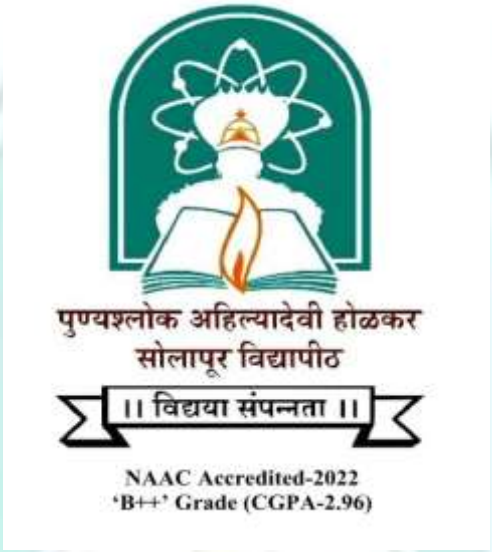

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF SCIENCE & TECHNOLOGY

NEP 2020 Compliant Curriculum for Mechanical Engineering with effect from 2023-24

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF SCIENCE & TECHNOLOGY

NEP 2020 Compliant Curriculum

With effect from 2023-2024

Semester I (Common for All Engineering Branches)

Course Type	*Course Code*	*Name of the Course*	*Engagement Hours*		*Credits*	*FA*	*SA*		*Total*
			L	*P*		*ESE*	*ISE*	*ICA*	
BSC	BS-01/ BS-02	Engineering Physics / Engineering Chemistry $	3	2	4	70	30	25	125
	BS-03	Engineering Mathematics-I	3	2	4	70	30	25	125
ESC	ES-01/ ES-02	Basics of Civil and Mechanical Engineering /Basic Electrical & Electronics Engineering $	3	2	4	70	30	25	125
	ES-03	Engineering Mechanics	3	2	4	70	30	25	125
AEC	AE-01	Communication Skills	1	2	2		25	25	50
CC	CC-01	Sports and Yoga or NSS/NCC/UBA (Liberal Learning Course-I)	1	2	2			25	25
SEC	SE-01	Workshop Practices		2	1			25	25
		Total	**14**	**14**	**21**	**280**	**145**	**175**	**600**
		Student Induction Program**							

Semester II (Common for All Engineering Branches)

Course Type	*Course Code*	*Name of the Course*	*Engagement Hours*		*Credits*	*FA*	*SA*		*Total*
			L	*P*		*ESE*	*ISE*	*ICA*	
BSC	BS-01/ BS-02	Engineering Physics / Engineering Chemistry $	3	2	4	70	30	25	125
	BS-04	Engineering Mathematics – II	3	2	4	70	30	25	125
ESC	ES-01/ ES-02	Basics of Civil and Mechanical Engineering / Basic Electrical & Electronics Engineering $	3	2	4	70	30	25	125
		Engineering Graphics and CAD		4	2		25	50	75
SEC	SE-02	Data Analysis and Programming Skills	1	2	2		25	25	50
CC	CC-02	Professional Personality Development (Liberal Learning Course-II)	1	2	2		25	25	50
IKS	IKS-01	Introduction to Indian Knowledge System	2		2		25	25*	50
		Total	**13**	**14**	**20**	**210**	**190**	**200**	**600**
		Democracy, Elections and Good Governance *	**1**			**50**			

***For IKS activity report should be submitted**

BSC- Basic Science Course, ESC- Engineering Science Course, PCC- Programme Core Course ,

AEC- Ability Enhancement Course, IKS- Indian Knowledge System, CC- Co-curricular Courses ,

VSEC-Vocational and Skill Enhancement Course

- Legends used–

L	Lecture	FA	Formative Assessment
T	Tutorial	SA	Summative Assessment
P	Lab Session	ESE	End Semester Examination
		ISE	In Semester Evaluation
		ICA	Internal Continuous Assessment

- **Notes-**

1. $ - Indicates approximately half of the total students at F. Y. will enroll under Group A and remaining will enroll under Group B.

