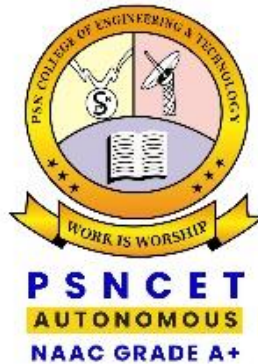


# **PSN COLLEGE OF ENGINEERING AND TECHNOLOGY**

(An Autonomous Institution Recognised by AICTE, New Delhi  
and Affiliated to Anna University, Chennai)

Accredited with A+ Grade by NAAC. An ISO 9001:2015 Certified Institution  
**Melathediyoor, Tirunelveli – 627 152**



## **DEPARTMENT OF MECHANICAL AND AUTOMATION ENGINEERING**

### **CURRICULUM**

### **III TO VIII SEMESTER**

**&**

### **SYLLABUS**

### **(III TO VI SEMESTER) & INTERDISCIPLINARY SERVICE COURSES**

**(REGULATION – 2022)**

<b>INSTITUTE VISION</b>
To emerge as a pioneer institute inculcating engineering education, skills, research, values and ethics.
<b>INSTITUTE MISSION</b>
<ul style="list-style-type: none"> <li>• To achieve greater heights of excellence in technical knowledge and skill development through innovative teaching and learning practices.</li> <li>• To develop the state of art infrastructure to meet the demands of technological revolution.</li> <li>• To improve and foster research in all dimensions for betterment of society.</li> <li>• To develop individual competencies to enhance innovation, employability and entrepreneurship among students.</li> <li>• To instill higher standards of discipline among students, inculcating ethical and moral values for societal harmony and peace.</li> </ul>

<b>DEPARTMENT VISION</b>
<ul style="list-style-type: none"> <li>• To originate the department into a centralized learning, teaching and research domain to produce proficient Mechanical and Automation Engineers encapsulated with entrepreneurship skill to compete the modernized automation Industries with their technical knowledge.</li> </ul>
<b>DEPARTMENT MISSION</b>
<ul style="list-style-type: none"> <li>• To develop the student's technical skill to the excel level of Mechanical and Automation engineers by offering standard engineering education by means of excellent teaching methodologies and creating professionalism with their learning's.</li> <li>• To strengthen the student capability of extracting knowledge and prepare them to compete the current scenario in Automated Industries and Research.</li> <li>• To amalgamate the technically enriched student to the streamline of Human values, ethics, communication skills, lifelong learning throughout the life and to work as a teamwork as well as individual.</li> </ul>

<b>PROGRAM EDUCATIONAL OBJECTIVES (PEOs)</b>	
<b>Sl. No.</b>	<b>PEOs</b>
<b>PEO1</b>	To utilize science and engineering principles together with modern tools in solving control and automation engineering problems, design high quality engineering systems, as well as propose implementable solutions for related interdisciplinary problems.
<b>PEO2</b>	To apply cross functional knowledge, modern computational concepts and tools to accommodate changing needs of society.
<b>PEO3</b>	To apply high standards in the performance of their professional work with ethical, societal and environmental awareness

<b>PROGRAM OUTCOMES</b>			
<b>PO'S No.</b>	<b>KNOWLEDGE</b>	<b>STATEMENT</b>	<b>APPLIANCE</b>
1	Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of Complex engineering problems.	Theory/ Practical / Project work
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.	Theory / Practical / Projects
3	Design / Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet the needs with appropriate consideration for the public health and safety, and the cultural, Societal and environmental considerations.	Theory / Practical / Projects
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.	Theory / Practical
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.	Theory / Practical / Project work
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.	Theory / Industrial visit / In plant training
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.	Theory / Industrial Visit/ In plant Training
8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	Theory / Industrial visit / In plant training
9	Individual and Team Work	Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.	Projects
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.	Projects/ Seminar/ Mini Project
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.	Projects
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.	Projects / Higher Studies

**PROGRAM SPECIFIC OUTCOMES (PSOs)**

**PSO1:** Ability to understand and perform manufacturing and production systems encapsulated with automation.

**PSO2:** Ability to carry out mechanical and electronic systems design and coding for robotic applications.

### SUMMARY SHEET

Semester wise Credits									Credits Total
Semester	I	II	III	IV	V	VI	VII	VIII	
Credits	21	21	21.5	21.5	22	22	25	10	165

