

Mahatma Education Society's

Pillai College of Engineering

(Autonomous)

Affiliated to University of Mumbai

Dr. K. M. Vasudevan Pillai's Campus, Sector 16, New Panvel – 410 206.



Department of Automobile Engineering

Syllabus

of

B.Tech. in Automobile Engineering

for

The Admission Batch of AY 2023-24

First Year - Effective from Academic Year 2023-24

Second Year - Effective from Academic Year 2024-25

Third Year - Effective from Academic Year 2025-26

Fourth Year - Effective from Academic Year 2026-27

as per

Choice Based Credit and Grading System

Mahatma Education Society's
Pillai College of Engineering

Vision

Pillai College of Engineering (PCE) will admit, educate and train a diverse population of students who are academically prepared to benefit from the Institute's infrastructure and faculty experience, to become responsible professionals or entrepreneurs in a technical arena. It will further attract, develop and retain, dedicated, excellent teachers, scholars and professionals from diverse backgrounds whose work gives them knowledge beyond the classroom and who are committed to making a significant difference in the lives of their students and the community.

Mission

To develop professional engineers with respect for the environment and make them responsible citizens in technological development both from an Indian and global perspective. This objective is fulfilled through quality education, practical training and interaction with industries and social organizations.



Dr. K. M. Vasudevan Pillai's Campus, Sector - 16, New Panvel – 410 206

Department of Automobile Engineering

Vision

To develop an established institution of Automobile Engineering which will become a centre of quality standardization, research and academics through innovation, high quality teaching, projects and world class technology.

Mission

To provide quality education and knowledge that is well-grounded in the fundamental principles of engineering, which fosters innovation, and prepares students for leadership positions and successful careers in industry, academia or entrepreneurial ventures.

Program Educational Objectives (PEOs):

- I. Students should develop sound fundamental knowledge in mathematics, science and automobile engineering.
- II. Students would acquire an ability to function productively as an individual as well as in a team and are well versed in using modern technology and equipment to solve real world problems.
- III. Students would be provided with opportunities to develop an instinct for innovation and skills as researchers through industry collaboration, practical training, laboratory experience, projects and the various courses offered to them.
- IV. Students would inculcate a professional and ethical attitude, good leadership qualities and commitment to social responsibilities in their thought process.
- V. Students will be encouraged to understand the importance of lifelong learning, working on contemporary global issues and to become a successful entrepreneur.

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.
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.

Program Specific Outcomes (PSOs):

1. Student should be able to generate and develop ideas that can result in self-employment (eg. Start-ups) and create more jobs.
2. Students should be updated with the latest trends in automobile engineering, beyond curriculum by way of doing internships and research projects.

The Autonomous status of the institute has given an opportunity to design and frame the curriculum in such a way that it incorporates all the needs and requirements of recent developments in all fields within the scope of the technical education. This curriculum will help graduates to attain excellence in their respective field. The curriculum has a blend of basic and advanced courses along with provision of imparting practical knowledge to students through minor and major projects. The syllabus has been approved and passed by the Board of Studies.

Outcome based education is implemented in the academics and every necessary step is undertaken to attain the requirements. Every course has its objectives and outcomes defined in the syllabus which are met through continuous assessment and end semester examinations. Evaluation is done on the basis of Choice Based Credit and Grading System (CBCGS). Optional courses are offered at department and institute level. Selection of electives from the same specialization makes the student eligible to attain a B. Tech. degree with respective specialization.

Every learner/student will be assessed for each course through (i) an Internal/Continuous assessment during the semester in the form of either Practical Performance, Presentation, Demonstration or written examination and (ii) End Semester Examination (ESE), in the form of either theory or viva voce or practical, as prescribed by the respective Board Studies and mentioned in the assessment scheme of the course content/syllabus. This system involves the Continuous Evaluation of students' progress Semester wise. The number of credits assigned with a course is based on the number of contact hours of instruction per week for the course. The credit allocation is available in the syllabus scheme of each semester.