   Group A will take up course of Engineering Physics (theory & laboratory) in Semester I and will take up course of Engineering Chemistry (theory & laboratory) in semester II.

   Group B will take up course of Engineering Chemistry (theory & laboratory) in Semester I and will take up course of Engineering Physics (theory & laboratory) in semester II.

2. # - For the Course (C113) Basic Electrical & Electronics Engineering, Practicals of Basic Electrical Engineering and Basic Electronics Engineering will be conducted in alternate weeks.

3. @ - For the Course (C113) Basics of Civil and Mechanical Engineering, Practicals of Basics of Civil Engineering and Basics of Mechanical Engineering will be conducted in alternate weeks.

4. In Semester Evaluation (ISE) marks shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level.

   Internal Continuous Assessment Marks (ICA) is calculated based upon student's performance during laboratory sessions / tutorial sessions.

5. *- Democracy, Elections & Good Governance is mandatory course. The marks earned by student with this course shall not be considered for calculation of SGPA/CGPA. However, student must complete End Semester Examination (ESE) of 50 marks (as prescribed by university) for fulfillment of this course. This course is not considered as a passing head for counting passing heads for ATKT. However, student must pass this subject for award of the degree.
6. Student must complete induction program of minimum five days before commencement of the regular academic schedule at the first semester.

**** GUIDELINES FOR INDUCTION PROGRAM (C119)**

New entrants into an Engineering program come with diverse thoughts, mind set and different social, economic, regional and cultural backgrounds. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose.

An induction program for the new UG entrant students is proposed at the commencement of the first semester. It is expected to complete this induction program before commencement of the regular academic schedule.
Its purpose is to make new entrants comfortable in their new environment, open them up, set a healthy daily routine for them, create bonding amongst the peers as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.
The Induction Program shall encompass (but not limited to) below activity –

1. Physical Activities
2. Creative Arts
3. Exposure to Universal Human Values
4. Literary Activities
5. Proficiency Modules
6. Lectures by Experts / Eminent Persons
7. Visit to Local Establishments like Hospital /Orphanage
8. Familiarization to Department

Induction Program Course do not have any marks or credits however performance of students for Induction Program is assessed at institute level using below mandatory criteria –

1. Attendance and active participation
2. Report writing

PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF SCIENCE & TECHNOLOGY

NEP 2020 Compliant Curriculum

With effect from 2024-2025

Semester -III

Distribution	*Course Code*	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*			*Total*
			L	*T*	*P*		*ESE*	*ISE*	*ICA*	*OE/ POE*	
PCC	MECHPCC-01	Applied Thermodynamics	2	-	2	03	70	30	25	-	125
PCC	MECHPCC-02	Manufacturing Processes	2	-	2	03	70	30	-	25	125
PCC	MECHPCC-03	Mechanics of Materials	3	1		04	70	30	25		125
CEP/FP	MECHFP-01	Mini-Project on Workshop Practice	-	-	4	02	-	-	50	25	75
Entrepreneurship	EM-01	Product Development and Entrepreneurship	1	1	-	02	-	50	25	-	75
OE	OE-01	Open Elective-01	2	-	2	03	70	30	25	-	125
MDM	MDM-01	Multidisciplinary Minor-I	2	-	2	03	70	30	25	-	125
VEC	VEC-01	Universal Human Values	1	-	2	02	50*		25	-	75
		Total	**13**	**2**	**14**	**22**	**400**	**200**	**200**	**50**	**850**
		Environmental Studies	**1**								

*For VEC-01 MCQ-based examination to be conducted.

PCC- Programme Core Course, CEP/FP – Community Engagement Project/Field Project, EM-01: Entrepreneurship/Management,
OE- Open Elective, MDM-Multidisciplinary Minor, VEC- Value Education Course, MDM – Multidisciplinary Minor: It should be selected from other UG engineering minor program.

