

**VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM**  
(Deemed to be University)

**AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY, CHENNAI**  
&  
**VINAYAKA MISSION'S KIRUPANANDA VARIYAR ENGINEERING COLLEGE, SALEM**

**FACULTY OF ENGINEERING AND TECHNOLOGY**

**STRUCTURED CHOICE BASED CREDIT SYSTEM**

**BOARD : MECHANICAL ENGINEERING**  
**REGULATION : 2017**  
**PROGRAM : B.Tech., – AUTOMOBILE ENGINEERING (FULL TIME - REGULAR)**

**CURRICULUM AND SYLLABUS**

<b>SEMESTER – II</b>								
<b>S.NO</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>OFFERING DEPARTMENT</b>	<b>CATEGORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>								
1		MATHEMATICS FOR MECHANICAL SCIENCES	MATHEMATICS	FC(BS)	2	2	0	3
2		PROGRAMMING IN PYTHON	CSE	FC(ES)	3	0	0	3
3		FUNDAMENTALS OF AUTOMOTIVE ENGINES	AUTOMOBILE	CC	3	0	0	3
4		SMART MATERIALS	PHYSICS	FC(BS)	3	0	0	3
5		BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	EEE & ECE	FC(ES)	4	0	0	4
<b>PRACTICAL</b>								
6		PROGRAMMING IN PYTHON LAB	CSE	FC(ES)	0	0	4	2
7		ENGINEERING GRAPHICS (Theory + Practice)	MECHANICAL	FC(ES)	1	0	4	3
8		AUTOMOTIVE ENGINE COMPONENTS LAB	AUTOMOBILE	CC	0	0	4	2
9		ENGINEERING SKILLS PRACTICE LAB A. BASIC ELECTRICAL ENGINEERING B. BASIC ELECTRONICS ENGINEERING	EEE & ECE	FC(ES)	0	0	4	2
<b>TOTAL</b>					<b>16</b>	<b>2</b>	<b>16</b>	<b>25</b>
<b>L – LECTURE HOUR</b>		<b>T – TUTORIAL HOUR</b>		<b>P – PRACTICAL HOUR</b>		<b>C – CREDIT</b>		

HSS	HUMANITIES AND SOCIAL SCIENCES	CC	CORE COURSES
BS	BASIC SCIENCES	EC	ELECTIVE COURSES
ES	ENGINEERING SCIENCES	EEC	EMPLOYABILITY ENHANCEMENT COURSES + EXTRA CURRICULAR COURSES + CO - CURRICULAR COURSES
PII	PROJECT + INTERNSHIP + INDUSTRY ELECTIVES		

COURSE CODE	SEMESTER – II				
	NAME OF THE COURSE : <b>MATHEMATICS FOR MECHANICAL SCIENCES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	TOTAL HOURS : <b>60</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>3</b>
	PREREQUISITE : <b>ENGINEERING MATHEMATICS</b>				
<b>PURPOSE:</b>					
To impart analytical ability in solving mathematical problems as applied to Mechanical Engineering.					
<b>INSTRUCTIONAL OBJECTIVES:</b>					
1.	Partial Differential equation arises in most of the engineering discipline when the number of independent variables in the given problem under discussion is two or more.				
2.	Fourier series is used to express even aperiodic functions in term of periodic function making them amenable for further processing.				
3.	Fourier series has the wide application in the field of heat diffusion, wave propagation and in signal and systems analysis.				
4.	Common applications of this distribution range from scientific and engineering applications to military and medical ones like Formulation of Business Problem Models, traffic flow, lottery tickets etc.				
5.	Common applications of this distribution range from scientific and engineering applications to military and medical ones like Formulation of Business Problem Models, traffic flow, lottery tickets etc.				
<b>UNIT – I PARTIAL DIFFERENTIAL EQUATIONS 12</b>					
Formation – Solutions of standard types, Clairaut's form, first order equations – Lagrange's Linear equation – Linear partial differential equations of second and higher order with constant coefficients.					
<b>UNIT – II FOURIER SERIES 12</b>					
Dirichlet's conditions – General Fourier series – Half -range Sine and Cosine series – Parseval's identity – Harmonic Analysis.					
<b>UNIT – III BOUNDARY VALUE PROBLEMS 12</b>					
Classification of second order linear partial differential equations – Solutions of one – dimensional wave equation, one – dimensional heat equation – Steady state solution of two – dimensional heat equation – Fourier series solutions in Cartesian coordinates.					
<b>UNIT – IV STANDARD DISTRIBUTIONS 12</b>					
Moment generating function of random variables – Binomial – Poisson – Geometric – Uniform – Exponential – Gamma and Normal Distributions and their Properties (Mean Variance and Problems).					
<b>UNIT – V STATISTICS 12</b>					
Measures of central tendency, Curve fitting – Straight line and Parabola by least square method, Correlation, Rank correlation and Regression.					
<b>TEXT BOOKS:</b>					
1. Dr.A.Singaravelu, "Transforms and Partial differential Equations", 18 <sup>th</sup> Edition, Meenakshi Agency, Chennai (2013).					
2. A.Singaravelu, "Probability and Statistics", Meenakshi Agencies, Chennai (2016).					
3. S.C.Gupta, V.K.Kapoor, "Fundamentals of mathematical statistics", Sultan Chand & Sons (2006).					

