

**SEMESTER VII/VIII\***

S. No.	Course Code	Course title	Cate Gory	Periods Per week			Total Contact Periods	Credits
				L	T	P		
<b>THEORY</b>								
1.	AU3701	Engine and Chassis Components Design	PCC	3	0	0	3	3
2.	AU3791	Electrical and Hybrid Vehicles	PCC	3	0	0	3	3
3.	GE3791	Human Values and Ethics	HSMC	2	0	0	2	2
4.		Elective – Management <sup>#</sup>	HSMC	3	0	0	3	3
5.		Open Elective II <sup>**</sup>	OEC	3	0	0	3	3
6.		Open Elective – III <sup>***</sup>	OEC	3	0	0	3	3
7.		Open Elective – IV <sup>***</sup>	OEC	3	0	0	3	3
<b>PRACTICALS</b>								
8.	AU3711	Vehicle Maintenance and Testing Laboratory	PCC	0	0	4	4	2
9.	AU3712	Summer Internship <sup>#</sup>	EEC	0	0	0	0	1
<b>TOTAL</b>				<b>20</b>	<b>0</b>	<b>4</b>	<b>24</b>	<b>23</b>

#Two weeks Summer Internship carries one credit and it will be done during VI semester summer vacation and same will be evaluated in VII semester.

\*If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.

\*\*Open Elective – II shall be chosen from the emerging technologies.

\*\*\*Open Elective III and IV (Shall be chosen from the list of open electives offered by other Programmes).

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**SEMESTER VIII / VII\***

S. No.	Course code	Course title	Cate Gory	Periods per week			Total Contact Periods	Credits
				L	T	P		
<b>PRACTICALS</b>								
1.	AU3811	Project Work /Internship	EEC	0	0	20	20	10
<b>TOTAL</b>				<b>0</b>	<b>0</b>	<b>20</b>	<b>20</b>	<b>10</b>

\*If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.

**TOTAL: 165 CREDITS**

*Attested*

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*[Signature]*  
**DIRECTOR**  
Centre for Academic Courses  
Anna University, Chennai-600 025

**OPEN ELECTIVES**

(Students shall choose the open elective courses, such that the course contents are not similar to any other course contents/title under other course categories).

**OPEN ELECTIVE I AND II  
(EMERGING TECHNOLOGIES)**

To be offered other than Faculty of Information and Communication Engineering

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OCS351	Artificial Intelligence and Machine Learning Fundamentals	OEC	2	0	2	4	3
2.	OCS352	IoT Concepts and Applications	OEC	2	0	2	4	3
3.	OCS353	Data Science Fundamentals	OEC	2	0	2	4	3
4.	CCS333	Augmented Reality /Virtual Reality	OEC	2	0	2	4	3

**OPEN ELECTIVES – III**

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OHS351	English for Competitive Examinations	OEC	3	0	0	3	3
2.	OMG352	NGOs and Sustainable Development	OEC	3	0	0	3	3
3.	OMG353	Democracy and Good Governance	OEC	3	0	0	3	3
4.	OCE353	Lean Concepts, Tools And Practices	OEC	3	0	0	3	3
5.	CME365	Renewable Energy Technologies	OEC	3	0	0	3	3
6.	OME354	Applied Design Thinking	OEC	3	0	0	3	3
7.	MF3003	Reverse Engineering	OEC	3	0	0	3	3
8.	OPR351	Sustainable Manufacturing	OEC	3	0	0	3	3
9.	OAS352	Space Engineering	OEC	3	0	0	3	3
10.	OIM351	Industrial Management	OEC	3	0	0	3	3
11.	OIE354	Quality Engineering	OEC	3	0	0	3	3
12.	OSF351	Fire Safety Engineering	OEC	3	0	0	3	3
13.	OML351	Introduction to Non-Destructive Testing	OEC	3	0	0	3	3
14.	OMR351	Mechatronics	OEC	3	0	0	3	3
15.	ORA351	Foundation of Robotics	OEC	3	0	0	3	3
16.	OAE352	Fundamentals of Aeronautical Engineering	OEC	3	0	0	3	3
17.	OGI351	Remote Sensing Concepts	OEC	3	0	0	3	3
18.	OAI351	Urban Agriculture	OEC	3	0	0	3	3
19.	OEN351	Drinking Water Supply and Treatment	OEC	3	0	0	3	3
20.	OEE352	Electric Vehicle Technology	OEC	3	0	0	3	3
21.	OEI353	Introduction to PLC Programming	OEC	3	0	0	3	3
22.	OCH351	Nano Technology	OEC	3	0	0	3	3
23.	OCH352	Functional Materials	OEC	3	0	0	3	3