Sl.No	Course code	Course Name	Classification		L	T	P	C
<b>SEM - 01</b>								
1	IC610001	Professional English I	IC	Theory	2	0	0	2
2	IC610002	Matrices and Calculus	IC	Theory	2	1	0	3
3	IC610003	Engineering Physics	IC	Theory	3	0	0	3
4	IC610004	Engineering Chemistry	IC	Theory	3	0	0	3
5	CS610005	Problem Solving and 'C' Programming	IC	Theory	3	0	0	3
6	ME610006	Engineering Graphics with CAD	IC	Theory with Practical Component	2	0	2	3
7	IP610101	Physics & Chemistry Laboratory	IC	Practical	0	0	3	1.5
8	IP610102	Programming in 'C' Laboratory	IC	Practical	0	0	3	1.5
9		NCC/NSS/NSO *	IM	Institute Mandatory	1	0	0	0
10	IC610007	Tamil marabu/Heritage of Tamil	IC	Theory	1	0	0	1
		<b>Total</b>			<b>17</b>	<b>1</b>	<b>8</b>	<b>21</b>
<b>SEM - 02</b>								
11	IC620008	Professional English II	IC	Theory with Practical Component	2	0	2	3
12	IC620009	Transforms & Partial Differential Equations	IC	Theory	2	1	0	3
13	IC620010	Engineering Materials (for Non Circuit Branches)	IC	Theory	3	0	0	3
	IC620011	Semiconductor Physics(for Circuit Branches)						
14	ME620012	Engineering Mechanics(for Non Circuit Branches)	PC	Theory with project	3	0	0	3
	CS620013	Fundamentals of Artificial Intelligence (for Circuit Branches)						
15	CS620014	Python Programming	IC	Theory	3	0	0	3
16	ME620015	Basic Engineering	IC	Theory	3	0	0	3

17	IP620103	Python Laboratory	IC	Practical	0	0	3	1.5
18	IP620104	Engineering practice laboratory	IC	Practical	0	0	3	1.5
19	IM610401	Environmental Studies	IM	Institute Mandatory	2	0	0	0
20	IC620016	Tamils and technology	IC	Theory	1	0	0	1
		<b>Total</b>			<b>25</b>	<b>1</b>	<b>8</b>	<b>22</b>
<b>SEM - 03</b>								
21	IC630017	Numerical Methods and Statistics (Common to MECH & MAE)	IC	Theory	3	0	0	3
22	ME630201	Engineering Thermodynamics (Common to MECH & MAE)	PC	Theory	3	0	0	3
23	ME630202	Fluid Mechanics and Machinery (Common to MECH, Aero and MAE)	PC	Theory	3	0	0	3
24	ME630203	Manufacturing Technology (Common to MECH & MAE)	PC	Theory with project	3	0	0	3
25	ME630204	Strength of materials(Common to MECH & MAE)	PC	Theory with Practical Component	2	0	2	3
26		Professional elective-1	PE	Theory	3	0	0	3
27	ME630301	Fluid Mechanics and Machinery (Common to MECH , MAE &AERO)	PC	Practical	0	0	3	1.5
28	ME630302	Manufacturing Technology Laboratory (Common to MECH & MAE)	PC	Practical	0	0	3	1.5
29	ME630501	Integrated Aptitude Skills - I (Lower)	EEC	skill based course	0	0	1	0.5
30	IM630402	Universal Human Values	IM	Theory	2	0	0	0
		<b>Total</b>			<b>19</b>	<b>0</b>	<b>9</b>	<b>21.5</b>
<b>SEM - 04</b>								
31	IC640018	Boundary value problems and probability distributions (Common to MECH & MAE)	IC	Theory	3	0	0	3
32	ME640205	Engineering Materials and Metallurgy (Common to MECH & MAE)	PC	Theory with Practical Component	2	0	2	3
33	ME640206	Thermal Engineering (Common to MECH & MAE)	PC	Theory with project	3	0	0	3
34	EE640901	Electrical Drives and Control (Common to MECH & MAE)	PC	Theory	3	0	0	3
35		Professional elective-2	PE	Theory	3	0	0	3
36		Institute elective -1	IE	Theory	3	0	0	3