The performance of a learner in a semester is indicated by a number called Semester Grade Performance Index (SGPI). The SGPI is the weighted average of the grade points obtained in all the courses by the learner during the semester. For example, if a learner passes five courses (Theory/labs./Projects/ Seminar etc.) in a semester with credits C₁, C₂, C₃, C₄ and C₅ and learners grade points in these courses are G₁, G₂, G₃, G₄ and G₅ respectively, then learners SGPI is equal to:

$$SGPI = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The learner's up to date assessment of the overall performance from the time s/he entered for the programme is obtained by calculating a number called the Cumulative Grade Performance Index (CGPI), in a manner similar to the calculation of SGPI. The CGPI therefore considers all the courses mentioned in the scheme of instructions and examinations, towards the

minimum requirement of the degree learners have enrolled for. The CGPI at the end of this semester is calculated as,

$$CGPI = \frac{C_1G_1 + C_2G_2 + C_3G_3 + \dots + C_i * G_i + \dots + C_nG_n}{C_1 + C_2 + C_3 + \dots + C_i + \dots + C_n}$$

The Department of Automobile Engineering offers a B. Tech. programme in Automobile Engineering. This is an eight-semester course. The complete course is a 169 credit course which comprises basic sciences and mathematics, core courses, projects, internship, MOOC course and elective courses. The elective courses are distributed over 7 specializations. The specializations are:

1. Electric Vehicles
2. Additive Manufacturing
3. Motor Sports Engineering
4. Autonomous Vehicles
5. Transportation
6. Supply Chain Management and Logistics
7. Automotive Designing

The students also have a choice of opting for Institute level specializations. These are

1. Business and Entrepreneurship
2. Bioengineering
3. Engineering Design
4. Art and Humanities
5. Applied Science
6. Life Skills, Repair, Maintenance and Safety

As minimum requirements for the credits to be earned for the B.Tech in Automobile Engineering program, a student will have to complete a minimum of three specializations of which two are to be chosen from the Department list and one has to be from the Institute level specialization list. In order to complete each specialization, a minimum of three courses under that specialization has to be completed.

- ***At least One MOOC course is highly recommended to be completed with certification in the four years of study.***

The credit requirement for the B.Tech. In Automobile Engineering course is tabulated in Table 1.

Table 1. Credit Requirement for B.Tech in Automobile Engineering

Category	Credits
Humanities and Social Sciences including Management courses	18
Basic Science courses	18
Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc	12
Professional core courses	52
Professional Elective courses relevant to chosen specialization/branch	17
Open subjects – Electives from other technical and /or emerging subjects	34
Project work, seminar and internship in industry or elsewhere	15
Mandatory Courses - Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge	2
Human Values	2
Total Credits	170

**Program Structure for
Bachelor of Technology in Automobile Engineering
W.E.F. A.Y.2023-24
Semester I**

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
FY101	Engineering Mathematics I	BSC	3	2	3	1	4
FY102	Engineering Physics I	BSC	2	1	2	0.5	2.5
FY103	Engineering Chemistry I	BSC	2	1	2	0.5	2.5
FY105	Basic Electrical Engineering	ESC	3	-	3	-	3
FY106	Engineering Mechanics	ESC	3	2	3	1	4
FY109	Basic Electrical Engineering Lab	Skill	-	2	-	1	1
FY112	Engineering Workshop-I	Skill	-	2	-	2	1
FY113	Indian Knowledge Systems	HSSM	-	2+2 [#]	-	2	2
FY114	Co-curricular course-I	Liberal Learning	-	4	-	2	2
Total			13	18	13	10	22

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
		1	2	Avg.					
FY101	Engineering Mathematics I	40	40	40	60	2	25	-	125
FY102	Engineering Physics I	30	30	30	45	2	25	-	100
FY103	Engineering Chemistry I	30	30	30	45	2	25	-	100
FY105	Basic Electrical Engineering	40	40	40	60	2	-	-	100
FY106	Engineering Mechanics	40	40	40	60	2	25	25	150
FY109	Basic Electrical Engineering Lab	-	-	-	-	-	25	25	50
FY112	Engineering Workshop-I	-	-	-	-	-	50	-	50
FY113	Indian Knowledge Systems	-	-	-	-	-	50	-	50
FY114	Co-curricular course-I	-	-	-	-	-	50	-	50
Total									775