24.	OFD352	Traditional Indian Foods	OEC	3	0	0	3	3
25.	OFD353	Introduction to Food Processing	OEC	3	0	0	3	3
26.	OPY352	IPR for Pharma Industry	OEC	3	0	0	3	3
27.	OTT351	Basics of Textile Finishing	OEC	3	0	0	3	3
28.	OTT352	Industrial Engineering for Garment Industry	OEC	3	0	0	3	3
29.	OTT353	Basics of Textile Manufacture	OEC	3	0	0	3	3
30.	OPE351	Introduction to Petroleum Refining and Petrochemicals	OEC	3	0	0	3	3
31.	OPE334	Energy Conservation and Management	OEC	3	0	0	3	3
32.	OPT351	Basics of Plastics Processing	OEC	3	0	0	3	3
33.	OEC351	Signals and Systems	OEC	3	0	0	3	3
34.	OEC352	Fundamentals of Electronic Devices and Circuits	OEC	3	0	0	3	3
35.	CBM348	Foundation Skills in Integrated Product Development	OEC	3	0	0	3	3
36.	CBM333	Assistive Technology	OEC	3	0	0	3	3
37.	OMA352	Operations Research	OEC	3	0	0	3	3
38.	OMA353	Algebra and Number Theory	OEC	3	0	0	3	3
39.	OMA354	Linear Algebra	OEC	3	0	0	3	3
40.	OBT352	Basics of Microbial Technology	OEC	3	0	0	3	3
41.	OBT353	Basics of Biomolecules	OEC	3	0	0	3	3
42.	OBT354	Fundamentals of Cell and Molecular Biology	OEC	3	0	0	3	3

#### OPEN ELECTIVES – IV

SL. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OHS352	Project Report Writing	OEC	3	0	0	3	3
2.	OMA355	Advanced Numerical Methods	OEC	3	0	0	3	3
3.	OMA356	Random Processes	OEC	3	0	0	3	3
4.	OMA357	Queuing and Reliability Modelling	OEC	3	0	0	3	3
5.	OMG354	Production and Operations Management for Entrepreneurs	OEC	3	0	0	3	3
6.	OCE354	Basics of Integrated Water Resources Management	OEC	3	0	0	3	3
7.	OMG355	Multivariate Data Analysis	OEC	3	0	0	3	3
8.	OME352	Additive Manufacturing	OEC	3	0	0	3	3
9.	OME343	New Product Development	OEC	3	0	0	3	3
10.	OME355	Industrial Design & Rapid Prototyping Techniques	OEC	3	0	0	3	3
11.	MF3010	Micro and Precision Engineering	OEC	3	0	0	3	3
12.	OMF354	Cost Management of Engineering Projects	OEC	3	0	0	3	3
13.	OAS353	Space Vehicles	OEC	3	0	0	3	3