37	ME640303	Thermal Engineering Laboratory(Common to MECH & MAE)	PC	Practical	0	0	3	1.5
38	EE640902	Electrical Drives and Control Laboratory (Common to MECH & MAE)	PC	Practical	0	0	3	1.5
39	ME640502	Integrated Aptitude Skills - II (Lower)	EEC	skill based course	0	0	1	0.5
40		Inplant Training (2 Weeks)	IM					0
		<b>Total</b>			<b>17</b>	<b>0</b>	<b>9</b>	<b>21.5</b>
<b>SEM - 05</b>								
41	ME650207	Theory of Machines (Common to MECH & MAE)	PC	Theory with Practical Component	2	0	2	3
42	ME650208	Engineering Metrology and Measurements(Common to MECH & MAE)	PC	Theory with project	3	0	0	3
43	ME650209	Design of Machine Elements (Common to MECH & MAE)	PC	Theory	2	1	0	3
44		Institute elective -2	IE	Theory	3	0	0	3
45		Professional elective-3	PE	Theory	3	0	0	3
46		Professional elective-4	PE	Theory	3	0	0	3
47	ME650304	Dynamics of Machinery Laboratory(Common to MECH & MAE)	PC	Practical	0	0	3	1.5
48	ME650305	Computer Numerical Control Laboratory (Common to MECH & MAE)	PC	Practical	0	0	3	1.5
49	ME650503	Integrated Aptitude Skills - I (Higher)	EEC	skill based course	0	0	2	1
50	ME650801	BIS	PM	Theory	2	0	0	0
		<b>Total</b>			<b>19</b>	<b>0</b>	<b>10</b>	<b>22</b>
<b>SEM - 06</b>								
51	ME660210	Heat and Mass Transfer (Common to MECH & MAE)	PC	Theory with project	2	1	0	3
52	ME660211	Design of Transmission Systems(Common to MECH & MAE)	PC	Theory with Practical Component	2	0	2	3
53	ME660212	CAD/CAM/CAE(Common to MECH & MAE)	PC	Theory	3	0	0	3
54		Institute elective -3	IE	Theory	3	0	0	3
55		Professional elective-5	PE	Theory	3	0	0	3
56		Professional elective-6	PE	Theory	3	0	0	3
57	ME660306	Heat Transfer Laboratory(Common to MECH & MAE)	PC	Practical	0	0	3	1.5



58	ME660307	CAD/CAM Laboratory (Common to MECH & MAE)	PC	Practical	0	0	3	1.5
59	ME660504	Training in Centre for excellence - BOSCH	EEC	Skill based course	0	0	2	1
60	IM660403	Professional Ethics(Common to MECH & MAE)	IM	Theory	2	0	0	0
61		Internship	IM					0
		<b>Total</b>			<b>19</b>	<b>0</b>	<b>10</b>	<b>22</b>
<b>SEM - 07</b>								
62	ME670213	Principles of Management	PC	Theory	3	0	0	3
63	ME670214	Finite Element Analysis (Common to MECH & MAE)	PC	Theory with project	3	0	0	3
64	ME670215	Mechatronics and Robotics	PC	Theory with Practical Component	2	0	2	3
65		Institute Elective-4	IE	Theory	3	0	0	3
66		Professional Elective 7	PE	Theory	3	0	0	3
67		Professional Elective-8	PE	Theory	3	0	0	3
68	ME670308	3D Printing (Common to MAE)	PC	Practical	0	0	3	1.5
69	ME670309	Computer Aided Simulation and Analysis Laboratory (Common to MECH & MAE)	PC	Practical	0	0	3	1.5
70	MG670019	Innovation Entrepreneurship and Startups	IC	Theory	3	0	0	3
71	ME670505	Advanced career development	EEC	skill based course	0	0	2	1
		<b>Total</b>			<b>20</b>	<b>0</b>	<b>10</b>	<b>25</b>
<b>SEM - 08</b>								
1	510303	Project Work	EEC	Practical	0	0	20	10
		<b>Total</b>			<b>0</b>	<b>0</b>	<b>20</b>	<b>10</b>