**REFERENCES:**

1. T. Veerarajan, "Engineering Mathematics" (for semester III), Third Edition, Tata McGraw-Hill Publishing Company limited (2011).
2. Grewal, B.S., "Higher Engineering Mathematics", 42<sup>nd</sup> Edition, Khanna Publishers, Delhi (2012).
1. Kreyszig, E., "Advanced Engineering Mathematics", 8<sup>th</sup> Edition, John Wiley and Sons (Asia) Pvt Ltd., Singapore (2012).
2. T. Veerarajan, "Probability, Statistics and Random processes" 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Ltd., New Delhi (2006).
3. Johnson. R.A., "Miller & Freund's Probability and Statistics for Engineers", Sixth Edition, Pearson education, Delhi, 2000. (Chapters 7, 8, 9, 12).

**COURSE CODE :****NAME OF THE COURSE : MATHEMATICS FOR MECHANICAL SCIENCES**

<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF MATHEMATICS</b>										
		a	b	c	d	e	f	g	h	i	j	k
1	Student Outcomes	√				√						
2	Mapping of instructional objectives with student outcome	1,2				3,4,5						
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
			√									

COURSE CODE	SEMESTER – II				
	NAME OF THE COURSE : <b>PROGRAMMING IN PYTHON</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	TOTAL HOURS : <b>45</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
	PREREQUISITE : <b>NIL</b>				
<b>PURPOSE:</b>					
The purpose of this course is to introduce Python, a remarkably powerful dynamic programming language, to write code for different operating systems along with application domain. Python has evolved on more popular and powerful open source programming tool.					
<b>INSTRUCTIONAL OBJECTIVES:</b>					
1.	Able to setup Python working environment.				
2.	To understand the object oriented features of Python.				
3.	To develop Network Applications using Python.				
4.	To develop Web Applications using Python.				
5.	To use and develop GUI applications in Python programming.				
<b>UNIT – I INTRODUCTION 9</b>					
Introduction to Python – Advantages of Python programming – Tokens – Keywords - Variables – I/O methods - Data types – Operators.					
<b>UNIT – II DATA STRUCTURES 9</b>					
Strings - List - Tuples - Dictionaries – Sets.					
<b>UNIT – III CONTROL STATEMENTS 9</b>					
Flow Control – Selection Control Structure – If – if-else – if-elif-else – nested if Iterative control structures: while loop, for loop and range.					
<b>UNIT – IV FUNCTIONS 9</b>					
Declaration – Types of arguments – Fixed arguments, default arguments, keyword arguments, variable arguments, and keyword variable arguments – Recursion – Anonymous functions: lambda - Generators – Decorators.					
<b>UNIT – V EXCEPTION HANDLING 9</b>					
Exception Handling - Regular Expression - Calendars and Clocks Files: File I/O operations – Directory Operations– Reading and Writing in Structured Files: CSV and JSON.					
<b>TEXT BOOK:</b>					
1. Bill Lubanovic, "Introducing Python Modern Computing in Simple Packages", 1 <sup>st</sup> Edition, O'Reilly Media, 2014.					
<b>REFERENCES:</b>					
1. Mark Lutz, "Learning Python", 5 <sup>th</sup> Edition, O'Reilly Media, 2013.					
2. David Beazley, Brian K. Jones, "Python Cookbook", 3 <sup>rd</sup> Edition, O'Reilly Media, 2013.					
3. Mark Lutz, "Python Pocket Reference", 5 <sup>th</sup> Edition, O'Reilly Media, 2014.					
4. www.python.org.					
5. www.diveintopython3.net.					

