L- Lectures, P –Practical, T- Tutorial, ISE- In Semester Examination, ESE - End Semester Examination (University Examination for Theory & / POE & / Oral), ICA- Internal Continuous Assessment.

Professional Elective – IV: Experimental Stress Analysis, Mechanical Vibration, Tool Engineering # Indicates practical Examination only.

• **Note –**

1. Batch size for the practical /tutorial shall be of 15 students. On forming the batches, if the strength of remaining students exceeds 07, then a new batch shall be formed.
2. Industrial Training (evaluated at B.E. Sem.-I) of minimum 30 days shall be completed in any vacation after S.E. Sem.-II, may be Maximum in two slots but before B.E. Sem.-I & the report shall be submitted and evaluated in B.E. Sem.-I.
3. Students shall select one Self Learning Module at T.E. Sem. I and T.E. Sem. II each from Humanities and Social Sciences and Technical Groups with at least one Self Learning Module from the Humanities and Social Sciences Group.
4. Curriculum for Humanities and Social Sciences Self Learning Modules is common for all under graduate programmes of faculty of Engineering and Technology.
5. Minimum four assignments for Self Learning Modules at T.E. Sem. I be submitted by the students which shall be evaluated by a Module Coordinator assigned by institute / department.
6. Self learning (Technical)T.E. Sem. II shall be containing of Mini Project(30-Marks) and Paper Presentation or Seminar(20-Marks).This will be assessed by respective Project guide at T.E. Level and Project group for T.E.(Mechanical) Sem. II (Mini Project)shall not be of more than **two** students.
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 attendance for theory and laboratory sessions as applicable.





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Semester I : Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME411	Automatic Control Engineering	3	-	-	-	3	30	70	-	100
ME412	Refrigeration and Air Conditioning	3	-	-	-	3	30	70	-	100
ME413	Operations Research	3	-	-	-	3	30	70	-	100
ME414	Professional Elective-V	3	-	-	-	3	30	70	-	100
ME415	Free Elective-I	3	-	-	-	3	30	70	-	100
ME416	Project Work -I	-	-	-	-	-	-	-	-	-
ME417	Industrial Training	-	-	-	-	-	-	-	-	-
	Sub Total	15	-	-	-	15	150	350	-	500

Semester I : 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	Automatic Control Engineering	-	-	2	-	1	-	-	-	25	50
ME412	Refrigeration and Air Conditioning	-	-	2	-	1	-	-	25	25	25
ME413	Operations Research	-	-	2	-	1	-	-	-	25	25
ME414	Professional Elective-V	-	-	2	-	1	-	-	25	25	50
ME415	Free Elective-I	-	-	2	-	1	-	-	25	25	50
ME416	Project Work -I	-	-	6	-	3	-	-	-	25	25
ME417	Industrial Training	-	-	1	-	1	-	-	50	25	75
	Sub Total	-	-	17	-	09	-	-	125	-	300
	Grand Total	16	-	17	-	24	150	475	175	800	

Abbreviations: L - Lectures, P –Practical, T- Tutorial, ISE- In Semester Examination, ESE - End Semester Examination (University Examination for Theory & / POE & / Oral), ICA- Internal Continuous Assessment.

Professional Elective-V: Finite Element Method, Piping Engineering, Production and Operational Management, Automobile Engineering, Costing and Cost Control

Free Elective-I: Industrial Robotics, Sugar Technology, Textile Engineering, Entrepreneurship Development, Process Equipments Design



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Semester II : Theory Courses

Course code	Name of Theory Course	Hrs./week				Credits	Examination Scheme			
		L	T	P	D		ISE	ESE	ICA	Total
ME421	Industrial Engineering	3	-	-	-	3	30	70	-	100
ME422	Industrial and Quality Management	3	-	-	-	3	30	70	-	100
ME423	Professional Elective -VI	3	-	-	-	3	30	70	-	100
ME424	Free Elective-II	3	-	-	-	3	30	70	-	100
ME425	Project Work -II	-	-	-	-	-	-	-	-	-
	Sub Total	12	-	-	-	12	120	280	-	400

Semester II: 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		
ME421	Industrial Engineering	-	-	2	-	1	-	-	25	25	50
ME422	Industrial and Quality Management	-	-	2	-	1	-	-	-	25	25
ME423	Professional Elective -VI	-	-	2	-	1	-	25	-	25	50
ME424	Free Elective-II	-	-	2	-	1	-	25	25	25	75
ME425	Project Work -II	-	-	10	-	5	-	-	100	100	200
	Sub Total	-	-	18	-	9	-	200		200	400
	Grand Total	12	-	18	-	21	120	480		200	800

Abbreviations: L- Lectures, P –Practical, T- Tutorial, ISE- In Semester Examination, ESE - End Semester Examination (University Examination for Theory & / POE & / Oral), ICA- Internal Continuous Assessment.

Professional Elective VI: Unconventional Machining, Mechatronics, Computational Fluid dynamics, Marketing Management, Process Engineering

Free Elective II: Software Engineering & Cyber Security, Agro Machine Engineering, Plastic Engineering, Economics for Engineers, Project Management.

- **Note:**

1. Batch size for the practical /tutorial shall be of 15 students. On forming the batches, if the strength of remaining students exceeds 07, then a new batch shall be formed.
2. Industrial Training (evaluated at B.E. Sem.-I) of minimum 30 days shall be completed in any vacation after S.E. Sem.-II, may be Maximum in two slots but before B.E. Sem.-I & the report shall be submitted and evaluated in B.E. Sem.-I
3. Appropriate subjects under Elective I & II may be added as per the requirement.
4. Project group for B.E. (Mechanical) Sem. I and Sem. II shall not be of more than **four** students.
5. 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.