<b>VERTICAL 1: ENERGY TECHNOLOGIES (COMMON TO MAE&amp;MECH)</b>								
1	ME606101	Power Plant Engineering	PE	Theory	3	0	0	3
2	ME606102	Heating Ventilation and Air Conditioning	PE	Theory	3	0	0	3
3	ME606103	Thermal Management of Batteries and Fuel Cells	PE	Theory	3	0	0	3
4	ME606104	Refrigeration and Air Conditioning	PE	Theory	3	0	0	3
5	ME606105	Internal Combustion Engine	PE	Theory	3	0	0	3
6	ME606106	Air Breathing Engines	PE	Theory	3	0	0	3
7	ME606107	Design of thermal systems	PE	Theory	3	0	0	3
8	ME606108	<u>Inverse Methods in Heat Transfer (NPTEL)</u>	PE	Theory	3	0	0	3
9	ME606109	<u>Fundamentals of combustion for propulsion (NPTEL)</u>	PE	Theory	3	0	0	3
10	ME606110	<u>Fundamentals of Gas Dynamics (NPTEL)</u>	PE	Theory	3	0	0	3
<b>VERTICAL 2: ENERGY TECHNOLOGIES (COMMON TO MAE&amp;MECH)</b>								
1	ME606201	Fuel Cell and Hydrogen Technology	PE	Theory	3	0	0	3
2	ME606202	Alternate Energy Fuels	PE	Theory	3	0	0	3
3	ME606203	Bio Energy Conversion Technologies	PE	Theory	3	0	0	3
4	ME606204	Energy Storage Devices	PE	Theory	3	0	0	3
5	ME606205	Energy Conservation and Waste heat recovery	PE	Theory	3	0	0	3
6	ME606206	Solar energy technologies	PE	Theory	3	0	0	3
7	ME606207	Green energy sources	PE	Theory	3	0	0	3
8	ME606208	<u>Micro and nano scale energy transport (NPTEL)</u>	PE	Theory	3	0	0	3
9	ME606209	<u>Design and Optimization of Energy systems (NPTEL)</u>	PE	Theory	3	0	0	3
10	ME606210	<u>Electric vehicles and Renewable energy (NPTEL)</u>	PE	Theory	3	0	0	3
<b>VERTICAL 3: LOGISTICS AND SUPPLY CHAIN MANAGEMENT (COMMON TO MAE&amp;MECH)</b>								
1	ME606301	Warehousing Automation	PE	Theory	3	0	0	3
2	ME606302	Business Process Re-engineering	PE	Theory	3	0	0	3
3	ME606303	Total Quality Management	PE	Theory	3	0	0	3
4	ME606304	Project Management (Common to MAE, MECH, AERO)	PE	Theory	3	0	0	3
5	ME606305	Industrial psychology	PE	Theory	3	0	0	3
6	ME606306	Resource management techniques	PE	Theory	3	0	0	3
7	ME606307	Enterprise resource planning	PE	Theory	3	0	0	3
8	ME606308	<u>Business Development: From Start to Scale (NPTEL)</u>	PE	Theory	3	0	0	3
9	ME606309	<u>Patent Law for Engineers and Scientists (NPTEL)</u>	PE	Theory	3	0	0	3
10	ME606310	<u>Business Analysis for Engineers (NPTEL)</u>	PE	Theory	3	0	0	3
<b>VERTICAL 4: MATERIALS SCIENCES (Common to MAE&amp;MECH)</b>								
1	MA606101	Composite Materials	PE	Theory	3	0	0	3
2	MA606102	Tribology	PE	Theory	3	0	0	3
3	MA606103	Mechanical Behaviour of Materials	PE	Theory	3	0	0	3
4	MA606104	Polymer Technology	PE	Theory	3	0	0	3
5	MA606105	Smart Materials	PE	Theory	3	0	0	3
6	MA606106	Electrical, Electronic and Magnetic materials	PE	Theory	3	0	0	3
7	MA606107	Fracture mechanics	PE	Theory	3	0	0	3
8	MA606108	Basics of Materials Engineering (NPTEL)	PE	Theory	3	0	0	3
9	MA606109	Transport Phenomena in Materials (NPTEL)	PE	Theory	3	0	0	3