14.	OIM352	Management Science	OEC	3	0	0	3	3
15.	OIM353	Production Planning and Control	OEC	3	0	0	3	3
16.	OIE353	Operations Management	OEC	3	0	0	3	3
17.	OSF352	Industrial Hygiene	OEC	3	0	0	3	3
18.	OSF353	Chemical Process Safety	OEC	3	0	0	3	3
19.	OML352	Electrical, Electronic and Magnetic Materials	OEC	3	0	0	3	3
20.	OML353	Nanomaterials and Applications	OEC	3	0	0	3	3
21.	OMR353	Sensors	OEC	3	0	0	3	3
22.	ORA352	Concepts in Mobile Robots	OEC	3	0	0	3	3
23.	MV3501	Marine Propulsion	OEC	3	0	0	3	3
24.	OMV351	Marine Merchant Vessels	OEC	3	0	0	3	3
25.	OMV352	Elements of Marine Engineering	OEC	3	0	0	3	3
26.	CRA332	Drone Technologies	OEC	3	0	0	3	3
27.	OGI352	Geographical Information System	OEC	3	0	0	3	3
28.	OAI352	Agriculture Entrepreneurship Development	OEC	3	0	0	3	3
29.	OEN352	Biodiversity Conservation	OEC	3	0	0	3	3
30.	OEE353	Introduction to Control Systems	OEC	3	0	0	3	3
31.	OEI354	Introduction to Industrial Automation Systems	OEC	3	0	0	3	3
32.	OCH353	Energy Technology	OEC	3	0	0	3	3
33.	OCH354	Surface Science	OEC	3	0	0	3	3
34.	OFD354	Fundamentals of Food Engineering	OEC	3	0	0	3	3
35.	OFD355	Food Safety and Quality Regulations	OEC	3	0	0	3	3
36.	OPY353	Nutraceuticals	OEC	3	0	0	3	3
37.	OTT354	Basics of Dyeing and Printing	OEC	3	0	0	3	3
38.	FT3201	Fibre Science	OEC	3	0	0	3	3
39.	OTT355	Garment Manufacturing Technology	OEC	3	0	0	3	3
40.	OPE353	Industrial Safety	OEC	3	0	0	3	3
41.	OPE354	Unit Operations in Petro Chemical Industries	OEC	3	0	0	3	3
42.	OPT352	Plastic Materials for Engineers	OEC	3	0	0	3	3
43.	OPT353	Properties and Testing of Plastics	OEC	3	0	0	3	3
44.	OEC353	VLSI Design	OEC	3	0	0	3	3
45.	CBM370	Wearable devices	OEC	3	0	0	3	3
46.	CBM356	Medical Informatics	OEC	3	0	0	3	3
47.	OBT355	Biotechnology for Waste Management	OEC	3	0	0	3	3
48.	OBT356	Lifestyle Diseases	OEC	3	0	0	3	3
49.	OBT357	Biotechnology in Health Care	OEC	3	0	0	3	3

Attested

6. Heat balance test on an automotive petrol/diesel engine.
7. Measurement of HC, CO, CO<sub>2</sub>, O<sub>2</sub> and NO<sub>x</sub> using exhaust gas analyzer.
8. Diesel smoke measurement.

**TOTAL: 60 PERIODS**

**COURSE OUTCOMES:**

At the end of this course, students will be able to

1. Identify the various emission measuring instruments
2. Describe the various engine testing instruments
3. Understand the procedure to measure the emission
4. Conduct testing for engine performance, combustion and emission characteristics
5. Recall the available emission norms

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1			1	2	1		1	1		2		1	3
2	1	1			1	2	1		1	1		2		1	3
3	1	1			1	2	1		1	1		2		1	3
4	1	1			1	2	1		1	1		2		1	3
5	1	1			1	2	1		1	1		2		1	3
Avg.	1	1			1	2	1		1	1		2		1	3

**SEMESTER VII**

**AU3701**

**ENGINE AND CHASSIS COMPONENTS DESIGN**

**L T P C  
3 0 0 3**

**COURSE OBJECTIVES:**

The objective of this course is to prepare the students for understanding the design concept and principles involved in various engine components like cylinder, piston, connecting rod, crankshaft, flywheel, axle, suspension and steering systems.

**UNIT I INTRODUCTION**

**9**

Engineering materials - Introduction endurance limit, notch sensitivity. Tolerances, types of tolerances and fits, design considerations for interference fits, surface finish, surface roughness, Rankine's formula - Tetmajer's formula - Johnson formula- design of pushrods.

**UNIT II DESIGN OF CYLINDER, PISTON AND CONNECTING ROD**

**9**

Choice of material for cylinder and piston, design of cylinder, piston, and piston pin, piston rings, piston failures, lubrication of piston assembly. Material for connecting rod, determining minimum length of connecting rod, small end design, shank design, design of big end cap bolts.