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FACULTY OF SCIENCE & TECHNOLOGY

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Semester -IV

Distribution	*Course Code*	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*			*Total*
			L	*T*	*P*		*ESE*	*ISE*	*ICA*	*OE/ POE*	
PCC	MECHPCC-04	Kinematics and Theory of Machine	2	-	2	03	70	30	-	25	125
PCC	MECHPCC-05	Machine Drawing	2	-	2	03	70	30	25	-	125
PCC	MECHPCC-06	Fluid mechanics and Fluid Machines	3	-	2	04	70	30	25	-	125
VSC	MECHVSC-01	Advanced Lab on CAD	1	-	2	02	-		25	25	50
Economic/ Management	EM-02	Project Management and Economics	2	-	-	02	-	25	25	-	50
OE	OE-02	Open Elective-02	2	-	2	03	70	30	25	-	125
MDM	MDM-02	Multidisciplinary Minor-II	2	-	2	03	70	30	25	-	125
VEC	VEC-02	Professional Ethics	1	-	2	02	50*	-	25	-	75
		Total	**15**	-	**14**	**22**	**400**	**175**	**175**	**50**	**800**
		Environmental Studies	**1**				**40**	**10**			**50**

*VEC-02 MCQ-based examination to be conducted.

PCC- Programme Core Course, EM-02: Entrepreneurship/Management, OE- Open Elective, MDM-Multidisciplinary Minor, VSC-Vocational Skill Course, VEC- Value Education Course

MDM – Multidisciplinary Minor: It should be selected from other UG engineering minor program.

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NEP 2020 Compliant Curriculum

With effect from 2025-2026

Semester -V

Distribution	*Course Code*	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*			*Total*
			L	*T*	*P*		*ESE*	*ISE*	*ICA*	*OE/ POE*	
PCC	MECHPCC-07	Advance Manufacturing Technology	2	-	2	03	70	30	25	-	125
PCC	MECHPCC-08	Design of Machine Elements	3	1		04	70	30	25	-	125
PCC	MECHPCC-09	Metallurgy	3	-	2	04	70	30	-	25	125
PEC	MECHPEC-01	Programme Elective Course-I	3	-	2	04	70	30	25	-	125
AEC	AEC-02	Creativity and Design Thinking	1	-	2	02	50*	-	25	-	75
OE	OE-03	Interdisciplinary Mini Project	1	-	2	02	-	-	25	25	50
MDM	MDM-03	Multidisciplinary Minor-III	2	-	2	03	70	30	25	-	125
		Total	**15**	**1**	**12**	**22**	**400**	**150**	**150**	**50**	**750**

*AEC-02 MCQ-based examination to be conducted.

PCC- Programme Core Course, PEC: Programme Elective Courses, OE- Open Elective, AEC- Ability Enhancement Course,

MDM-Multidisciplinary Minor,

MDM – Multidisciplinary Minor: It should be selected from other UG engineering minor program.

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Semester -VI

Distribution	*Course Code*	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*			*Total*
			L	*T*	*P*		*ESE*	*ISE*	*ICA*	*OE/ POE*	
PCC	MECHPCC-10	Transmission System Design	2	1		03	70	30	25		125
PCC	MECHPCC-11	Heat Transfer	2	-	2	03	70	30	-	25	125
PCC	MECHPCC-12	Instrumentation and Control Engineering	2	-	2	03	70	30	25	-	125
PEC	MECHPEC-02	Programme Elective Course-II	3	-	2	04	70	30	25	25	150
PEC	MECHPEC-03	Programme Elective Course -III	3	-	2	04	70	30	25	-	125
SEC	MECHSEC-03	Mini project on Industrial Applications (MPIA)	1	-	2	02	-	-	25	50	75
MDM	MDM-04	Multidisciplinary Minor-IV	2	-	2	03	70	30	25	-	125
		Total	**15**	**1**	**12**	**22**	**420**	**180**	**150**	**100**	**850**

PCC- Programme Core Course, PEC: Programme Elective Courses, MDM-Multidisciplinary Minor, SEC- Skill Enhancement Course

MDM – Multidisciplinary Minor: It should be selected from other UG engineering minor program.