10	MA606110	Welding Processes (NPTEL)	PE	Theory	3	0	0	3
<b>VERTICAL 5: MANUFACTURING ENGINEERING (Common to MAE&amp;MECH)</b>								
1	MA606201	Computer Integrated Manufacturing	PE	Theory	3	0	0	3
2	MA606202	Industry 4.0	PE	Theory	3	0	0	3
3	MA606203	Flexible Manufacturing Systems (Common to MAE, MECH, AERO)	PE	Theory	3	0	0	3
4	MA606204	Additive Manufacturing Processes	PE	Theory	3	0	0	3
5	MA606205	Lean Manufacturing	PE	Theory	3	0	0	3
6	MA606206	Rapid Prototyping	PE	Theory	3	0	0	3
7	MA606207	Theory of metal cutting	PE	Theory	3	0	0	3
8	MA606208	Steel Quality : Role of Secondary Refining & Continuous Casting (NPTEL)	PE	Theory	3	0	0	3
9	MA606209	Laser Based Manufacturing (NPTEL)	PE	Theory	3	0	0	3
10	MA606210	Forming (NPTEL)	PE	Theory	3	0	0	3
<b>VERTICAL 6: AUTOMATION</b>								
1	MA606301	Machine Learning	PE	Theory	3	0	0	3
2	MA606302	Industrial Automation and Control(NPTEL)	PE	Theory	3	0	0	3
3	MA606303	Industrial Automation system	PE	Theory	3	0	0	3
4	MA606304	Smart Mobility and Intelligent Vehicles	PE	Theory	3	0	0	3
5	MA606305	Artificial Intelligence and Expert System	PE	Theory	3	0	0	3
6	MA606306	Manufacturing Automation (NPTEL)	PE	Theory	3	0	0	3
7	MA606307	Microprocessor in Automation	PE	Theory	3	0	0	3
8	MA606308	Robotics: Basics and Selected Advanced Concepts (NPTEL)	PE	Theory	3	0	0	3
9	MA606309	Microcontrollers and PLC	PE	Theory	3	0	0	3
10	MA606310	Field and Service Robotics	PE	Theory	3	0	0	3
<b>VERTICAL 7: DIVERSIFIED COURSES GROUP 1</b>								
1	MA606401	Industrial Layout Design and Safety	PE	Theory	3	0	0	3
2	MA606402	Automation System Design	PE	Theory	3	0	0	3
3	MA606403	Mechanical Vibrations and Controls	PE	Theory	3	0	0	3
4	MA606404	Design of Jigs and Fixtures	PE	Theory	3	0	0	3
5	MA606405	Operations Research	PE	Theory	3	0	0	3
6	MA606406	Welding Technology	PE	Theory	3	0	0	3
7	MA606407	Turbo Machinery	PE	Theory	3	0	0	3
8	MA606408	Design for Quality, Manufacturing and Assembly (NPTEL)	PE	Theory	3	0	0	3
9	MA606409	Oil Hydraulics and Pneumatics(NPTEL)	PE	Theory	3	0	0	3
10	MA606410	Advanced Operations Research(NPTEL)	PE	Theory	3	0	0	3
<b>VERTICAL 8: DIVERSIFIED COURSES GROUP 2</b>								
1	MA606501	Maintenance Engineering	PE	Theory	3	0	0	3
2	MA606502	Design of Pressure Vessels	PE	Theory	3	0	0	3
3	EE606604	Virtual Instrumentation (Common to MAE & EEE)	PE	Theory	3	0	0	3
4	MA606503	Computational Fluid Dynamics	PE	Theory	3	0	0	3
5	MA606504	Fluid Power Control System	PE	Theory	3	0	0	3
6	MA606505	Hydraulics and Pneumatics	PE	Theory	3	0	0	3
7	MA606506	Industrial Networking	PE	Theory	3	0	0	3

8	MA606507	Functional and Conceptual Design(NPTEL)	PE	Theory	3	0	0	3
9	MA606508	Vehicle Dynamics (NPTEL)	PE	Theory	3	0	0	3
10	MA606509	Microfluidics (NPTEL)	PE	Theory	3	0	0	3

#### INSTITUTE ELECTIVE I

S.No	Course code	Course Name	Dept	Classification	L	T	P	C
1	MA607116	Non-Destructive Testing	MAE	IE Theory	3	0	0	3
2	MA607117	Unconventional Machining Process	MAE	IE Theory	3	0	0	3

#### INSTITUTE ELECTIVE II

S.No	Course code	Course Name	Dept	Classification	L	T	P	C
1	MA607215	Sensors and Instrumentation	MAE	IE Theory	3	0	0	3
2	MA607216	Engineering Economics	MAE	IE Theory	3	0	0	3
3	MA607217	Process planning and Cost Estimation	MAE	IE Theory	3	0	0	3

#### INSTITUTE ELECTIVE III

S.No	Course code	Course Name	Dept	Classification	L	T	P	C
1	MA607315	Robot Motion Planning	MAE	IE Theory	3	0	0	3
2	MA607316	Intellectual Property Rights	MAE	IE Theory	3	0	0	3

#### INSTITUTE ELECTIVE IV

S.No	Course code	Course Name	Dept	Classification	L	T	P	C
1	MA607414	Disaster Management	MAE	IE Theory	3	0	0	3
2	MA607415	Human resource management	MAE	IE Theory	3	0	0	3
3	MA607416	Hazardous Waste Management	MAE	IE Theory	3	0	0	3