**UNIT III DESIGN OF CRANKSHAFT AND FLYWHEEL**

**9**

Balancing of I.C. engines, significance of firing order. Material for crankshaft, design of crankshaft under bending and twisting, balancing weight calculations, development of short and long crank arms. Front and rear-end details. Determination of the mass of a flywheel for a given co-efficient of speed fluctuation. Engine flywheel - stresses on the rim of the flywheels. Design of hubs and arms of the flywheel, turning moment diagram.

**UNIT IV DESIGN OF VEHICLE FRAME, SUSPENSION AND STEERING SYSTEMS**

**9**

Study of loads-moments and stresses on frame members. Design of frame for passenger and commercial vehicle - Design of leaf Springs-Coil springs and torsion bar springs. Determination of optimum dimensions and proportions for steering linkages, ensuring minimum error in steering.

**UNIT V DESIGN OF FRONT AXLE, REAR AXLE AND DRIVE LINE****9**

Analysis of loads-moments and stresses at different sections of front axle. Determination of bearing loads at Kingpin bearings. Wheel spindle bearings. Choice of Bearings. Design of front axle beam. Design of propeller shaft. Design details of final drive gearing. Design details of full floating, semi-floating and three quarter floating rear shafts and rear axle housings and design aspects of final drive.

**TOTAL : 45 PERIODS****COURSE OUTCOMES:**

At the end of this course, students will be able to

1. Understand the choice of material for various vehicle components
2. Design various vehicle components.
3. Apply the concept of limits, fits and tolerance during the design of engine and chassis components
4. Analyse the different types of loads acting in various engine components
5. Describe the requirement of surface finish of vehicle components

**TEXT BOOKS:**

1. Khurmi. R.S. & Gupta. J.K., "A text book of Machine Design", Eurasia Publishing House (Pvt) Ltd, 2001.
2. Giri, N.K., "Automobile Mechanics", Khanna publishers, New Delhi, 2007.

**REFERENCES:**

1. Jain.R.K, "Machine Design", Khanna Publishers, New Delhi, 2005.
2. Dean Avern, "Automobile Chassis Design", Illife Book Co., 2001.
3. Heldt, P.M., "Automotive Chassis", Chilton Book Co., 1992.

C O	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	1	1	1	2	2		1	1		2		1	3
2	1	1	1	1	1	2	2		1	1		2		1	3
3	1	1	1	1	1	2	2		1	1		2		1	3
4	1	1	1	1	1	2	2		1	1		2		1	3
5	1	1	1	1	1	2	2		1	1		2		1	3
Av g.	1	1	1	1	1	2	2		1	1		2		1	3

PROGRESS THROUGH KNOWLEDGE

Attested

**COURSE OBJECTIVES:**

The objective of this course is to prepare the students to know about the general aspects of Electric and Hybrid Vehicles (EHV), including architectures, modelling, sizing, and sub system design and hybrid vehicle control.

**UNIT I DESIGN CONSIDERATIONS FOR ELECTRIC VEHICLES 9**

Need for Electric vehicle- Comparative study of diesel, petrol, hybrid and electric Vehicles. Advantages and Limitations of hybrid and electric Vehicles. - Design requirement for electric vehicles- Range, maximum velocity, acceleration, power requirement, mass of the vehicle. Various Resistance- Transmission efficiency- Electric vehicle chassis and Body Design, Electric Vehicle Recharging and Refuelling Systems.

**UNIT II ENERGY SOURCES 9**

Battery Parameters - Different types of batteries – Lead Acid- Nickel Metal Hydride - Lithium ion-Sodium based- Metal Air. Battery Modelling - Equivalent circuits, Battery charging- Quick Charging devices. Fuel Cell- Fuel cell Characteristics- Fuel cell types-Half reactions of fuel cell. Ultra capacitors. Battery Management System.

**UNIT III MOTORS AND DRIVES 9**

Types of Motors- DC motors- AC motors, PMSM motors, BLDC motors, Switched reluctance motors working principle, construction and characteristics.