**Program Structure for
Bachelor of Technology in Automobile Engineering
W.E.F. A.Y.2023-24
Semester II**

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
FY115	Engineering Mathematics II	BSC	3	2	3	1	4
FY116	Engineering Physics II	BSC	2	1	2	0.5	2.5
FY117	Engineering Chemistry II	BSC	2	1	2	0.5	2.5
FY120	Engineering Drawing	ESC	3	2	3	1	4
FY119	Python Programming	ESC	3	-	3	-	3
FY121	Professional Communication and Ethics-I	HSSM	1	2	1	1	2
FY122	Python Programming Lab	Skill	-	2	-	1	1
FY124	Engineering Workshop-II	Skill	-	2	-	1	1
FY125	Co-curricular Course-II	Liberal learning	-	4	-	4	2
Total			14	16	14	10	22

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract./ Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs.)			
		1	2	Avg.					
FY115	Engineering Mathematics II	40	40	40	60	2	25	-	125
FY116	Engineering Physics II	30	30	30	45	2	25	-	100
FY117	Engineering Chemistry II	30	30	30	45	2	25	-	100
FY120	Engineering Drawing	40	40	40	60	3	25	25	150
FY119	Python Programming	40	40	40	60	2	-	-	100
FY121	Professional Communication and Ethics-I	20	20	20	30	1	25	-	75
FY122	Python Programming Lab	-	-	-	-	-	25	25	50
FY124	Engineering Workshop-II	-	-	-	-	-	50	-	50
FY125	Co-curricular Course-II	-	-	-	-	-	50	-	50
Total									800

**Program Structure for Second Year
Bachelor of Technology in Automobile Engineering
W.E.F. A.Y. 2024-25
Semester III**

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
AE201	Production Technology	PCC	3	-	3	-	3
AE202	Engineering Mathematics III*	MD M	2	-	2	-	2
AE203	Strength of Materials*	MD M	3	2	3	1	4
AE204	Thermodynamics*	PCC	3	-	3	-	3
AE205	Engineering Metallurgy and Automotive Materials	PCC	3	2	3	1	4
AE206	Computer Aided Drafting	VSEC	-	2	-	1	1
AE207	CNC and Additive Manufacturing Lab	VSEC	-	2	-	1	1
AE 208	Human Values and Social Ethics	HSSM	2	-	2	-	2
AE291	Minor Project I	CEP		4	-	2	2
Total			16	12	16	6	22

Course Code	Course Name	Examination Scheme								
		Theory					Term Work	Pract./Oral	Total	
		Internal Assessment			End Sem Exam	Exam Duration (Hrs.)				
		1	2	Avg.						
AE 201	Production Technology	40	40	40	60	2	-	-	100	
AE 202	Engineering Mathematics III*	30	30	30	45	2	-	-	75	
AE 203	Strength of Materials*	40	40	40	60	2	25	25	150	
AE 204	Thermodynamics*	40	40	40	60	2	-	-	100	
AE 205	Engineering Metallurgy and Automotive Materials	40	40	40	60	2	25	-	125	
AE 206	Computer Aided Drafting	-	-	-	-	-	25	50	75	
AE 207	CNC and Additive Manufacturing Lab	-	-	-	-	-	25	25	50	
AE 208	Human Values and Social Ethics	-	-	-	-	-	50	-	50	
AE291	Minor Project I	25(Mid Sem assessment)						25	25	75
Total									800	

* - Common with B.Tech in Mechanical Engineering

**Program Structure for
Bachelor of Technology in Automobile Engineering
W.E.F. A.Y. 2024-25
Semester IV**

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
AE 209	Automotive Engines & Combustion	PCC	3	2	3	1	4
AE 210	Theory of Machines & Mechanisms*	PCC	3	2	3	1	4
AE 211	Fluid Mechanics	VSEC	3	-	3	-	3
AE 212	Elements of Machine Design	PCC	3	2	3	1	4
AE 213	Engineering Mathematics-IV	MD M	2	-	2	-	2
AE 214	Data Science	AEP	-	4	-	2	2
AE 292	Minor Project II	CEP	-	4	-	2	2
Total			14	14	14	7	21