COURSE CODE :												
NAME OF THE COURSE : PROGRAMMING IN PYTHON												
COURSE DESIGNED BY		DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING										
		a	b	c	d	e	f	g	h	i	j	k
1	Student Outcomes	√				√						√
2	Mapping of instructional objectives with student outcome	1-5				1-5						1-5
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

COURSE CODE	SEMESTER – II				
	NAME OF THE COURSE : <b>FUNDAMENTALS OF AUTOMOTIVE ENGINES</b>	L	T	P	C
	TOTAL HOURS: <b>45</b>	3	0	0	3
	PREREQUISITE: <b>NIL</b>				
<b>PURPOSE:</b>					
The student will undergo a sequential understanding of the concept, construction and required components of automotive engine to provide environmental friendliness.					
<b>INSTRUCTIONAL OBJECTIVES:</b>					
1.	To understand fundamentals of Engine principle and operations.				
2.	To provide an in-depth study of construction details of Engine components.				
3.	To understand the concept of Petrol and Diesel engine fuel injection system and types.				
4.	To provide in-depth study of Cooling systems and types systems.				
5.	To understand the types of Lubrication systems.				
<b>UNIT – I    ENGINE PRINCIPLE AND OPERATION</b>					
<b>9</b>					
Introduction to IC engines, Basic engine terminologies, Classification of IC engines, Constructional details of four stroke and two stroke engine, working principle, four stroke and two stroke petrol and diesel engine construction and operation, comparison of four stroke and two stroke engine operation, comparison of petrol and diesel engine operation firing order and its significance. Port Timing, Valve Timing of engines, Firing order -4, 6 & 8 cylinders, Number and Arrangement of engine cylinders.					
<b>UNIT - II    CONSTRUCTION DETAILS OF ENGINE COMPONENTS</b>					
<b>9</b>					
Cylinder block & Crank case, cylinder head, oil pan, manifolds, gaskets & its types liners, Functions of piston ,piston materials, piston rings-types & functions, piston pin, connecting rod. Crank shafts - function, materials, Flywheel. Engine valves– types, arrangement of valve in engine, valve materials, valve guides, valve springs, valve actuating mechanisms, valve clearance, valve train component - camshaft, cam shaft drive, valve tappet , push rod, rocker arm & rocker shaft, variable valve timing technologies.					
<b>UNIT - III    FUEL INJECTION SYSTEMS</b>					
<b>9</b>					
Carburetor working principle, requirements of an automotive carburetor, starting, idling, acceleration and normal circuits of carburetors, fuel feed systems, mechanical and electrical fuel feed pumps. Petrol injection, MPFI. Unit injector. GDI, Mechanical and pneumatic governors. Fuel injector, common rail direct injection, Types of injection nozzle.					
<b>UNIT – IV    COOLING SYSTEMS</b>					
<b>9</b>					
Need for cooling system, Types of cooling system: air cooling system, liquid cooling system, forced circulation system, pressure cooling system. Water pump, radiator-cellular and tubular types, variable speed fan-types of engine coolants, anti freeze Solutions.					
<b>UNIT – V    LUBRICATION SYSTEMS</b>					
<b>9</b>					
Splash lubricating system, Pressure system, Dry sump lubrication system, pressure lubrication system, Full flow and by pass systems, Characteristics of lubricating oils, classification & Identification of SAE oils, Filtering Systems—Oil Strainer—Oil pumps—Gear and Rotor type, Construction and operation- Pressure Relief Valve – Construction. Draft tube – Positive Crankcase Ventilation Systems –Construction. Vapour recovery cooling system Oil Cooler.					