**UNIT IV POWER CONVERTERS AND CONTROLLERS 9**

Solid state Switching elements and characteristics – BJT, MOSFET, IGBT, SCR and TRIAC - Power Converters – rectifiers, inverters and converters - Motor Drives - DC, AC motor, PMSM motors, BLDC motors, Switched reluctance motors – four quadrant operations –operating modes

**UNIT V HYBRID AND ELECTRIC VEHICLES 9**

Main components and working principles of a hybrid and electric vehicles, Different configurations of hybrid and electric vehicles. Power Split devices for Hybrid Vehicles - Operation modes - Control Strategies for Hybrid Vehicle - Economy of hybrid Vehicles - Case study on specification of electric and hybrid vehicles.

**TOTAL: 45 PERIODS****COURSE OUTCOMES:**

At the end of this course, the student will be able to

1. Understand the operation and architecture of electric and hybrid vehicles
2. Identify various energy source options like battery and fuel cell
3. Select suitable electric motor for applications in hybrid and electric vehicles.
4. Explain the role of power electronics in hybrid and electric vehicles
5. Analyze the energy and design requirement for hybrid and electric vehicles.

**TEXT BOOKS:**

1. Iqbal Husain, “ Electric and Hybrid Vehicles-Design Fundamentals”, CRC Press,2003
2. Mehrdad Ehsani, “ Modern Electric, Hybrid Electric and Fuel Cell Vehicles”, CRC Press,2005.

**REFERENCES:**

1. James Larminie and John Lowry, “Electric Vehicle Technology Explained “ John Wiley & Sons,2003
2. Lino Guzzella, “ Vehicle Propulsion System” Springer Publications,2005
3. Ron HodKinson, “Light Weight Electric/ Hybrid Vehicle Design”, Butterworth Heinemann Publication,2005.

*Attested*

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	2	1		3	2					2		1	3
2	1	1	2	1		3	2					2		1	3
3	1	1	2	1		3	2					2		1	3
4	1	1	2	1		3	2					2		1	3
5	1	1	2	1		3	2					2		1	3
Avg.	1	1	2	1		3	2					2		1	3



Attested



**COURSE DESCRIPTION**

This course aims to provide a broad understanding about the modern values and ethical principles that have evolved and are enshrined in the Constitution of India with regard to the democratic, secular and scientific aspects. The course is designed for undergraduate students so that they could study, understand and apply these values in their day to day life.

**COURSE OBJECTIVES:**

- To create awareness about values and ethics enshrined in the Constitution of India
- To sensitize students about the democratic values to be upheld in the modern society.
- To inculcate respect for all people irrespective of their religion or other affiliations.
- To instill the scientific temper in the students' minds and develop their critical thinking.
- To promote sense of responsibility and understanding of the duties of citizen.

**UNIT I DEMOCRATIC VALUES****6**

Understanding Democratic values: Equality, Liberty, Fraternity, Freedom, Justice, Pluralism, Tolerance, Respect for All, Freedom of Expression, Citizen Participation in Governance – World Democracies: French Revolution, American Independence, Indian Freedom Movement.

Reading Text: Excerpts from John Stuart Mills' *On Liberty*

**UNIT II SECULAR VALUES****6**

Understanding Secular values – Interpretation of secularism in Indian context - Disassociation of state from religion – Acceptance of all faiths – Encouraging non-discriminatory practices.

Reading Text: Excerpt from *Secularism in India: Concept and Practice* by Ram Puniyani

**UNIT III SCIENTIFIC VALUES****6**

Scientific thinking and method: Inductive and Deductive thinking, Proposing and testing Hypothesis, Validating facts using evidence based approach – Skepticism and Empiricism – Rationalism and Scientific Temper.

Reading Text: Excerpt from *The Scientific Temper* by Antony Michaelis R

**UNIT IV SOCIAL ETHICS****6**

Application of ethical reasoning to social problems – Gender bias and issues – Gender violence – Social discrimination – Constitutional protection and policies – Inclusive practices.

Reading Text: Excerpt from *21 Lessons for the 21<sup>st</sup> Century* by Yuval Noah Harari

**UNIT V SCIENTIFIC ETHICS****6**

Transparency and Fairness in scientific pursuits – Scientific inventions for the betterment of society - Unfair application of scientific inventions – Role and Responsibility of Scientist in the modern society.