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NEP 2020 Compliant Curriculum

With effect from 2026-2027

Semester -VII

Distribution	*Course Code*	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*			*Total*
			L	*T*	*P*		*ESE*	*ISE*	*ICA*	*OE/ POE*	
PCC	MECHPCC-13	Automation and Robotics	3	-	-	03	70	30	-	-	100
PCC	MECHPCC-14	Refrigeration and Air Conditioning	2	-	2	03	70	30	25	-	125
PEC	MECHPEC-04	Programme Elective Course -IV or MOOCS ##	4	-	-	04	100	-	-	-	100
Project	MECHProject	Capstone project		-	8*	04	-	-	100	100	200
RM	RM	Research Methodology and IPR	3	-	2	04	70	30	25	-	125
MDM	MDM-05	Multidisciplinary Minor-V	2	-		02	70	30	-	-	100
		Total	**14**	-	**12**	**20**	**380**	**120**	**150**	**100**	**750**

Students should attend Moocs in 4 hrs.

PCC- Programme Core Course, PEC: Programme Elective Courses, RM-Research Methodology, MDM-Multidisciplinary Minor

*Load based on the project groups

MDM – Multidisciplinary Minor: It should be selected from other UG engineering minor program.

List of Moocs courses related to MECHPEC04 will be provided by BOS time to time

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NEP 2020 Compliant Curriculum

With effect from 2026-2027

Semester -VIII

Distribution	*Course Code*	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*			*Total*
			L	*T*	*P*		*ESE*	*ISE*	*ICA*	*OE/ POE*	
PCC	MECHPCC-15	Energy Engineering	4#	-	-	04	100	-	-	-	100
PEC	MECHPEC-05	Programme Elective Course-V or MOOCS	4#	-	-	04	100	-	-	-	100
OJT	MECHOJT	On-Job Training	-	-	24	12	-	-	200	100	300
		Total	**8**	**-**	**24**	**20**	**200**	**-**	**200**	**100**	**500**

PCC- Programme Core Course, PEC: Programme Elective Courses, OJT-On job Training

#PCC-15-Students will practice or attend in Self-Learning mode

#PEC-05: - Students will practice or attend in Self-Learning mode or MOOCS.

List of Moocs courses related to MECHPEC05 will be provided by BOS time to time

Basket of Programme Elective Course (PEC)

PEC/Sem	Course code and name
MECHPEC - 01/V	MECHPEC – 01A:Metrology and Quality control MECHPEC – 01B:Internal Combustion Engines MECHPEC – 01C:Product Life cycle Management MECHPEC – 01D:Mechatronics systems
MECHPEC –02/VI	MECHPEC – 02A:Plastic Engineering MECHPEC – 02B: Tool engineering MECHPEC – 02C: Automobile Engineering MECHPEC – 02D: CAD-CAM-CAE
MECHPEC – 03/VI	MECHPEC – 03A:Finite Element Method MECHPEC – 03B: Industrial Engineering MECHPEC – 03C: Power plant and Energy Engineering MECHPEC – 03D: Railway Transportation
MECHPEC – 04/VII **OR**	MECHPEC – 04A: Production and Operation Management MECHPEC – 04B: Supply chain Management MECHPEC – 04C: Industrial Hydraulics and Pneumatics MECHPEC – 04D: Railway systems and Management
MECHPEC – 04/VII	MOOC Courses MECHPEC – 04E: <As per the list provided by BoS>
MECHPEC – 05/VIII **OR**	MECHPEC – 05A: Marketing Management MECHPEC – 05B: Industrial Safety and hazards MECHPEC – 05C: Material Handling System MECHPEC – 05D: Business Economics
MECHPEC – 05/VIII	MOOC Courses MECHPEC – 05E: <As per the list provided by BoS>