**TEXT BOOKS:**

1. Ganesan.V., "Internal Combustion Engines", Tata McGraw-Hill Publishing Co., New Delhi, 2003.
2. John B.Heywood, "Internal Combustion Engine Fundamental", McGraw-Hill, 1988.
3. M.L.Mathur and R.P.Sharma, "A course in Internal combustion engines", Dhanpat Rai & Sons Publications, New Delhi, 2001.

**REFERENCES:**

1. "Internal Combustion Engine analysis and Practice", Obert.E.F International Text Book Co., Scranton, Pennsylvania, 1988.
2. William H. Crouse, "Automotive Engines", McGraw-Hill Publishers, 1985.
3. "Internal Combustion Engines", Taylor. C.F, MIT Press, 1972
4. Pulkrabek, "Engineering Fundamentals of the Internal Combustion Engines", Practice Hall of India, 2003.

**COURSE CODE :****NAME OF THE COURSE : FUNDAMENTALS OF AUTOMOTIVE ENGINES**

<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF AUTOMOBILE ENGINEERING</b>										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√		√		√				√	√	
2	Mapping of instructional objectives with student outcome	1-5		1-5						1-5	1-5	
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
					√							

<b>SEMESTER – II</b>					
<b>COURSE CODE</b>	<b>NAME OF THE COURSE : SMART MATERIALS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>TOTAL HOURS : 45</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
	<b>PREREQUISITE : PHYSICAL SCIENCES</b>				
<b>PURPOSE:</b>					
The fundamental knowledge gained will be useful for various applications in Engineering & Technology.					
<b>INSTRUCTIONAL OBJECTIVES:</b>					
1.	To understand the properties of smart materials.				
2.	To understand the structure of crystalline materials.				
3.	To learn the synthesis of Nano materials.				
4.	To learn the properties and classification of magnetic materials.				
5.	To understand the concept of superconducting materials and their properties.				
<b>UNIT – I</b>	<b>SMART MATERIALS</b>				<b>9</b>
Shape Memory Alloys (SMA) – Characteristics and properties of SMA, Application, advantages and disadvantages of SMA. Metallic glasses – Preparation, properties and applications.					
<b>UNIT – II</b>	<b>CRYSTALLINE MATERIALS</b>				<b>9</b>
Unit cell – Bravais lattice – Miller indices – Calculation of number of atoms per unit cell – atomic radius – coordination number – packing factor for SC, BCC, FCC, HCP structures.					
<b>UNIT – III</b>	<b>NANO MATERIALS</b>				<b>9</b>
Nanophase materials – Top-down approach - Mechanical Grinding – Lithography – Bottom-up approach – Sol-gel method – Carbon nanotubes – Fabrication – applications.					
<b>UNIT – IV</b>	<b>MAGNETIC MATERIALS</b>				<b>9</b>
Basic concepts – Classification of magnetic materials – Domain theory – Hysteresis – Soft and Hard magnetic materials.					
<b>UNIT – V</b>	<b>SUPERCONDUCTING MATERIALS</b>				<b>9</b>
Superconducting phenomena – properties of superconductors – Meissner effect – isotope effect – Type I and Type II superconductors – High T <sub>c</sub> Superconductors – Applications of superconductors.					
<b>TEXT BOOK:</b>					
1. Mani P, “Engineering Physics II”, Dhanam Publications, 2011.					
<b>REFERENCES:</b>					
1. Pillai S.O., “Solid State Physics”, New Age International (P) Ltd., publishers, 2009.					
2. Senthilkumar G., “Engineering Physics II”, VRB Publishers, 2011.					