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs.)			
		1	2	Avg.					
AE 208	Automotive Engines & Combustion	40	40	40	60	2	25	25	150
AE 209	Theory of Machines & Mechanisms*	40	40	40	60	2	25	25	150
AE 210	Fluid Mechanics	40	40	40	60	2	25	-	125
AE 211	Elements of Machine Design	40	40	40	60	2	25	25	100
AE 212	Engineering Mathematics-IV	30	30	30	45	2	-	-	75
AE 213	Data Science	-	-	-	-	-	50	25	75
AE 292	Minor Project II	25 (Mid Sem assessment)					25	25	75
Total									750

* - Common with B.Tech in Mechanical Engineering

**Program Structure for
Bachelor of Technology in Automobile Engineering
W.E.F. A.Y. 2025-26
Semester V**

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
AE 301	Finite Element Analysis*	PCC	3	2	3	1	4
AE 302	Heat Transfer	MD M	3	-	3	-	3
AE 303	Automotive Systems	PCC	3	2	3	1	4
AE 304	Controls Engineering and Model based Systems	MD M	2	2	2	1	3
AE 3xx	Department Elective I	PEC	3	-	3	-	3
IL 3xx	Institute Elective I	OE	3	-	3	-	3
AE 391	Minor Project III	CEP	-	2	-	1	1
Total			17	8	17	4	21

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract./Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
		1	2	Avg.					
AE 301	Finite Element Analysis*	40	40	40	60	2	25	25	150
AE 302	Heat Transfer	40	40	40	60	2	25	-	125
AE 303	Automotive Systems	40	40	40	60	2	25	25	150
AE 304	Controls Engineering and Model based Systems	30	30	30	45	2	25	25	125
AE 3xx	Department Elective I	40	40	40	60	2	-	-	100
IL 3xx	Institute Elective I	40	40	40	60	2	-	-	100
AE 391	Minor Project III	25 (Mid Sem assessment)					25	25	75
Total									825

* - Common with B.Tech in Mechanical Engineering

Group	Department Specialization	Course Code	DLOC I
1	Electric Vehicles	AE 305	Electrical Machines
2	Additive Manufacturing	AE 306	CAD for Additive Manufacturing
3	Motorsports Engineering	AE 307	Material Selection and Manufacturing

**Program Structure for
Bachelor of Technology in Automobile Engineering
Semester VI**

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
AE 305	Automotive Body and Chassis Systems	PCC	3	-	3	-	3
AE 306	Automotive Vibrations	PCC	3	2	3	1	4
AE 307	Automotive Design	PCC	3	-	3	-	3
AE 310	Professional Communication & Ethics II	VSEC	1	2	1	1	2
AE 3xx	Department Elective II	PEC	3	-	3	-	3
IL 3xx	Institute Elective II	OE	3	-	3	-	3
AE 392	Major Project I	CEP	-	6	-	3	3
Total			16	12	16	5	21

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract./Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs)			
		1	2	Avg					
AE 308	Automotive Body and Chassis Systems	40	40	40	60	2	25	-	125
AE 309	Automotive Vibrations	40	40	40	60	2	25	25	150
AE 310	Automotive Design	40	40	40	60	2	-	-	100
AE 310	Professional Communication & Ethics II	-	-	-	-	-	50	-	50
AE 3xx	Department Elective II	40	40	40	60	2	-	-	100
IL 3xx	Institute Elective II	40	40	40	60	2	-	-	100
AE 392	Major Project I						25	50	75
Total									700

For an elective which has a laboratory associated, the examination scheme will have additional 25 marks of termwork and that would be a continuous evaluation.