Reading Text: Excerpt from *American Prometheus: The Triumph and Tragedy of J.Robert Oppenheimer* by Kai Bird and Martin J. Sherwin.

**TOTAL: 30 PERIODS****COURSE OUTCOMES**

Students will be able to

- CO1 : Identify the importance of democratic, secular and scientific values in harmonious functioning of social life
- CO2 : Practice democratic and scientific values in both their personal and professional life.
- CO3 : Find rational solutions to social problems.
- CO4 : Behave in an ethical manner in society
- CO5 : Practice critical thinking and the pursuit of truth.

**REFERENCES:**

1. The Nonreligious: Understanding Secular People and Societies, Luke W. Galen Oxford University Press, 2016.
2. Secularism: A Dictionary of Atheism, Bullivant, Stephen; Lee, Lois, Oxford University Press, 2016.
3. The Oxford Handbook of Secularism, John R. Shook, Oxford University Press, 2017.
4. The Civic Culture: Political Attitudes and Democracy in Five Nations by Gabriel A. Almond and Sidney Verba, Princeton University Press,
5. Research Methodology for Natural Sciences by Soumitro Banerjee, IISc Press, January 2022

**AU3711****VEHICLE MAINTENANCE AND TESTING LABORATORY****L T P C  
0 0 4 2****COURSE OBJECTIVES:**

The objective of this course is to educate the students on the aspects of maintenance of vehicle and subsystems.

**LIST OF EXPERIMENTS:**

1. Study on layout of automotive service station.
2. Tightening and adjustment of wheel bearing.
3. Adjustment of pedal play in clutch, brake, hand brake lever and steering wheel orientation.
4. Wheel alignment in four wheelers.
5. Minor and major tune up of gasoline and diesel engines.
6. Calibration of Fuel injection pump
7. Fault diagnosis and service of Electrical system like battery, starting system, charging system, lighting system.
8. Removal and fitting of tyre.
9. Engine fault diagnosis using scan tool
10. Fault diagnosis of brake system –Air bleeding from hydraulic brakes.
11. Performance test on two wheeler chassis dynamometer.

**TOTAL: 60 PERIODS****COURSE OUTCOME:**

At the end of this course, students will be able to

1. Describe the layout of an automotive service station
2. Demonstrate the skills on the adjustment of clutch, brake, hand brake lever and steering wheel orientation
3. Calibrate Fuel injection pump
4. Trouble shoot the fault in electrical systems
5. Align wheel for four wheelers

C O	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1			1	2	1		1	1		2		1	3
2	1	1			1	2	1		1	1		2		1	3
3	1	1			1	2	1		1	1		2		1	3
4	1	1			1	2	1		1	1		2		1	3
5	1	1			1	2	1		1	1		2		1	3
Avg.	1	1			1	2	1		1	1		2		1	3

**Course objective**

The objective of this course is to prepare the students to get exposure to industry environment and to take up on-site assignment as trainees or interns.

The students are expected with two weeks of work at industry site and supervised by an expert at the industry.

At the end of Industrial internship, the candidate shall submit a certificate from the organization where he / she has undergone training and a brief report. The evaluation will be made based on this report and a Viva-Voce Examination, conducted internally by a three member Departmental Committee constituted by the Head of the Institution. The certificates (issued by the organization) submitted by the students shall be attached to the mark list sent by the Head of the Institution to the Controller of Examinations.

**COURSE OUTCOMES**

At the end of the course, students will be able to:

1. Understand the industrial practices and work environment as an individual, member or leader in diverse teams, and in multidisciplinary settings
2. Communicate effectively on complex engineering activities with the engineering community and with society at large
3. Understand the impact of engineering solutions in a global, economic, environmental and societal context
4. Develop the ability to engage in research and to involve in life-long learning
5. Comprehend contemporary issues

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	1	1	1	1	2	1	1	2	2	1	1		
2						3			1	1		2	1		
3			1			1	1				1	1	1		
4	1	1	1	1	1	2						1		1	2
5	1	1	1	1	1							1	1	1	
<b>Avg.</b>	1	1	1	1	1	1.75	1.5	1	1	1.5	1.5	1.2	1	1	2

Attested