<b>COURSE CODE :</b>												
<b>NAME OF THE COURSE : SMART MATERIALS</b>												
<b>COURSE DESIGNED BY</b>				<b>DEPARTMENT OF PHYSICS</b>								
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√	√	√	√	√		√	√	√	√	√
2	Mapping of instructional objectives with student outcome	3	1	1	3	5		2	4	3	5	1
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
			√									

COURSE CODE	SEMESTER – II				
	NAME OF THE COURSE : <b>BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING</b>	L	T	P	C
	<b>PART A - BASIC ELECTRICAL ENGINEERING</b>				
	TOTAL HOURS : <b>30</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>
PREREQUISITE : <b>NIL</b>					
<b>PURPOSE:</b>					
This course provides comprehensive idea about circuit analysis, working principles of machines and common measuring instruments.					
<b>INSTRUCTIONAL OBJECTIVES:</b>					
1.	Understand the basic concepts of AC and DC circuits.				
2.	Gain knowledge about the working principle, construction, applications of DC, AC machines and measuring instruments.				
3.	Understand the fundamentals of safety procedures, Earthing and Power system.				
<b>UNIT – I</b>	<b>HISTORY OF ELECTRICITY, QUANTITIES AND CIRCUITS</b>				<b>10</b>
Evolution of Electricity and Electrical inventions, Electrical quantities- Charge, Electric potential, voltage, current– DC & AC, power, energy, time period, frequency, phase, flux, flux density, RMS, Average, Peak, phasor & vector diagram. Electric Circuits - Passive components (RLC), Ohm’s law, KCL, KVL, Faraday’s law, Lenz’s law. Electrical materials – Conducting and insulating materials.					
<b>UNIT – II</b>	<b>MEASURING INSTRUMENT AND ENERGY CALCULATION</b>				<b>10</b>
Measuring Instruments – Analog and Digital meters – Types and usage. AC and DC Machines & Equipment- Types, Specifications and applications. Loads – Types of Loads- Power rating and Energy calculation – for domestic loads. Energy Efficient equipments – star ratings.					
<b>UNIT – III</b>	<b>ELECTRICAL SAFETY AND INTRODUCTION TO POWER SYSTEM</b>				<b>10</b>
Protection & Safety - Hazards of electricity - shock, burns, arc-blast, Thermal Radiation, explosions, fires, effects of electricity on the human body. Electrical safety practices, Protection devices. Electric Power- Generation resources, Transmission types & Distribution system (levels of voltage, power ratings and statistics) - Simple layout of generation, transmission and distribution of power.					
<b>TEXT BOOKS:</b>					
1. R.K.Rajput , “Basic Electrical and Electronics engineering”, Second Edition, Laxmi Publication, 2012. 2. “Basic Electrical and Electronics Engineering”, Department of EEE & ECE, Faculty of Engineering & Technology, VMRFDU, Anuradha Agencies, 2017. 3. Kothari.D.P and Nagrath.I.J, “Basic Electrical Engineering”, Second Edition, Tata McGraw - Hill, 2009. 4. Metha.V.K, Rohit Metha, “Basic Electrical Engineering”, Fifth Edition, Chand. S & Co, 2012.					
<b>REFERENCE:</b>					
1. Smarajt Ghosh, “Fundamentals of Electrical & Electronics Engineering”, Second Edition, PHI Learning, 2007.					

<b>COURSE CODE :</b>												
<b>NAME OF THE COURSE : BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING</b>												
<b>PART A - BASIC ELECTRICAL ENGINEERING</b>												
<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING</b>										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	K
		√				√						
2	Mapping of instructional objectives with student outcome	1 -3				1						
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