A. Multidisciplinary Minor in "Material Science and Energy Engineering"

Semester	Course Code	Course Title
III	MECHMDM-01A	**Fundamentals of Material Science and Engineering**
IV	MECHMDM-02A	**Materials for Technology Development**
V	MECHMDM-03A	**Advanced Materials and Manufacturing Process**
VI	MECHMDM-04A	**Renewable Energy Resources**
VII	MECHMDM-05A	**Energy Conversion Systems**

B. Multidisciplinary Minor in "Industrial and Project Management"

Semester	Course Code	Course Title
III	MECHMDM-01B	**Industrial Management**
IV	MECHMDM-02B	**Production and Operation Management**
V	MECHMDM-03B	**Operation Research**
VI	MECHMDM-04B	**Project Management**
VII	MECHMDM-05B	**Marketing Management**

A. Honors in Robotics Engineering

Semester	*Course Code*	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*			*Total*
			L	*T*	*P*		*ESE*	*ISE*	*ICA*	*OE/ POE*	
III	MechHon-01A	Industrial Robotics	3	-	2	4	70	30	25	-	125
IV	MechHon - 02A	Machine Vision	3	-	2	4	70	30	25	-	125
V	MechHon - 03A	Industrial Networks and Controllers	2	-	2	3	70	30	25	-	125
VI	MechHon - 04A	Advanced topics in Robotics	3	-	2	4	70	30	25	-	125
VII	MechHon - 05A	Mini Project	1	-	4	3	-	-	50	-	50
		Total				**18**	**280**	**120**	**150**		**550**

Honors Course will be for the students of same Program

B. Honors in Electric Vehicle Engineering

Semester	*Course Code*	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*			*Total*
			L	*T*	*P*		*ESE*	*ISE*	*ICA*	*OE/ POE*	
III	MechHon - 01B	Introduction to Automobile Engineering	3	-	2	4	70	30	25	-	125
IV	MechHon - 02B	Introduction to Electric and Hybrid Vehicles	3	-	2	4	70	30	25	-	125
V	MechHon - 03B	Battery Technology and Charging Infrastructure	2	-	2	3	70	30	25	-	125
VI	MechHon - 04B	Advanced topics in Electric Vehicles	3	-	2	4	70	30	25	-	125
VII	MechHon - 05B	Mini project	1	-	4	3	-	-	50	-	50
		Total				**18**	**280**	120	150		550

Honors Course will be for the students of same Program

Honors with Research

Semester	*Course Code*	*Name of the Course*	*Engagement Hours*	*Credits*	*SA*		*Total*
			P		*ICA*	*OE*	
VII	MECHRES-01	Research Project Phase-01	9 #	9	100	100	200
VIII	MECHRES-02	Research Project Phase-02	9 ##	9	100	100	200
		Total	18	18	200	200	400

Along with 9 hours of engagement hours, 4.5 Hrs. activities for preparation for community engagement and service, preparation of reports, etc.

Along with 9 hours of engagement hours 4.5 Hrs. activities for preparation for community engagement and service, preparation of reports, etc. and independent reading during Project Phase 2 and preferably related to Project Phase 2 activities.

These Courses are open for students of all the UG Engineering Program.

Semester: III List of Open Elective - I

Sr. No.	List of Open Electives
1.	OE-01A: Advanced Mathematics and Statistics
2.	OE-01B Digital Marketing and E- Commerce
3.	OE-01C Humanities and Social Sciences
4.	OE-01D Industrial and Quality Management
5.	OE-01E Mathematics for Software and Hardware
6.	OE-01F Soft Skills and Personality Development

Semester: IV List of Open Elective – II

Sr. No.	List of Open Electives
1.	OE-02A Entrepreneurship and Innovation
2.	OE-02B Environmental Sustainability
3.	OE-02C Renewable Energy
4.	OE-02 D Measurement, Instrumentation and Sensors
5.	OE-02E Operation Research
6..	OE-02F Computational Mathematics
7.	OE-02 G Professional Business Communication

Semester: V Open Elective – III

Sr. No.	List of Open Electives
1.	Interdisciplinary Mini Project