Semester VI

Group	Department Specialization	Course Code	DLOC II
1	Electric Vehicles	AE 311	Power Electronics (TL)
2	Additive Manufacturing	AE 312	Additive Manufacturing in Biomedical application (T)
3	Motor Sports Engineering	AE 313	Race Car Designing (TL)
		AE 314	Electronics in Race Cars (TL)
Group	Department Specialization	Course Code	DLOC III
4	Transportation	AE 315	Fundamentals of Transportation Engineering (T)
		AE 316	Motor Vehicles Acts & Loss Assessments (T)
5	Supply Chain Management & Logistics	AE 317	Supply Chain Management (T)
		AE 318	Production and Operations Management (T)
6	Automotive Designing	AE 319	Concept Sketching, Rendering and Modelling (TL)
7	Autonomous Vehicles	AE 320	Introduction to Self-Driving Cars (T)

Group	Institute Specialization	SEM	ILOC I
1	Business and Entrepreneurship	V	IPR and Patenting
		VI	e- Commerce and e-Business
2	Bio Engineering	V	Introduction to Bioengineering
		VI	Medical Image Processing
3	Engineering Design	V	Product Design
		VI	Technologies for Rural Development
4	Art and Humanities	V	Visual Art
		VI	Economics
5	Applied Science	V	Computational Physics
		VI	GIS and Remote Sensing
6	Life Skills, Repair, Maintenance and Safety	V	Vehicle Safety
		VI	Maintenance of Electronics and Mechanical Equipment

**Program Structure for
Bachelor of Technology in Automobile Engineering
Semester VII**

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
AE 401	Hybrid and Electric Vehicles	PCC	3	2	3	1	4
AE 402	Vehicle Dynamics	PCC	3	2	3	1	4
AE 403	Automotive Electronics & Diagnostics	PCC	3	-	3	-	3
AE 4xx	Department Elective III	PEC	3	-	3	-	3
AE 4xx	Department Elective IV	PEC	3	-	3	-	3
AE 491	Major Project II	CEP	-	8	-	4	4
Total			15	12	15	6	21

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract/Oral	Total
		Internal Assessment			End Sem Exam	Exam Duration (Hrs.)			
		1	2	Avg.					
AE 401	Hybrid and Electric Vehicles	40	40	40	60	2	25	25	150
AE 402	Vehicle Dynamics	40	40	40	60	2	25	25	150
AE 403	Automotive Electronics & Diagnostics	40	40	40	60	2	-	-	100
AE 4xx	Department Elective III	40	40	40	60	2	-	-	100
AE 4xx	Department Elective IV	40	40	40	60	2	-	-	100
AE 491	Major Project II	-					50	50	100
Total									700

For an elective which has a laboratory associated, the examination scheme will have additional 25 marks of term work and that would be a continuous evaluation.

Semester VII

Group	Department Specialization	Course Code	DLOC IV
1	Electric Vehicles	AE 403	Automotive Embedded Systems (T)
2	Additive Manufacturing	AE 404	Automotive Product Design and Development (T)
3	Motor Sports Engineering	AE 405	Race Car Dynamics (T)
		AE 406	Simulation of Racing Cars (TL)
Group	Department Specialization	Course Code	DLOC V
4	Transportation	AE 407	Spatial Mapping Techniques (T)
		AE 408	Mass Transport Systems (T)
5	Supply Chain Management & Logistics	AE 409	Procurement and Materials Management (T)
		AE 410	Logistics and Distribution management (T)
6	Automotive Designing	AE 411	Aesthetics and Ergonomics (T)
7	Autonomous Vehicles	AE 412	Image and Video Processing (TL)
		AE 413	Multi Object Tracking in Self-Driving Cars (T)

**Program Structure for
Bachelor of Technology in Automobile Engineering
Semester VIII**

Course Code	Course Name	Category	Teaching Scheme (Contact Hours)		Credits Assigned		
			Theory	Pract.	Theory	Pract.	Total
AE 404	Personal Financial Management	VEC	2	-	2	-	2
IL XXX	Entrepreneurship and Innovation	VEC	2	-	2	-	2
AE 4xx	Department Elective V	PEC	3	-	3	-	3
AE 4xx	Department Elective VI	PEC	3	-	3	-	3
AE 492	Major Project III	CEP	-	4	-	2	2
AE 493	Internship*	AEC	-	-	-	8	8
Total			10	4	10	10	20