COURSE CODE	SEMESTER – II				
	NAME OF THE COURSE : <b>BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING</b>	L	T	P	C
	<b>PART B - BASIC ELECTRONICS ENGINEERING</b>				
	TOTAL HOURS : <b>30</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>
	PREREQUISITE : <b>NIL</b>				
<b>PURPOSE:</b>					
Basic information on how to use electronic components and explains the logic behind solid state circuit design. Starting with an introduction to semiconductor physics, the tutorial moves on to cover topics such as resistors, capacitors, inductors, transformers, diodes, and transistors.					
<b>INSTRUCTIONAL OBJECTIVES:</b>					
1.	Acquire knowledge in real life applications.				
2.	Fundamentals of semiconductor devices and transducers.				
3.	Principles of digital electronics.				
4.	Principles of various communication systems.				
5.	Knowledge on electronic components and communication engineering concepts.				
<b>UNIT – I SEMICONDUCTOR DEVICES 10</b>					
Passive and Active Components - Resistors, Inductors, Capacitors, Characteristics of PN Junction Diode - Zener Diode and its Characteristics - Half wave and Full wave Rectifiers - Voltage Regulation. Bipolar Junction Transistor, JFET, MOSFET & UJT.					
<b>UNIT – II DIGITAL FUNDAMENTALS 10</b>					
Number Systems – Binary, Octal, Decimal and Hexa-Decimal – Conversion from one to another – Logic Gates – AND, OR, NOT, XOR, Universal Gates – Adders, Multiplexer, De Multiplexer, Encoder, Decoder – Memories					
<b>UNIT – III COMMUNICATION AND ADVANCED GADGETS 10</b>					
Modulation and Demodulation – AM, FM, PM – RADAR – Satellite Communication – Mobile Communication, LED, HD, UHD, OLED, HDR & Beyond, Smart Phones – Block diagrams Only.					
<b>TEXT BOOKS:</b>					
1. R.K. Rajput, "Basic Electrical and Electronics Engineering", Laxmi Publications, Second Edition, 2012.					
2. "Basic Electrical and Electronics Engineering", Department of EEE & ECE, Faculty of Engineering & Technology, VMRFDU, Anuradha Agencies, 2017.					
3. Edward Hughes, "Electrical and Electronics Technology", Pearson Education Limited, Ninth Edition, 2005.					
<b>REFERENCE:</b>					
1. John Kennedy "Electronics Communication System", Tata McGraw Hill, 2003.					

<b>COURSE CODE :</b>												
<b>NAME OF THE COURSE : BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING PART B - BASIC ELECTRONICS ENGINEERING</b>												
<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING</b>										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√	√	√	√	√						
2	Mapping of instructional objectives with student outcome	3,4	1	2	5	3,4						
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

<b>COURSE CODE</b>	<b>SEMESTER – II</b>									
	<b>NAME OF THE COURSE : PROGRAMMING IN PYTHON LAB</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>TOTAL HOURS : 60</b>						<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
	<b>PREREQUISITE : NIL</b>									
<b>PURPOSE:</b>										
This course will help the students to gain the in-depth knowledge in Python Programming.										
<b>INSTRUCTIONAL OBJECTIVES:</b>										
1.	To understand Control Structures.									
2.	To understand Concept of Arrays.									
3.	To implement Functions and files.									
<b>LIST OF EXPERIMENTS:</b>										
1. Write a Program to sum the series of N numbers. 2. Write a Program to calculate Simple Interest. 3. Write a Program to generate Fibonacci Series using for loop. 4. Write a program to calculate factorial using while loop. 5. Write a Program to a) Find the greatest of three numbers using if condition. b) Find the greatest of three numbers using conditional operator. 6. Write a program for finding the roots of a given quadratic equation using conditional control statements. 7. Write a program to compute matrix multiplication using the concept of arrays. 8. Write a program to compute matrix multiplication using the concept of arrays. 9. Write a program to implement recursive function. 10. Write a program to read and write data using file concepts.										
<b>REFERENCE:</b>										
1. Laboratory Reference Manual.										

<b>COURSE CODE :</b>												
<b>NAME OF THE COURSE: PROGRAMMING IN PYTHON LAB</b>												
<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING</b>										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√				√						√
2	Mapping of instructional objectives with student outcome	1-5				1-5						1-5
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