Course Code	Course Name	Examination Scheme							Total
		Theory					Term Work	Pract./ Oral	
		Internal Assessment			End Sem Exam	Exam Duration (Hrs.)			
		1	2	Avg.					
AE 414	Personal Financial Management	20	20	20	40	2	-	-	60
IL XXX	Entrepreneurship and Innovation	20	20	20	40	2	-	-	60
AE 4xx	Department Elective V	40	40	40	60	2	-	-	100
AE 4xx	Department Elective VI	40	40	40	60	2	-	-	100
AE 492	Major Project III	-	-	-	-	-	25	-	25
AE 493	Internship	-	-	-	-	-	200	-	200
Total									545

* - Six months internship to be undertaken by the student during the semester

Semester VIII

Group	Department Specialization	Course Code	DLOC VI
4	Transportation	AE 415	Refrigeration and Air Conditioning (T)
5	Supply Chain Management & Logistics	AE 416	Quality Management (T)
6	Automotive Designing	AE 417	ARVR in Automobiles (TL)
		AE 418	Visual Communication & Digital Publishing (TL)
7	Autonomous Vehicles	AE 419	Decision making in Self Driving Cars (T)
		AE 420	Artificial Neural Networks (TL)

Group	Institute Specialization	Course Code	ILOC II
1	Business and Entrepreneurship	IL 480	Digital Business Management and Digital Marketing (T)
2	Bio Engineering	IL 481	Medical Image Processing (T)
3	Engineering Design	IL 482	Technologies for Rural Development (T)
4	Art and Humanities	IL 483	Economics (T)
5	Applied Science	IL 484	GIS and Remote Sensing (T)
6	Life Skills, Repair, Maintenance and Safety	IL 485	Physical Education (T)
		IL 486	Environmental Management (T)

Semester	I	II	III	IV	V	VI	VII	VIII	Total Credits
Credits	22	22	22	21	21	21	21	20	170
Grand Total of Credits									170

Department Specializations at a glance:

Minimum **Two** to be completed (Minimum **Three** subjects from each.)

Department Specializations						
1	2	3	4	5	6	7
<i>Electric Vehicles</i>	<i>Additive Manufacturing</i>	<i>MotorSports Engineering</i>	<i>Transportation</i>	<i>Supply Chain Management and Logistics</i>	<i>Automotive Designing</i>	<i>Autonomous Vehicles</i>
Electrical Machines (T)	CAD for Additive Manufacturing (T)	Material Selection and Manufacturing (T)	Fundamentals of Transportation Engineering (T)	Supply Chain Management (T)	Concept Sketching, Rendering and Modelling (TL)	Introduction to Self-Driving Cars (T)
Power Electronics (TL)	AM in Biomedical applications (T)	Race Car Designing (T)	Motor Vehicles Acts & Loss Assessments (T)	Production and Operations Management (T)	Aesthetics and Ergonomics (T)	Image and Video processing (TL)
Automotive Embedded Systems (T)	Automotive Product Design and Development (T)	Electronics in Race cars (TL)	Spatial Mapping Techniques (T)	Procurement and Materials Management (T)	ARVR in Automobiles (TL)	Multi Object Tracking in self-driving cars (T)
		Race Car Dynamics (T)	Mass Transport Systems (T)	Logistics and Distribution management (T)	Visual Communication & Digital Publishing (TL)	Decision making in Self Driving Cars (T)
		Simulation of Racing Cars (TL)	Refrigeration and Air Conditioning (T)	Quality Management (T)		Artificial Neural Networks (TL)

Institute Specializations at a glance:Minimum **One** to be completed (Minimum **Two** subjects from each.)

Institute Specializations					
1	2	3	4	5	6
<i>Business and Entrepreneurship</i>	<i>Bio Engineering</i>	<i>Engineering Design</i>	<i>Art and Humanities</i>	<i>Applied Science</i>	<i>Life Skills, Repair, Maintenance and Safety</i>
Entrepreneurship	Introduction to Bioengineering	Product Design	Visual Art	Computational Physics	Vehicle Safety
IPR and Patenting	Biomedical Instrumentation	Design for sustainability	Journalism, Media and Communication studies	Polymers and Polymeric Materials	Maintenance of Electronics Equipment
e- Commerce and e-Business	Medical Image Processing	Technologies for Rural Development	Political Science	Research Methodology	Maintenance of Mechanical Equipment
Business analytics	----	---	Economics	GIS and Remote Sensing	Cooking and Nutrition