COURSE CODE	SEMESTER – II							
	NAME OF THE COURSE: <b>ENGINEERING GRAPHICS</b> (Theory + Practice)				L	T	P	C
	TOTAL HOURS : <b>60</b>				<b>1</b>	<b>0</b>	<b>4</b>	<b>3</b>
	PREREQUISITE : <b>NIL</b>							
<b>PURPOSE:</b>								
The aim of the subject is to provide knowledge of fundamentals of mechanical Engineering.								
<b>INSTRUCTIONAL OBJECTIVES:</b>								
1.	To know about different types of lines and curves and represent letters and numbers in drawing sheets.							
2.	To know projection of points, straight lines.							
3.	To know projection of various solids.							
4.	To know about the section of solids and development of different types of surfaces.							
5.	To know about isometric projection and different angle of projection.							
<b>UNIT – I</b>								
<b>PLANE CURVES AND FREE HAND SKETCHING</b>								<b>9</b>
Conics – Construction of ellipse– First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.								
<b>UNIT – II</b>								
<b>AUTOMOTIVE ENGINES AND COMPONENTS</b>								<b>9</b>
Projection of points, Projection of straight lines located in the first quadrant: inclined to both planes – Determination of true lengths and true inclinations – rotating line method only.								
<b>UNIT – III</b>								
<b>PROJECTION OF SOLIDS</b>								<b>9</b>
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to any one reference plane by change of position method.								
<b>UNIT – IV</b>								
<b>SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES</b>								<b>9</b>
Sectioning of above solids in simple vertical position by cutting planes inclined to any one reference plane and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids like Prisms, pyramids, cylinders and cones.								
<b>UNIT – V</b>								
<b>ISOMETRIC VIEW AND PERSPECTIVE PROJECTION</b>								<b>9</b>
Principles of isometric View – isometric scale – isometric view of simple solids – Introduction to Perspective projection.								
<b>TEXT BOOKS:</b>								
1. N.D. Bhatt, “Engineering Drawing” Charotar Publishing House, 46 <sup>th</sup> Edition, (2003). 2. K. V. Natarajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai (2006).								
<b>REFERENCES:</b>								
1. M.S. Kumar, “Engineering Graphics”, D.D. Publications, (2007). 2. K. Venugopal & V. Prabhu Raja, “Engineering Graphics”, New Age International (P) Limited. 3. M.B. Shah and B.C. Rana, “Engineering Drawing”, Pearson Education (2005). 4. K. R. Gopalakrishnana, “Engineering Drawing”, (Vol.I & II), Subhas Publications (1998).								

**COURSE CODE:**

**NAME OF THE COURSE : ENGINEERING GRAPHICS (Theory + Practice)**

**COURSE DESIGNED BY**

**DEPARTMENT OF MECHANICAL ENGINEERING**

		a	b	c	d	e	f	g	h	i	j	k
1	Student Outcomes	√		√								√
2	Mapping of instructional objectives with student outcome	1-5		1-5								1-5
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								



<b>COURSE CODE</b>	<b>SEMESTER – II</b>									
	<b>NAME OF THE COURSE : AUTOMOTIVE ENGINE COMPONENTS LAB</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>TOTAL HOURS: 60</b>						<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>
	<b>PREREQUISITE: NIL</b>									

**PURPOSE:**

The student will undergo training in the dismantling and assembly of engine components and acquire knowledge to modify them according to the need.

**INSTRUCTIONAL OBJECTIVES:**

- |    |   |
|----|---|
| 1. | To understand the dismantling of single and multi cylinder engines. |
| 2. | To understand the assembly of single and multi cylinder engines.    |
| 3. | To study the engine accessories and their functions.                |

**LIST OF EXPERIMENTS**

1. Dismantling and Assembling of single cylinder petrol engine.
2. Dismantling and Assembling of multi cylinder petrol engine.
3. Dismantling and Assembling of single cylinder diesel engine.
4. Dismantling and Assembling of multi cylinder diesel engine.
5. Dismantling and Assembling of cam shaft, timing gear.
6. Dismantling and Assembling of valve mechanism, and adjusting valve timing, valve clearance.
7. Dismantling and Assembling of fuel filter, fuel injection system, carburetor.
8. Removing and servicing of cooling system components.
9. Removing and servicing of lubrication system.
10. Removing and servicing of oil pump and oil filter.

**REFERENCE:**

1. Automotive Engine Components Lab Manual

**COURSE CODE:**

**NAME OF THE COURSE : AUTOMOTIVE ENGINE COMPONENTS LAB**

<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF AUTOMOBILE ENGINEERING</b>										
		a	b	c	d	e	f	g	h	i	j	k
1	Student Outcomes		√	√	√							√
2	Mapping of instructional objectives with student outcome		1-3	1-3	1-3							1-3
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
					√							

<b>COURSE CODE</b>	<b>SEMESTER – II</b>									
	<b>NAME OF THE COURSE : ENGINEERING SKILLS PRACTICE LAB</b>						<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>PART A – BASIC ELECTRICAL ENGINEERING LAB</b>									
	<b>TOTAL HOURS : 30</b>						<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>
<b>PREREQUISITE : NIL</b>										

**PURPOSE:**

To provide exposure to the students with hands on experience on various electrical engineering practices.

**INSTRUCTIONAL OBJECTIVES:**

1.	Learn the residential wiring and various types of wiring.
2.	Measure the various electrical quantities.
3.	Gain knowledge about the fundamentals of various electrical gadgets, their working and trouble shooting.
4.	Know the necessity and types of earthing and measurement of earth resistance.

**LIST OF EXPERIMENTS:**

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair case wiring.
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of electrical equipment.

**REFERENCE:**

Laboratory Reference Manual.

**COURSE CODE :**

**NAME OF THE COURSE : ENGINEERING SKILLS PRACTICE LAB**

**PART A - BASIC ELECTRICAL ENGINEERING LAB**

<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING</b>										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√	√		√							
2	Mapping of instructional objectives with student outcome	1-4	1-4		1-4							
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

<b>COURSE CODE</b>	<b>SEMESTER – II</b>								
	<b>NAME OF THE COURSE : ENGINEERING SKILLS PRACTICE LAB PART B - BASIC ELECTRONICS ENGINEERING LAB</b>					<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	Total Hours : <b>30</b>					<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>
	Prerequisite : <b>NIL</b>								

**PURPOSE:**

The aim of this course is to impart fundamental hands-on skill in carrying out experiments at higher semester practical courses.

**INSTRUCTIONAL OBJECTIVES:**

1.	To familiarize the electronic components and basic electronic instruments.
2.	To analyze characteristics of Diodes, BJT and FET.
3.	To analyze the principles of digital logic gates.
4.	To understand the concept of basic modulation techniques.
5.	To Understand specifications of basic electronic components.

**LIST OF EXPERIMENTS:**

1. Identifying Electronics Components.
2. Practicing of Soldering and Desoldering.
3. Characteristics of PN junction Diode.
4. Characteristics of Zener diode.
5. Input & Output characteristics of BJT.
6. Transfer characteristics of JFET.
7. Verification of Logic Gates.
8. Study of Amplitude Modulation.
9. Study of Frequency Modulation.

**REFERENCE:**

Laboratory Reference Manual

<b>COURSE CODE:</b>												
<b>NAME OF THE COURSE: ENGINEERING SKILLS PRACTICE LAB PART B - BASIC ELECTRONICS ENGINEERING LAB</b>												
<b>COURSE DESIGNED BY</b>			<b>DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING</b>									
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
			√		√							
2	Mapping of instructional objectives with student outcome		2,3, 4,5		1							
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

<b>CATEGORY :</b>			
HSS	HUMANITIES AND SOCIAL SCIENCES	CC	CORE COURSES
BS	BASIC SCIENCES	EC	ELECTIVE COURSES
ES	ENGINEERING SCIENCES	EEC	EMPLOYABILITY ENHANCEMENT COURSES + EXTRA CURRICULAR COURSES + CO - CURRICULAR COURSES
PII	PROJECT + INTERNSHIP + INDUSTRY ELECTIVES		

<b>STUDENT OUTCOMES :</b>	
<b>a.</b>	An ability to apply knowledge of Mathematics, Science and Engineering.
<b>b.</b>	An ability to design and conduct experiments, as well as to analyze and interpret data.
<b>c.</b>	An ability to design a system, component, or process to meet desired needs within realistic constraints such as Economic, Environmental, Social, Political, Ethical, Health and Safety, Manufacturability and Sustainability.
<b>d.</b>	An ability to function on Multi Disciplinary Teams.
<b>e.</b>	An ability to identify, formulate and solve Engineering Problems.
<b>f.</b>	An understanding of professional and Ethical Responsibility.
<b>g.</b>	An ability to Communicate Effectively.
<b>h.</b>	The broad education necessary to understand the impact of Engineering Solutions in Global, Economic, Environmental and Social Context.
<b>i.</b>	A recognition of the need for, and an ability to engage in Life-Long Learning.
<b>j.</b>	A knowledge of contemporary issues.
<b>k.</b>	An ability to use the Techniques, Skills and Modern Engineering Tools necessary for Engineering Practice.